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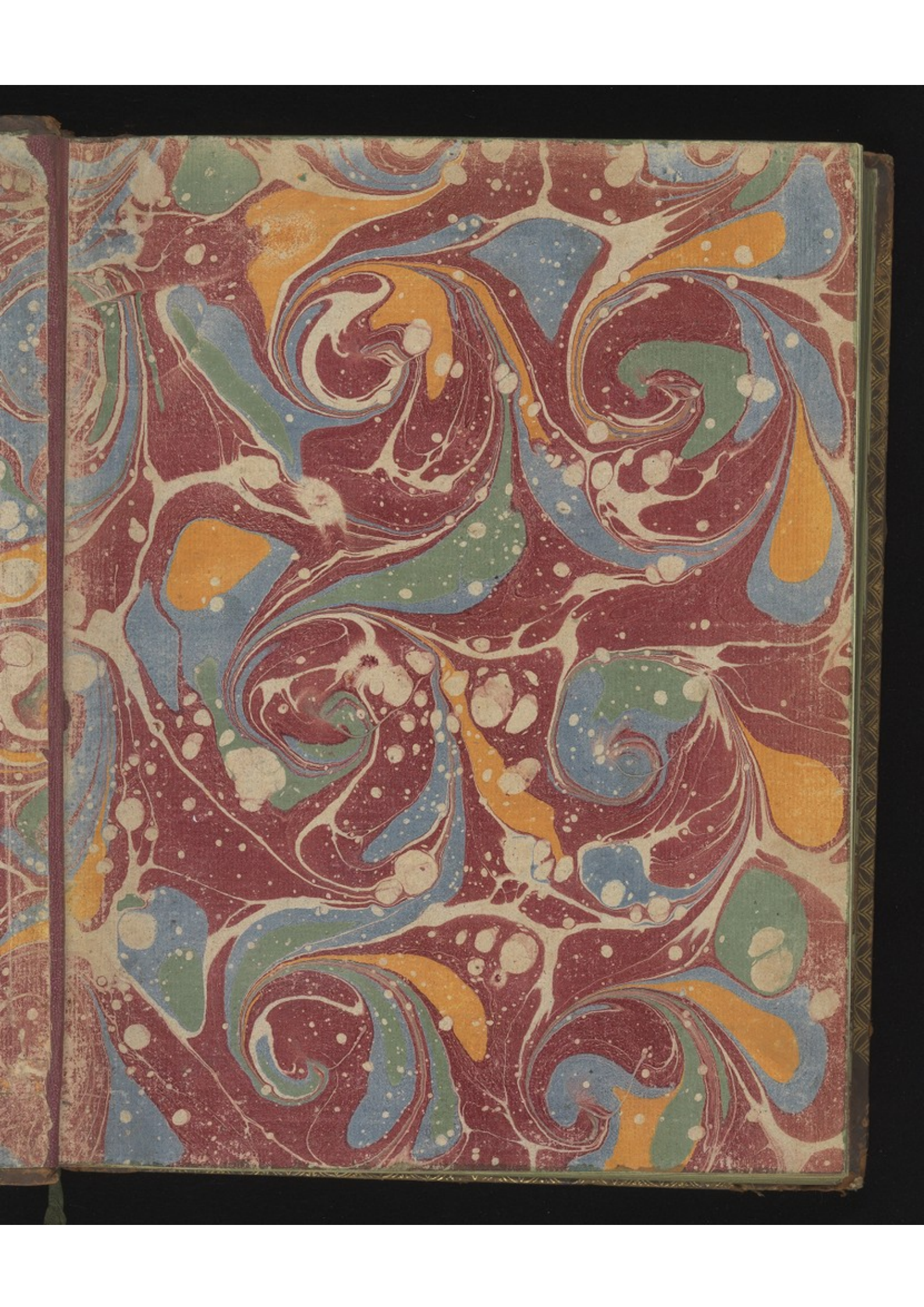

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Vice-Comes S.^ti Albani Baro Verulamii
Magnus Angliæ Cancellarius.
Geo. Virtue Sculpsit. 1728.

88077.

THE

WORKS

OF

FRANCIS BACON,

BARON OF VERULAM,

VISCOUNT St. ALBAN,

AND

Lord High Chancellor of England.

IN FIVE VOLUMES.

VOL. I.

LONDON:
Printed for A. MILLAR, in the Strand.
MDCCLXV.

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TO

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CHARLES YORKE,

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OF THE LORD CHANCELLOR BACON

WERE FIRST PUBLISHED,

THIS EDITION OF THE INTIRE WORKS

OF THE GREAT AUTHOR

IS,

WITH PROPRIETY, AS WELL AS GRATITUDE AND ESTEEM,

INSCRIBED BY

THE EDITOR.

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AS the preſent Edition of Lord Bacon's Works may claim to be more correct and complete, and nearer to a ſtandard one, than even the laſt, it may be requiſite to acquaint the Reader what Advantages it has to juſtify ſuch a Pretenſion.

Theſe are chiefly owing to two Gentlemen, now deceaſed, Robert Stephens, Eſq; Hiſtoriographer Royal, and John Locker, Eſq; Fellow of the Society of Antiquaries; both of whom had made a particular Study of Lord Bacon's Writings, and a great Object of their Induſtry the correcting from original or authentic Manuſcripts, and the earlieſt and beſt Editions, whatever of his Works had been already publiſhed, and adding to them ſuch, as could be recovered, that had never ſeen the Light.

Mr. Stephens dying in November, 1732, his Papers came into the Hands of Mr. Locker, whoſe Death, on the 30th of May 1760, prevented the World from enjoying the Fruits of his Labours, tho' he had actually finiſhed his Correction of the fourth Volume of Mr. Blackburne's Edition, containing the Law-Tracts, Letters, &c. After his Deceaſe his Collections, including thoſe of Mr. Stephens's, were purchaſed by Dr. Birch; the Uſe of which he is glad of this Opportunity of giving to the Public.

With regard to the Letters formerly printed of Lord Bacon, the ſeveral Books or Manuſcripts, from which they were taken, are reſpectively marked, and the Collection publiſhed by Dr. Birch in 1763 in octavo, with ſome conſiderable Additions by him, is added.

The

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The Diſpoſition of the ſeveral Pieces in the laſt Edition is preſerved in the preſent. The Engliſh are arranged in the following Order: 1. Philoſophical: 2. Moral and Political: 3. Law: 4. Theological: 5. Letters. The Latin Pieces are ſeparated from the reſt, and placed in the Order pointed out by the Author himſelf, preſenting at one View the ſeveral Parts of his admirable Plan for the great Inſtauration of the Sciences.

LONDON, May 4th, 1765.

CONTENTS

OF THE

FIRST VOLUME.

PHILOSOPHICAL WORKS.

Of the PROFICIENCE and ADVANCEMENT of LEARNING, divine and human.

BOOK I.

THE Objections against Learning considered Page 3

The Objections of Divines, ibid.

The objections of Politicians, 5

Objections drawn from the Fortune, Manners, or Studies of Learned Men, 9

The Diseases of Learning, 14

The Dignity of Learning shewn, 22

BOOK II.

Public Obstacles to Learning considered, 39

The Distribution of Knowledge into particular Sciences, 42

Knowledge divided, according to Man's three principal Faculties, into, I. HISTORY, *which relates to Memory.* II. POESY, *which flows from the Imagination.* III. PHILOSOPHY, *which is the Produce of Reasoning,* 42

HISTORY *divided into,* 1. *Natural.* 2. *Civil.* ibid.

Natural History is of three sorts, 1. *The History of Generations.* 2. *Of Preter-generations.* 3. *Of Arts,* 43

Civil History divided into, 1. *Memoirs.* 2. *Just History.* 3. *Antiquities,* 44

Just History divided into Chronicles, Lives, and Narratives or Relations, 45

History divided also into Annals and Journals, 47

History Ecclesiastical divided into, the History of the Church; the History of Prophesy; and the History of Providence, 49

Appendices to History: Speeches, Letters, Apophthegms, ibid.

POETRY *divided into,* 1. *Narrative.* 2. *Dramatical.* 3. *Parabolical,* 50

PHILOSOPHY *divided into three Branches,* 1. *Divine.* 2. *Natural.* 3 *Human,* 52

The Trunk of all, a primitive or summary Philosophy, ibid.

Divine Philosophy, or natural Theology, relates to the Being and Attributes of God; and the Nature of Angels or Spirits, 52

Natural Philosophy, divided into Speculative and Practical, 55

Speculative Philosophy, or natural Science, divided into Physics and Metaphysics, ibid.

Physics divided into, 1. *The Doctrine of the Principles of things.* 2. *The Doctrine of the Formation of Things, or the World.* 3. *The Doctrine concerning the Variety of Things,* 57

Metaphysics divided into, 1. *The Doctrine of Forms.* 2. *The doctrine of final Causes,* ibid.

Mathematics divided into, 1. *Pure.* 2. *Mixed,* 60

Pure Mathematics divided into Geometry and Arithmetic, ibid.

Mixed Mathematics divided into Perspective, Music, Astronomy, Cosmography, Architecture, Enginery, &c. 51

Practical Philosophy, or natural Prudence, divided into Mechanics and Magic, ibid.

Human Philosophy has two parts, human and civil, 64

Human Doctrine divided into; 1. *The doctrine of the human Body.* 2. *The Doctrine of the human Soul,* 64

The Doctrine of the Union of Soul and Body divided into, 1. *The Doctrine of Notices.* 2. *The Doctrine of Impression,* 65

The Doctrine of the human Body divided into, 1. *Medicine.* 2. *Cosmetics.* 3. *Athletics.* 4. *Arts of Elegance,* 66

The Doctrine of the human Soul divided into, 1. *The Doctrine of the Nature of the Soul.* 2. *The Doctrine of the Faculties of the Soul,* 71

Appendices to the Doctrine of the Soul. 1. *Divination.* 2. *Fascination,* 71, 72

The

CONTENTS.

The Doctrine of the Faculties of the Soul divided into, 1. Logics. 2. Ethics, 73, 74
The intellectual Arts are four, 1. The art of inquiry or invention. 2. The art of Examination. 3. The art of custody or Memory. 4. The art of elocution or tradition, 73, 74
Ethics divided into, 1. The doctrine of the image of good. 2. The georgics or cultivation of the mind, 92
Good divided into simple and compound; private good, and the good of society, 92, 93
The cultivation of the mind regards, 1. Different dispositions. 2. Affections. 3. Remedies. 98—104
Civil doctrine divided into three kinds of doctrine or prudence. 1. Prudence in conversation. 2. Prudence in business. 3. Prudence in government, ibid.

Sylva Sylvarum; or a NATURAL HISTORY, in ten Centuries.

CENTURY I.

Of straining or percolation, outward and inward, 137
Of motion upon pressure, 138
Of separations of bodies liquid, by weight, 139
Of infusions, in water and air, 140
Of the appetite of continuation in liquids, 141
Of artificial springs, 142
Of the venomous quality of man's flesh, ibid.
Of turning air into water, ibid.
Of helping or altering the shape of the body, 143
Of condensing of air, to yield weight or nourishment, ibid.
Of flame and air commixed, 144
Of the secret nature of flame, 145
Of flame, in the midst, and on the sides, ibid.
Of motion of gravity, ibid.
Of contraction of bodies in bulk, 146
Of making vines more fruitful, ibid.
Of the several operations of purging medicines, ibid.
Of meats and drinks most nourishing, 148
Of medicines applied in order, 152
Of cure by custom, 153
Of cure by excess, ibid.
Of cure by motion of consent, ibid.
Of cure of diseases contrary to predisposition, ibid.
Of preparation before and after purging, 154
Of stanching blood, 154
Of change of aliments and medicines, 155
Of diets, ibid.
Of production of cold, ibid.
Of turning air into water, 156
Of induration of bodies, 158
Of preying of air upon water, 160
Of the force of union, ibid.
Of making feathers and hairs of divers colours, ibid.
Of nourishment of young creatures in the egg, or womb, 161
Of sympathy and antipathy, ibid.
Of the spirits, or pneumaticals in bodies, 162
Of the power of heat, 163
Of impossibility of annihilation, ibid.

CENTURY II.

Of musc, 165
Of the nullity and entity of sounds, 168
Of production, conversation, and delation of sounds, 170
Of magnitude, exility, and damps of sounds, 173
Of loudness and softness of sounds, 176
Of communication of sounds, 177
Of equality and inequality of sounds, ibid.
Of more treble and base tones, 178
Of proportion of treble and base, 179
Of exterior and interior sounds, 180
Of articulation of sounds, 181

CENTURY III.

Of the lines in which sounds move, 183
Of the lasting or perishing of sounds, 184
Of the passage in intercception of sounds, 185
Of the medium of sounds, ibid.
Of the figures of bodies yielding sounds, 186
Of mixture of sounds, 187
Of melioration of sounds, 188
Of imitation of sounds, 189
Of reflection of sounds, 190
Of consent and dissent between audibles and visibles, 192
Of sympathy and antipathy of sounds. 194
Of hindering or helping of hearing, ibid.
Of the spiritual and fine nature of sounds, 196
Of orient colours in dissolutions of metals, 197
Of prolongation of life, ibid.
Of the appetite of union in bodies, ibid.
Of the like operations of heat and time, 198
Of the differing operations of fire and time, ibid.
Of motions by imitation, ibid.
Of infectious diseases, ibid.
Of the incorporation of powders and liquors, ibid.
Of exercise of the body, and the benefits or evils thereof, 199
Of meats soon glutting, or not glutting, ibid.

CENTURY IV.

Of clarification of liquors, and the acceleration thereof, 200
Of maturation, and the accelerating thereof; and of the maturation of drinks and fruits, 202
Of making gold, 204
Of the several natures of gold, 205
Of inducing and accelerating putrefaction, ibid.
Of prohibiting and preventing putrefaction, 207
Of rotten wood shining, 209
Of acceleration of birth, ibid.
Of acceleration of growth and stature, 210
Of bodies sulphureous and mercurial, ibid.

Of

Of the chameleon, 211
Of subterrany fires, 212
Of nitrous water, ibid.
Of congealing of air, ibid.
Of congealing of water into cryſtal, ibid.
Of preſerving the ſmell and colour in roſe leaves, 213
Of the laſting of flame, ibid.
Of infuſions or burials of divers bodies in earth, 215
Of the affects of mens bodies from ſeveral winds, 216
Of winter and ſummer ſickneſſes, ibid.
Of peſtilential years, ibid.
Of epidemical diſeaſes, ibid.
Of preſervation of liquors in wells, or deep vaults, 217
Of ſlutting, ibid.
Of ſweet ſmel's, ibid.
Of the goodneſs and choice of waters, 218
Of temperate heats under the æquinoctial, 219
Of the coloration of black and tawny moors, ibid.
Of motion after the inſtant of death, ibid.

CENTURY V.

Of accelerating or haſtening forward germination, 221
Of retarding or putting back germination, 223
Of meliorating, or making better, fruits and plants, ibid.
Of compound fruits and flowers, 231
Of ſympathy and antipathy of plants, 232
Of making herbs and fruits medicinable, 236

CENTURY VI.

Of curioſities about fruits and plants, 238
Of the degenerating of plants, and of their tranſmutation one into another, 241
Of the procerity and lowneſs of plants, and of artificial dwarfing them, 243
Of the rudiments of plants, and of the excreſcences of plants, or ſuper-plants, 244
Of producing perfect plants without ſeed, 247
Of foreign plants, ibid.
Of the ſeaſons of ſeveral plants, 249
Of the laſting of plants, 250
Of ſeveral figures of plants, 251
Of ſome principal differences in plants, 252
Of all manner of compoſts and helps for ground, 253

CENTURY VII.

Of the affinities and differences between plants, and bodies inanimate, 255
Of affinities and differences between plants and living creatures, and of the confiners and participles of both, 256
Of plants experiments promiſcuous, 257
Of the healing of wounds, 268
Of fat diffuſed in fleſh, ibid.
Of ripening drink ſpeedily, ibid.
Of piloſity and plumage, ibid.
Of the quickneſs of motion in birds, 269
Of the clearneſs of the ſea, the north wind blowing, ibid.
Of the different heats of fire and boiling water, ibid.
Of the qualification of heat by moiſture, ibid.
Of yawning, 270
Of the hiccough, ibid.
Of ſneezing, 270
Of the tenderneſs of the teeth, ibid.
Of the tongue, 271
Of the mouth out of taſte, ibid.
Of ſome prognoſtics of peſtilential ſeaſons, ibid.
Of ſpecial ſimples for medicines, ibid.
Of Venus, 272
Of the inſecta, or creatures bred of putrefaction, ibid.
Of leaping, 257
Of the pleaſures and diſpleaſures of hearing, and of the other ſenſes, ibid.

CENTURY VIII.

Of veins of earth medicinal, 276
Of ſponges, ibid.
Of ſea fiſh in freſh waters, ibid.
Of attraction by ſimilitude of ſubſtance, ibid.
Of certain drinks in Turky, 277
Of ſweat, ibid.
Of the glow-worm, 278
Of the impreſſions upon the body, from ſeveral paſſions of the mind, ibid.
Of drunkenneſs, 281
Of the hurt or help of wine, taken moderately, ibid.
Of caterpillers, 282
Of the flies cantharides, ibid.
Of laſſitude, ibid.
Of caſting the ſkin, and ſhell, in ſome creatures, 283
Of the poſtures of the body, ibid.
Of peſtilential years, ibid.
Of ſome prognoſtics of hard winters, ibid.
Of certain medicines that condenſe and relieve the ſpirits, 284
Of paintings of the body, ibid.
Of the uſe of bathing and anointing, ibid.
Of chambletting of paper, 285
Of cuttle ink, ibid.
Of earth increaſing in weight, ibid.
Of ſleep, ibid.
Of teeth, and hard ſubſtances in the bodies of living creatures, 286
Of the generation, and bearing of living creatures in the womb, 288
Of ſpecies viſible 289
Of impulſion and percuſſion, ibid.
Of titillation, 290
Of ſcarcity of rain in Egypt, ibid.
Of clarification, ibid.
Of plants without leaves, 291
Of the materials of glaſs, ibid.
Of prohibition of putrefaction, and the long conſervation of bodies, ibid.
Of abundance of nitre in certain ſea-ſhores, 292
Of bodies born up by water, ibid.
Of fuel conſuming little or nothing, ibid.
Of cheap fuel, 293
Of gathering of wind for freſhneſs, ibid.
Of trials of air, ibid.
Of increaſing milk in milch beaſts, ibid.

CONTENTS.

Of ſand of the nature of glaſs, 293
Of the growth of coral, 294
Of the gathering of manna, ibid.
Of the correcting of wines, ibid.
Of bitumen, one of the materials of wildfire, ibid.
Of plaſter growing as hard as marble, 295
Of the cure of ſome ulcers and hurts, ibid.
Of the healthfulneſs or unhealthfulneſs of the ſouthern wind, ibid.
Of wounds made with froſt, and with iron, ibid.
Of mortification by cold, ibid.
Of weight, 296
Of ſupernatation of bodies, ibid.
Of the flying of unequal bodies in the air, ibid.
Of water, that it may be the medium of ſounds, ibid.
Of the flight of the ſpirits upon odious objects, 297
Of the ſuper-reflection of echos, ibid.
Of the force of imagination imitating that of the ſenſe, ibid.
Of preſervation of bodies, ibid.
Of the growth, or multiplying of metals, 298
Of the drowning the more baſe metal in the more precious, ibid.
Of fixation of bodies, ibid.
Of the reſtleſs nature of things in themſelves, and their deſire to change, 299

CENTURY IX.

Of perception in bodies inſenſible, tending to natural divination and ſubtile trials, 300
Of the cauſes of appetite in the ſtomach, 304
Of ſweetneſs of odour from the rainbow, ibid.
Of ſweet ſmells, 305
Of the corporeal ſubſtance of ſmells, ibid.
Of fetid and fragrant odours, ibid.
Of the cauſes of putrefaction, 306
Of bodies imperfectly mixt, 307
Of concoction and crudity, ibid.
Of alterations, which may be called majors, ibid.
Of bodies liqueſiable, and not liqueſiable, 308
Of bodies fragile and tough, ibid.
Of the two kinds of pneumaticals in bodies, 309
Of concretion and diſſolution of bodies, ibid.
Of bodies hard and ſoft, ibid.
Of ductile and tenſile, 310
Of ſeveral paſſions of matter, and characters of bodies, ibid.
Of induration by ſympathy, ibid.
Of honey and ſugar, 311
Of the finer ſort of baſe metals, ibid.
Of certain cements and quarries, ibid.
Of the altering of colours in hairs and feathers, ibid.
Of the difference of living creatures, male and female, 312
Of the comparative magnitude of living creatures, ibid.
Of producing fruit without core or ſtone, ibid.
Of the melioration of tobacco, ibid.
Of ſeveral heats working the ſame effects, ibid.
Of ſwelling and dilatation in boiling, 314
Of the dulceration of fruits, 314
Of fleſh edible and not edible, ibid.
Of the ſalamander, 315
Of the contrary operations of time on fruits and liquors, ibid.
Of blows and bruiſes, ibid.
Of the orrice root, ibid.
Of the compreſſion of liquors, 316
Of the working of water upon air contiguous, ibid.
Of the nature of air, ibid.
Of the eyes and ſight, ibid.
Of the colour of the ſea, or other water, 318
Of ſhell-fiſh, ibid.
Of the right ſide, and the left, ibid.
Of frictions, ibid.
Of globes appearing flat at diſtance, ibid.
Of ſhadows, 319
Of the rolling and breaking of the ſeas, ibid.
Of the dulceration of ſalt water, ibid.
Of the return of ſaltneſs in pits by the ſea-ſhore, ibid.
Of attraction by ſimilitude of ſubſtance, ibid.
Of attraction, ibid.
Of heat under earth, 320.
Of flying in the air, ibid.
Of the ſcarlet dye, ibid.
Of maleficiating, ibid.
Of the riſe of liquors, or powders, by means of flame, ibid.
Of the influences of the moon, 321
Of vinegar, 322
Of creatures that ſleep all winter, ibid.
Of the generating of creatures by copulation, and by putrefaction, 323

CENTURY X.

Of the tranſmiſſion and influx of immateriate virtues, and the force of imagination, 324
Of emiſſion of ſpirits in vapour, or exhalation odour-like, 327
Of emiſſion of ſpiritual ſpecies which affect the ſenſes, 331
Of emiſſions of immateriate virtues, from the minds and the ſpirits of men, by affections, imagination, or other impreſſions, 333
Of the ſecret virtue of ſympathy and antipathy, 336
Of ſecret virtues and proprieties, 343
Of the general ſympathy of mens ſpirits, 344
New Atalantis, 347
Mr. Bacon *in praiſe of knowledge*, 370
Valerius Terminus *of the interpretation of nature: a few fragments of the firſt book*, 372
Filum Labyrinthi, ſive Formula inquiſitionis, 395
Sequela chartarum, ſive inquiſitio legitima de Calore et Frigore, 401

PHYSIOLOGICAL REMAINS.

Inquiſitions touching the compounding of metals, 407
Queſtions touching minerals, with Dr. Meverel's *ſolutions*, 411

Of

CONTENTS.

Of the compounding, incorporating, or union of metals or minerals, 411
Compound metals now in use, 413
Of the separation of metals and minerals, ibid.
Of the variation of metals into several shapes, bodies, or natures, 415
Of the restitution of metals and minerals, 418
Inquisition concerning the versions, transmutations, multiplications, and affections of bodies, 419
A speech concerning the recovering of drowned mineral works, ibid.
Experiments about weight in air and water, 421
Certain sudden thoughts of the Lord Bacon, *set down by him under the title of Experiments for profit,* 422
Experiments about the commixture of liquors only, not solids, without heat or agitation, but only by simple composition and settling, ibid.
A catalogue of bodies, attractive and not attractive, together with experimental observations about attraction, 424

MEDICAL REMAINS.

Grains of youth, 425
Preserving ointments, ibid.
A purge familiar for opening the liver, 425
Wine for the spirits, ibid.
The preparing of saffron, ibid.
Wine against adverse melancholy, preserving the senses and the reason, ibid.
Breakfast preservative against the gout and rheums, ibid.
The preparation of garlick, ibid.
The artificial preparation of damask roses for smell, 426
A restorative drink, ibid.
Against the waste of body by heat, ibid.
Methusalem water: Against all asperity and torrefaction of inward parts, and all adustion of the blood, and generally against the dryness of age, ibid.
A catalogue of astringents, openers, and cordials, 427
An extract by the lord Bacon, *for his own use, out of the book of prolongation of life, together with some new advices in order to health,* ibid.

MEDICAL RECEIPTS.

His lordship's usual receipt for the gout, 430
His lordship's broth and fomentation for the stone, ibid.
A Manus Christi for the stomach, 431
A secret for the stomach, ibid.

WORKS MORAL.

A Fragment of the colours of good and evil, 435

ESSAYS or COUNSELS CIVIL and MORAL.

1 *Of truth,* 447
2 *Of death,* 448
3 *Of unity in religion,* 449
4 *Of revenge,* 451
5 *Of adversity,* 452
6 *Of simulation and dissimulation,* ibid.
7 *Of parents and children,* 454
8 *Of marriage and single life,* 455
9 *Of envy,* 456
10 *Of love,* 458
11 *Of great place,* 459
12 *Of boldness,* 461
13 *Of goodness, and goodness of nature,* 462
14 *Of nobility,* 463
15 *Of seditions and troubles,* 464
16 *Of atheism,* 467
17 *Of superstition,* 469
18 *Of travel,* 470
19 *Of empire,* 471
20 *Of counsel,* 473
21 *Of delays,* 476
22 *Of cunning,* ibid.
23 *Of wisdom for a man's self,* 478
24 *Of innovations,* 479
25 *Of dispatch,* 480
26 *Of seeming wise,* 481
27 *Of friendship,* ibid.
28 *Of expence,* 485
29 *Of the true greatness of kingdoms and estates,* 486
30 *Of regiment of health,* 490
31 *Of suspicion,* ibid.
32 *Of discourse,* 492
33 *Of plantations,* 493
34 *Of riches,* 494
35 *Of prophesies,* 496
36 *Of ambition,* 498
37 *Of masques and triumphs,* 499
38 *Of nature in men,* 500
39 *Of custom and education,* ibid.
40 *Of fortune,* 501
41 *Of usury,* 502
42 *Of youth and age,* 504
43 *Of beauty,* 505
44 *Of deformity,* 506
45 *Of building,* ibid.
46 *Of gardens,* 509
47 *Of negotiating,* 512
48 *Of followers and friends,* 513
49 *Of suitors,* ibid.
50 *Of studies,* 514
51 *Of faction,* 515
52 *Of ceremonies and respects,* 516
53 *Of praise,* 517
54 *Of vain-glory,* 518
55 *Of honour and reputation,* 519
56 *Of judicature,* 520
57 *Of anger,* 522
58 *Of vicissitude of things,* 523
Of a king 525
A fragment of an essay on fame, 527
A COLLECTION *of* APOPHTHEGMS, *New and Old,* 529
Ornamenta Rationalia, 566
Short notes for civil conversation, 571
An essay on death, 572

THE

LIFE

OF

FRANCIS BACON,

Lord High Chancellor of ENGLAND.

THE ancient Egyptians had a law, which ordained, that the actions and characters of their dead ſhould be ſolemnly canvaſſed before certain judges; in order to regulate what was due to their memory. No quality, however exalted; no abilities, however eminent; could exempt the poſſeſſors from this laſt and impartial trial. To ingenuous minds this was a powerful incentive, in the purſuit of virtue; and a ſtrong reſtraint on the moſt abandoned, in their career of vice. Whoever undertakes to write the life of any perſon, deſerving to be remembered by poſterity, ought to look upon this law as preſcribed to him. He is fairly to record the faults as well as the good qualities, the failings as well as the perfections, of the dead; with this great view, to warn and improve the living. For this reaſon, though I ſhall dwell with pleaſure on the ſhining part of my lord Bacon's character, as a writer; I ſhall not dare either to conceal or palliate his blemiſhes, as a man. It equally concerns the public to be made acquainted with both.

Sir Nicholas Bacon was the firſt lord Keeper of the ſeals inveſted with all the dignity, and truſted with all the power, of a lord Chancellor. This high employment he held under queen Elizabeth near twenty years: a miniſter conſiderably learned, of remarkable prudence and honeſty; ſerving his country with the integrity of a good man, and preſerving, through the whole courſe of his proſperity, that moderation and plainneſs of manners which adorn a great man. His ſecond wife was a daughter of Sir Antony Cooke, who had been preceptor to Edward the ſixth, and of whom hiſtorians have made honorable mention for his ſkill in the learned languages. Neither have they forgot to celebrate this lady on the ſame account. To the truth of which even an enemy bore teſtimony, while he reproached her with having tranſlated, from the latin, biſhop Jewel's apology for the church of England. Parſons the Jeſuit.

Such were the parents of Francis Bacon, whoſe life I am writing. Of two ſons, by this marriage, he was the youngeſt: and born at York-houſe in the Strand, the
1561. twenty-ſecond of January 1561. As he had the good fortune to come into the world at a period of time when arts and ſciences were eſteemed and cultivated, by the great and powerful, almoſt in the ſame degree they are now neglected; ſo he brought with him a capacity for every kind of knowledge, uſeful and ornamental. An original genius, formed not to receive implicit notions of thinking and reaſoning from what was admitted and taught before him; but to preſcribe laws himſelf, in the empire of learning, to his own and ſucceeding ages.

He gave marks, very early, of a pregnant and happy diſpoſition, far above his years. We are told that queen Elizabeth took a particular delight in trying him with queſtions; and received ſo much ſatisfaction from the good ſenſe and manlineſs of his anſwers, that ſhe was wont to call him, in mirth, her young lord keeper. One ſaying of his deſerves to be remembered. The queen having aſked him his age, while he was yet a boy; he anſwered readily, that he was juſt two years younger than her happy reign.

Of his education I know no particulars, till he was ſent to ſtudy in the univerſity of Cambridge under Doctor Whitgift, afterwards archbiſhop of Canterbury: and I find he was entered of Trinity college in his twelfth year. The progreſs he
16th of June 1573. made was rapid and uncommon: for he had run through the whole circle of the liberal arts, as they were then taught, before he was ſixteen. But what is far more ſurpriſing; he began, even then, to ſee through the emptineſs and futility of the philoſophy in vogue: and to conjecture, that uſeful knowledge muſt be raiſed on other foundations, and built up with other materials, than had been employed through a tract of many centuries backward. In this, his own genius, aided by a ſingular diſcernment, muſt have been his only preceptor. In matters of reaſoning, the authority of Ariſtotle was ſtill acknowledged infallible in the ſchools; as much as that of the pope, in affairs of religion, had lately been acknowledged there and every where elſe. And our author may be juſtly ſtyled the firſt great reformer of philoſophy. He had the prepoſſeſſions, the voluminous and uſeleſs reading, nay he had the vanity of men grown old in contrary opinions, to ſtruggle with: yet he lived to ſee a conſiderable revolution on his ſide. Another age brought over the learned of all nations to his party.

It may be juſtly wondered at, that the lord Keeper, a miniſter of great obſervation on men and things, ſhould have ſent his ſon to travel at the age of ſixteen; as we find he did: for, by a letter from Sir Amias Powlet, then ambaſſador in France, it is certain that young Bacon was at Paris, and under his roof, in the year 1577. We need but look around us, to be convinced how little our youth of quality, who viſit foreign countries about that age, are wont to profit either in taſte, wiſdom, or morals. But perhaps he diſcovered in his ſon a maturity of diſcretion and judgment beyond what is common to that early ſeaſon of life. However that was, the ambaſſador conceived a very favourable opinion of Bacon; for he ſent him over to the queen with a commiſſion that required ſecrecy and diſpatch: of which he acquitted himſelf with applauſe, and then returned to finiſh his travels. The native bent of his mind, ſtrongly turned to reflection and inquiry, ſuffered him not to ſtop ſhort at the ſtudy of languages, but led him higher to remark accurately on the cuſtoms and manners of thoſe that ſpoke them; on the characters of their princes, and on the conſtitution of their ſeveral governments.

ments. In proof of this, there is ſtill extant among his works, a paper of obſervations on the general ſtate of Europe, written by him ſhortly after this time; as I have diſcovered by a circumſtance mentioned in it *.

He was the youngeſt ſon, and ſeems to have been the favorite of his father; who had ſet apart a conſiderable ſum of money to purchaſe an eſtate for him, in his abſence. But before that kind intention could take effect, the lord Keeper died ſuddenly, by the following accident. He was under the hands of his barber, and, the weather being warmer than uſual, had ordered a window before him to be thrown open. As he was become very corpulent, he preſently fell aſleep in the current of freſh air that was blowing in upon him; and awaked after ſome time diſtempered all over. Why, ſaid he to the ſervant, did you ſuffer me to ſleep thus expoſed? The fellow replied, that he durſt not preſume to diſturb him. Then, ſaid the lord Keeper, by your civility I loſe my life: and ſo removed into his bedchamber, where he died a few days after. Thus there remained to his youngeſt ſon only the ſmall proportion of a ſum, which was to be divided among five brothers.

The narrowneſs of his circumſtances obliged him to think of ſome profeſſion for a ſubſiſtence: and he applied himſelf more through neceſſity, than choice, to the ſtudy of the common law. For that purpoſe, he placed himſelf in the ſociety of Gray's Inn; where his ſuperior talents rendered him the ornament of the houſe: as the gentleneſs and affability of his deportment won him the affection of all its members. In his profeſſion, he quickly roſe to ſo much eminence and reputation, that, at the age of twenty eight years, he was named by Elizabeth her learned council extraordinary: a diſtinction which he needed no aſſiſtance from his father's merit with her to deſerve. It was however next to impoſſible that ſo noble a genius, born to embrace the whole compaſs of ſcience, ſhould confine its reſearches within the narrow and perplexed ſtudy of precedents and authorities; a ſtudy hedged round with brambles and thorns, dark and barbarous in its beginnings, and rendered in its progreſs ſtill more obſcure, by the learned dulneſs of commentators and compilers: men, for the moſt part, of indefatigable induſtry, and of no ſpirit or diſcernment. Accordingly we find that in this interval he often gave full ſcope to his conceptions; ſurveying the whole ſtate of learning, obſerving its defects, and imagining the proper methods to ſupply them. This he firſt attempted in a treatiſe which he intitled THE GREATEST BIRTH OF TIME; as appears from a letter written after his retirement, to father Fulgentio the Venetian, in which he paſſes a kind of cenſure on the pompous and ſwelling title prefixed to it. Though the piece itſelf is loſt, it appears to have been the firſt outlines of that amazing deſign, which he afterwards filled up and finiſhed in his grand Inſtauration of the ſciences. As there is not a more amuſing, perhaps a more uſeful ſpeculation, than that of tracing the hiſtory of the human mind, if I may ſo expreſs myſelf, in its progreſſion from truth to truth, and from diſcovery to diſcovery; the intelligent reader would doubtleſs have been pleaſed to ſee, in the tract I am ſpeaking of, by what ſteps and gradations a ſpirit like Bacon's advanced in building up, for more than thirty years together, his new and univerſal theory. He thought himſelf born for the uſe of human kind: and, in the letter above mentioned, ſtyles himſelf, the ſervant of poſterity.

* He ſays that Henry III. of France was then 30 years old: now that king began his reign in 1574, at the age of 24 years. So that Bacon was then nineteen.

Theſe few hints for filling up this firſt part of our author's life, trivial and unſatisfactory as they may appear, I have yet been obliged to glean here and there in the rubbiſh of ſeveral collections, where they lay ſcattered, without order or connection. But I ſhall now no longer regard Bacon as a mere philoſopher; as a man of ſpeculation who converſed only with books and his own thoughts, in the ſhade of retirement and leiſure. The courſe of his fortunes produced him on the great theatre of the world, involved him in buſineſs, and complicated him with the moſt conſiderable perſons of the age he lived in. He was honourably employed by one prince, and highly preferred under another. It will be therefore neceſſary, that this hiſtory may have its due extent and uſefulneſs, to exhibit a general proſpect of the two reigns in which Bacon flouriſhed and fell, at leaſt in their principal points of view. The characters of thoſe with whom he had any connection will illuſtrate his, and ſhew it in a truer, as well as a fuller light.

I have yet another reaſon for enlarging this account beyond the ordinary limits. Our author's letters are written, many of them at leaſt, on public occaſions, and may be conſidered as the moſt authentic vouchers for ſeveral remarkable occurrences, in which he himſelf was an actor, and well acquainted with the ſecret motives on which others acted. But as thoſe things are for the moſt part only hinted at, or no farther opened than to ſerve the preſent purpoſe of his letter; they will require to be developed at ſome length, and ranged into their proper places.

Elizabeth had a larger ſhare of good ſenſe and ſound judgment, than is commonly to be met with among women; accompanied with a greatneſs of mind and ſteadineſs of purpoſe that might do honor to the beſt of men. Theſe her natural endowments received much, tho' ſevere, improvement from the dangers ſhe was expoſed to in the firſt part of her life. She grew up in a ſtrict attention over her own actions, even over her looks and words, from the rigor of her father's temper, and particularly from the jealous cruelty of her ſiſter's adminiſtration: a ſhort but memorable period of time! when England beheld, under a female reign, ſuch inſtances of mercileſs rage, ſuch ſcenes of horror, as had of old ſtartled the Roman world, under a Nero and a Domitian. The dreadful genius of that ſuperſtition to which ſhe had devoted herſelf, then exerted its ſpirit undiſguiſed, in betraying, tormenting, butchering, by the miniſtry of inhuman prieſts and inquiſitors, whoever would not profeſs what he could not poſſibly believe. If we may credit hiſtorians, they had even doomed Elizabeth herſelf to die: and ſhe eſcaped, miraculouſly, not by the kindneſs, but the policy of Philip; himſelf a tyrant, the cooleſt and moſt determined of theſe latter ages.

At her acceſſion to the throne, ſhe found her revenues anticipated or exhauſted; her kingdom, through the ſanguinary madneſs of her predeceſſor, diſjointed and broken of its vigor within: at the ſame time unſupported by allies and without conſideration abroad. Her good ſenſe led her to ſee, by the errors of her father and her ſiſter, that ſhe could expect to reign with ſecurity, only by deſerving the confidence and gaining the love of the nation: and that in order thereto, ſhe muſt propoſe to herſelf no other end of ruling but the happineſs and honour of all her people. This ſyſtem of policy, ſo ſimple in itſelf, ſo glorious in its conſequences, and yet by princes ſo ſeldom purſued, ſhe adhered to ſteadily, almoſt uniformly, through a long and triumphant reign; for this very reaſon triumphant!

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The reformation of religion ſhe attempted and effected, at a ſeaſon when her power was unconfirmed and in probable danger from inteſtine commotions. For revolutions in religion are apt to put the whole conſtitution of a ſociety into ferment, even more ſtrongly than alterations in government; as every individual is immediately and intimately actuated by what ſeems to him of higheſt and moſt laſting concern. She kept awake, and animated, with wonderful addreſs, the diviſions in Scotland, in France, in the Netherlands: and that with more juſtice on her part, than is uſually obſerved by princes when they would do ill offices to their neighbours. The ſovereigns of thoſe countries, when they agreed in nothing elſe, were ever combined in a common enmity to her: at a time too when ſhe had nothing to oppoſe againſt their pretenſions, their conſpiracies, their open attacks, but her own courage and the native ſtrength of England alone. And yet, by helping forward the reformation in Scotland; by ſupporting the proteſtants in France; by the wiſe and well-managed ſupplies ſhe ſent to the Dutch, who were ſtruggling hard for their lives and liberties with an unrelenting tyrant: by this ſeries of conduct, ſteadily purſued, ſhe triumphed over all oppoſition, and rendered herſelf the arbitreſs of Europe. For it may be affirmed, that her adminiſtration made a greater impreſſion on all the ſtates round her, than it received itſelf from any: an undoubted proof of its firmneſs and active vigor.

When ſhe came to the crown, ſhe found the nation four millions in debt: a ſum then almoſt incredible! and yet her oeconomy alone enabled her to diſcharge it. The coin, which had been much embaſed by Henry the eighth, and by Mary wholly neglected, ſhe quickly reſtored to its juſt ſtandard; and therewith the public faith and credit. Her magazines ſhe carefully repleniſhed with arms, ammunition, warlike ſtores of every kind: and the youth all over England were ordered to be duly trained in military exerciſes. Her navy was fallen to decay, and almoſt abandoned. This ſhe ſet herſelf to repair with an attention, which the great bulwark of this kingdom will ever deſerve from a prince, who underſtands in what his own ſtrength and that of his dominions naturally conſiſt. Her fleet was at laſt a match for the mighty armada of Spain: that armada, which was boaſted to be invincible, and was in truth a deſperate effort of the whole power and reſentment of her bitterеſt enemy. Her victory over him, as intire as it was glorious, gave ſecurity and renown to this iſland: and, whatever the partiality of foreign writers may have inſinuated to the contrary, ſhe owed it to her own heroical conduct, and the unexampled bravery of her ſubjects.

She was the firſt of our princes who purſued, in any conſiderable degree, the only ſure method of making England great and powerful; by encouraging and extending our commerce: which, under her protection, grew high, and ſpread itſelf through the North and to both the Indies. In a word, ſuch was her conduct, ſuch her good fortune, in this iſland and on the continent, that her allies had the ſtrongeſt confidence in her aſſiſtance and good faith: that her enemies ſtood in awe of her power, and were forced to an unwilling approbation of her prudence. The applauſe of ſuch as think they have cauſe to hate, and diſtreſs us, is the ſincereſt, as it is the nobleſt praiſe. Her oeconomy was admirable. She huſbanded the public money for her people's eaſe: ſhe laid it out, on proper occaſions, for their ſafety and honor. The undertakings of the government were never greater; the charge was never leſs. This gives the higheſt idea of her miniſtry, and places their characters, in general, above imputation or reproach.

Of Sir Nicholas Bacon, our author's father, I have already given ſome account: and ſhall only add here, that he never aſpired beyond the rank he brought with him to court. His moderation in all other reſpects was the ſame. When the queen viſited him at his ſeat in Hertfordſhire, ſhe told him with an air of pleaſantry, that his houſe was too little for him. No, replied the lord Keeper; but your majeſty has made me too great for my houſe.

Walſingham, in his private character, was of unblemiſhed honeſty. As a miniſter he had ſingular ſagacity in procuring intelligence; which he knew to apply, with great dexterity, to the purpoſes of government: devoting himſelf, with ſo generous a ſelf-neglect, to the ſervice of his country, that he gained a reputation for contempt of riches, which would have been highly reverenced in the beſt times of antiquity; and will go near in theſe days, to be thought either folly or frenzy.

The lord treaſurer Burleigh, for his conſummate abilities as a ſtateſman, was reckoned the firſt name of his age: and is ſtill pointed out as a pattern, which we rather wiſh, than expect, to ſee fully copied by his ſucceſſors in power. As he had ſtrong natural parts, and was of unwearied application to buſineſs, his experience muſt have been univerſal and unequalled; for he was at the head of the government almoſt forty years. He ſeems, in particular, to have been eminently poſſeſſed of that intrepidity of head, that civil courage, ſo neceſſary in a great miniſter: and without which no miniſter will ever do any thing truly noble, or of laſting utility to mankind. Inviolably attached to his miſtreſs, he ſerved her with equal fidelity and ſucceſs: and had the ſingular felicity to promote the good of his country by the ſame arts that he employed to gratify the inclinations of his ſovereign.

The glory of this princeſs will receive a new luſtre by comparing the ſtate of England with that of almoſt all other nations in Europe, at the ſame time. It muſt have been no common addition to the tranquillity and happineſs of our anceſtors, that they enjoyed both uninterrupted, for ſuch a length of years; while Scotland and France, Spain and Holland, were torn with continual diviſions, and bleeding by the wounds of foreign and domeſtic wars. Her's too was the age of heroes both in arts and arms. Great captains, able ſtateſmen, writers of the higheſt order aroſe, and under her influence floriſhed together. Thus Bacon had all the incentives that could kindle him up to a generous ambition, and quicken his emulation in the purſuit of knowledge and honeſt fame. And indeed his letters remain a proof, that if he courted the proper opportunities of raiſing his name, he loſt none that might improve and enlarge his mind. As the lord treaſurer had married his aunt, we find him frequent in his applications to that miniſter for ſome place of credit and ſervice in the ſtate. He profeſſes too, that his views on this head are as moderate, as his aims another way are ambitious and vaſt; for that he hath taken all philoſophy for his province. My lord Burleigh intereſted himſelf ſo far on his behalf as to procure for him, againſt violent oppoſition, the office of regiſter to the Star-chamber, worth about 1600 l. a year: but it was only in reverſion, and did not fall to him till near twenty years afterwards. Neither did he obtain any other preferment all this reign: though his winning addreſs, his eloquence, his large and ſyſtematical learning had raiſed him to the admiration of the greateſt men at court. He was particularly eſteemed and patronized by Robert Devereux, the famous and unfortunate earl of Eſſex; to whom he attached himſelf in his younger years, and by whoſe intereſt in the queen he flattered himſelf with the proſpect of bettering his condition. Elizabeth herſelf ſhewed him ſeveral marks of diſtinction, admitted him

Bacon, Vol. III. Letter vii.

him often to her preſence, and even conſulted him on the ſtate of her affairs: as her miniſters ſometimes made uſe of his pen in the vindication of her government. And yet, notwithſtanding theſe fair appearances, he met with no preferment from that queen anſwerable to the idea we have of his merit, or her diſcernment in the diſtribution of favors. This deſerves ſome explanation; as it will diſcover to us the true genius of thoſe miniſters, who, pretending to merit themſelves, are jealous of it in all other men: who are equally poor-ſpirited and aſpiring.

The whole court was at this time rent into factions, headed on one part by the earl of Eſſex; on the other by the Cecils, father and ſon. Eſſex was then in all the flower of his youth, and remarkable for the gracefulneſs of his perſon. In his nature brave, ambitious, popular: and what is uncommon, at once the favourite of the ſovereign and of the nation. Fond of military glory; liberal to profuſion; devoted intirely to his friends, and keeping no meaſures with his enemies; of competent learning himſelf, and a ſignal benefactor to learned men. One quality he had, which diſtinguiſhes him eminently from ſuch as are perſonally beloved by princes: in the height of his favor he received the admonitions, the remonſtrances of his friends with all gentleneſs; and was ever moſt patient of the truth. But then he wanted thoſe arts which are moſt neceſſary in a courtier; and are indeed the only qualities which the rabble of courtiers value themſelves upon; circumſpection, cunning, affectation of ſecrecy, with a ſervile obſequiouſneſs to the humours of their ſuperiors, and a mean but anxious attention to their own intereſt, whether at the expence of their patrons, or of their country. A different turn of mind gave the earl's enemies great advantages againſt him. They failed not to repreſent to the queen, on ſeveral occaſions, that this young lord, not ſatisfied with the diſtinction of being her favourite, pretended to be her maſter; and preſcribed to her judgment on affairs of ſtate, with a haughtineſs ill becoming the diſtance betwixt a ſovereign and the creature of her bounty. Such inſinuations, as they were partly true, could not fail of making an impreſſion on Elizabeth, who was naturally high-ſpirited, and infinitely jealous of her authority. Though ſhe had a particular fondneſs for the earl, ſhe took occaſion every now and then to mortify his pride, by refuſing to advance thoſe friends of his whom he recommended for preferment. After his return from the expedition to Cadiz, in which he had behaved himſelf with much gallantry, ſhe raiſed his enemy, Sir Robert Cecil, to be ſecretary of ſtate; tho' he had earneſtly ſolicited that poſt for another. He had often applied to her in behalf of Bacon, and aſked for him, with all the warmth of friendſhip, the place of Solicitor General, but had been always refuſed. Cecil, who mortally hated Eſſex, and had entertained a ſecret jealouſy of Bacon, on account of his ſuperior talents, repreſented the latter to the queen as a man of mere ſpeculation; as one wholly given up to philoſophical inquiries, new indeed and amuſing, but fanciful and unſolid: and therefore more likely to diſtract her affairs, than to ſerve her uſefully and with proper judgment. Bacon however was this man's couſin-german; his father and the lord Burleigh having married two ſiſters: but ambition knows neither merit nor relation. This unworthy treatment from ſo near a kinſman carried Bacon into very free expoſtulations on his courtly artifices, as he endeavoured in ſecret to cruſh the man whom yet he pretended openly to ſerve: and theſe repeated diſappointments ſunk ſo deep into his ſpirit, that he was ſeveral times on the point of retiring for ever, and even of hiding his grief and reſentment in ſome foreign country. Eſſex, who could but ill brook the mortification of a denial,

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finding himſelf unable to ſerve his friend in a public way, would needs make up the loſs to him out of his own private fortune: and if we may believe Buſhel, he beſtowed upon him about this time Twickenham-Park and its garden of Paradiſe. Whether it was that or ſome other of his lands, the donation was ſo very conſiderable, that Bacon, as himſelf acknowledges in his Apology, ſold it afterwards, even at an under price, for no leſs than eighteen hundred pounds. A bounty ſo noble, accompanied too, as we know it was, with all thoſe agreeable diſtinctions that to a mind, delicately ſenſible, are more obliging than the bounty itſelf, muſt kindle in the breaſt of a good man the moſt ardent ſentiments of gratitude, and create an inviolable attachment to ſuch a benefactor. What then are we to think of Bacon, when we find him, after this nobleman's unhappy fate, publiſhing to all England a Declaration of the treaſons of Robert earl of Eſſex? This behaviour drew upon him a heavy and general hatred at that time; which was not extinguiſhed even by his death, but continues ſtill in the writings of more than one hiſtorian, an imputation on his memory. As this tranſaction is of importance to his moral character, I will lay it before the reader as impartially as I can.

Buſhel's abridg. poſt. p. 1.

Elizabeth had raiſed that young lord, through a ſeries of honors, to be earl Mareſchal of England: and was every day giving him new proofs of a particular and uncommon eſteem. This only ſerved to exaſperate his enemies. They were powerful, and cloſely united. But as they durſt not attack him openly, they had recourſe to dark and ſurer arts of vengeance; againſt which his openneſs of temper, unſuſpecting and improvident, was no wiſe guarded. In truth, his imperious humour, which he could ſeldom diſguiſe, aided their deſigns; for it often broke forth into downright abuſe and ſcorn of thoſe who thwarted his projects, or diſſented from his opinions: and he once, in ſome diſpute with the Queen herſelf, turned his back abruptly upon her with all the marks of diſreſpect and contempt. Provoked at this inſolence, Elizabeth forgetting her ſex, and the dignity of her character, ſtruck the earl a box on the ear: which he on his part, with a meanneſs of paſſion yet leſs excuſeable in a man, reſented ſo highly as to lay his hand on his ſword, againſt a woman and his ſovereign. No ſubſequent favours could wear this imaginary affront out of his memory; though ſhe pardoned him the inſult that occaſioned it, and ſent him ſhortly after into Ireland, as her vicegerent, with a commiſſion almoſt unlimited. His conduct there has not eſcaped the cenſure of hiſtorians, who have remarked ſeverely on the unjuſtifiable treaty he made with the arch-rebel Tyrone, on the private conference they held together, and on his precipitate return to England, againſt the queen's expreſs orders. This laſt ill ſtep he was betrayed into, if we may believe Oſborn, by an artifice of Cecil: who firſt inflamed Elizabeth's ſuſpicions of the earl, and then ſtopped all veſſels that were to ſail for Ireland, except one which he ordered thither on purpoſe with a feigned report of her death. Fatally deceived by this intelligence, Eſſex ſailed away in a hurry for England, attended only by a few of his friends. The queen received him without any emotion either of anger or affection, and having confined him to his own houſe, ordered his conduct to be examined in the Star-Chamber. At this uſage of him, however gracious and moderate, the people, whoſe idol he was, loudly exclaimed: and their unſeaſonable partiality, repreſented by his adverſaries as of dangerous tendency to the ſtate, kindled anew the queen's indignation againſt him. Thus that popularity he had ſo eagerly courted, and ſo much depended upon, ſerved now only to haſten forward his deſtruction. He was ſentenced by the council to be removed

Mem. of Q. Eliz. p. 458.

moved from his place at that board; to be ſuſpended from his offices of earl Marſhal and Maſter of the ordnance, and to be impriſoned during the queen's pleaſure. Having humbled him thus far, ſhe ſtopped ſhort, forbidding his ſentence to be entered on record, and ſtill continuing him Maſter of the horſe. She even gave him the full enjoyment of his liberty, upon his expreſſing a perfect reſignation to her pleaſure; but withal adviſed him to be his own keeper. His ſeeming repentance was of ſhort duration; for upon the queen's refuſal to grant him the farm of ſweet wines, which he had very imprudently petitioned for, he returned out of the country, and again abandoned himſelf to all the impetuoſity of his temper; or rather to the pernicious ſuggeſtions of his followers. Indeed the preſumption that naturally grows out of ſucceſsful ambition, and the intereſted counſels of thoſe whoſe fortunes were involved with his, ſeem to have intirely turned his head: for his actions henceforward were the genuine effects of frenzy and deſpair. In conjunction with his friends, of ſeveral conditions, he meditated no leſs an attempt than to ſeize on the palace, to make himſelf maſter of the queen's perſon, and to baniſh from about her all thoſe whom he reputed his enemies. Never was conſpiracy ſo ill laid, or conducted with ſo little probability of ſucceſs. The court was preſently alarmed, his houſe inveſted, himſelf and his friends made priſoners, without any reſiſtance on his part; for though he was embarqued in a kind of rebellion, he knew not how to be a rebel. The particulars of his trial are foreign to my purpoſe. It was managed againſt him by Sir Edward Coke, the attorney general, and by Bacon as one of the queen's council. It ought not to be forgot that the former treated this unfortunate nobleman with a ſtrain of petulant dulneſs and ſcurrility that makes us contemn his talent as a pleader, while we abhor the purpoſe to which he made it ſubſervient. Bacon was moderate and decent. The crime was proved by a cloud of witneſſes: and the unanimous ſuffrage of his peers found him guilty. After his ſentence he appeared wholly indifferent to life or death: though the queen ſeemed ſtill irreſolute, or rather inclining to ſave him. He died with the tenderneſs of a penitent, and the firmneſs of a hero: though the marſhal de Biron jeſted on his deportment in that laſt ſcene of life, as ſuiting rather a monk than a ſoldier.

State Trials, Vol. I. p. 205.

The untimely fate of this nobleman, who died on a ſcaffold in the prime and vigor of his years, excited univerſal pity, and was murmured againſt by all conditions of people. Their reflections on the prevailing party at court, even on the queen herſelf, were ſo bold and injurious, that the adminiſtration thought it neceſſary to vindicate their conduct in a public appeal to the people. This taſk was aſſigned to Bacon, even then in high eſteem for his excellencies as a writer. Some ſay it was by his enemies inſidiouſly impoſed on him, to divert the national reſentment from themſelves upon a particular perſon, who was known to have lived in friendſhip with Eſſex, and whom they intended to ruin in the public eſteem. If ſuch was their intention, they ſucceeded but too well in it. Never man incurred more univerſal or more laſting cenſure than Bacon by this writing. He was every where traduced as one who endeavoured to murder the good name of his benefactor, after the miniſtry had deſtroyed his perſon: his life was even threatened; and he went in daily hazard of aſſaſſination. This obliged him to publiſh, in his own defence, the Apology we find among his writings. It is long and elaborate; but not, perhaps, in every part ſatisfactory. Let us believe him on his own teſtimony, that he had never done that nobleman any ill offices with the queen; though ſhe herſelf

V. A declarat. of the treaſons of Rob. earl of Eſſex. Vol. II. p. 79.

Apology, Vol. II. p. 124.

ſelf had, it ſeems, inſinuated the contrary: that on the other hand he had always, during the time of their intimacy, given him advice no leſs uſeful than ſincere; that he had wiſhed, nay endeavoured the earl's preſervation even at laſt, purely from affection to him, without any regard to his own intereſt in that endeavour: let all this be allowed; ſome blemiſh will ſtill remain on his character.

Eſſex deſerved the fate he underwent: but he had paid his debt to juſtice: and the commonwealth had now nothing to fear from any of his party. The declaration above mentioned could therefore be intended, only to ſtill the preſent clamors of the multitude; and though the matter of it might be true, Bacon was not the man who ſhould have publiſhed thoſe truths. He had been long and highly indebted to the earl's friendſhip, almoſt beyond the example even of that age. In another man this proceeding might not have been blameable: in him it cannot be excuſed. In the next reign Sir Henry Yelverton ventured on the diſpleaſure both of the king and his minion, rather than do the miniſtry of his office, by pleading againſt the earl of Somerſet, who had made him ſolicitor general. Had Bacon refuſed that invidious part, there were others, among the herd of aſpiring and officious lawyers, ready enough to have performed it: and his very enemies muſt have thought more advantageouſly of him for declining a taſk, in itſelf of no eſſential importance to the ſtate, and in him unjuſt to friendſhip, obligation, gratitude, the moſt ſacred regards among men.

Aul. Coqui. p. 186.

Elizabeth ſurvived her favorite about a year: and, if we may credit Oſborn, grief and remorſe for his fate accompanied her to the grave *. She died the twenty-fourth of March 1603, in the fulneſs of days and honor. Her reign had been long and triumphant: and ſhe had through the whole courſe of it preſerved, what ſhe ſo juſtly merited, the love and veneration of her people; the trueſt glory, the rareſt felicity of a ſovereign! She was ſucceeded by James the ſixth of Scotland, under whom Bacon aſcended, by ſeveral ſteps, to the higheſt dignity of the law.

Oſborn, p. 459.

* He is the firſt author who mentions the ſtory of the ring.

1603.

This prince, the moſt unwarlike that ever lived, was born in the midſt of civil commotions; at a time when his whole kingdom was torn into factions, betwixt the party who had eſpouſed the intereſts of his mother, and thoſe who had declared for him. After he had taken the adminiſtration into his own hands, he was hardly ever his own maſter; ſuffering himſelf to be led implicitly by the cabal in whoſe power he then happened to be. The moment he thought himſelf at liberty from either, like a boy eſcaped from under the eye of a rigid preceptor, he forgot all his uneaſineſſes, and abandoned himſelf to his favorite amuſements of hawking and hunting, as if his kingdom had been in the profoundeſt tranquillity. He grew up in an unaccountable fondneſs for favorites. The firſt, who took deep root with him, was likewiſe the worſt; not only encouraging him in a total inapplication to buſineſs, but tincturing his youth with the poiſon of all debauchery. The name of this man was Stuart, afterwards earl of Arran; one who had great and dangerous vices, without a ſingle virtue, private or public, to atone for them: an open ſcoffer at the obligations of morality, inſolent, rapacious, ſanguinary, hated by, and hating, all good men. The honeſter part of the nobility often remonſtrated againſt the credit and pernicious influence of this minion: James acknowledged the juſtice of their remonſtrances; baniſhed him ſeveral times from court; and ſeveral times received him into new favour. He was at length ſhot by a private hand in revenge for the death of the earl of Morton, to which he had baſely contributed.

Me'vil's Mem. p. 131.

Melvil, p. 200.

James

James hated the church of Scotland; and confirmed its authority. He declared the attempt of thoſe lords, who had reſcued him out of the hands of Arran and Lenox, to be juſt and ſerviceable: he afterwards baniſhed them, and would have confiſcated their eſtates, on that very account. When they had made themſelves maſters of his perſon a ſecond time, he pronounced them all traitors; and pardoned them. P. 132. P. 139. P. 169.

Elizabeth, who knew his genius perfectly, ſent Mr. Wotton on an embaſſy to him in 1585. Her intention was to divert him from a marriage with the princeſs of Denmark, and to give his counſels what other turn her intereſts might require. The ambaſſador, a man of addreſs and intrigue, had, by long habitude, learnt to perſonate all characters, and to aſſume, with an eaſe that ſeemed altogether unaffected, whatever ſhape might ſerve moſt effectually the purpoſes of his ſuperiors. P. 161. At the age of twenty-one he had been employed to ſound the intentions of the court of France: and had well nigh duped the famous conſtable de Montmorency, a miniſter grown gray in the obſervation of human falſhood and artifice. To his natural talent he had now added the experience of thirty years more. By accompanying king James in his ſports; by falling in frankly, and as it were naturally, with all his paſſions; by making a jeſt of buſineſs; by entertaining him pleaſantly with an account of foreign faſhions and follies; this man gained an abſolute aſcendant not only over his underſtanding, but over his humour. His moſt faithful ſubjects, who had ſerved him longeſt and beſt, who had even warned him againſt the ſubtilties of this ſtranger, he received with approbation or diſlike juſt as Wotton inſpired him. He was even brought by him to be ſeriouſly perſuaded that the king of Denmark was deſcended from a race of merchants: and that an alliance with his daughter was therefore infinitely beneath a king of Scotland's dignity. P. 164.

Such was the prince who now mounted that throne, which Elizabeth had filled with ſo great capacity and reputation. The union of the two crowns in the perſon of one ſovereign, was extremely dreaded by foreigners, and in particular by Henry the fourth of France. The acceſſion of a new kingdom to the native force of England, which even alone had been long formidable on the continent; the alliance of James with the moſt potent monarch of the North; his relation to the houſe of Lorrain, which had lately embroiled all France, rendered ſuch fears very probable. But his conduct diſſipated them for ever: and all Europe quickly ſaw, that no people but his own had any thing to apprehend from his power. At his arrival in England, he beſtowed titles and honors with ſo wild a profuſion, that there hardly remained any other mark of diſtinction but that of having eſcaped them. The public ſtood amazed: and paſquinades were openly affixed, undertaking to aſſiſt weaker memories to a competent knowledge of the nobility. Sir Francis Bacon, who had been early in his homage, and application for favor, to the new ſovereign, was knighted by him in perſon: and has left us the following picture of him, ſtrongly touched in its moſt obvious features. "His ſpeech, ſays he, is ſwift and curſory; and in the full dialect of his country: in matters of buſineſs, ſhort; in general diſcourſe, large. He affecteth popularity, by gracing ſuch as he hath heard to be popular; not by any faſhions of his own. He is thought ſomewhat general in his favors; and his eaſineſs of acceſs is rather becauſe he is much abroad and in a croud, than that he giveth eaſy audience. He haſteneth to a mixture of both kingdoms and occaſions faſter, perhaps, than policy will well bear." An. 1603. Wilſon, p. 7. Bacon, Vol. III. Letter LXXIII.

An. 1605. In 1605, Sir Francis Bacon recommended himſelf to the king's particular notice, as well as to the general eſteem of his cotemporaries, by publiſhing a work he had long meditated; The Progreſs and Advancement of Learning. The great aim of this treatiſe, no leſs original in the deſign than happy in the execution, was to ſurvey accurately the whole ſtate and extent of the intellectual world; what parts of it had been unſucceſsfully cultivated; what lay ſtill neglected, or unknown; and by what methods theſe might be diſcovered, and thoſe improved to the farther advantage of ſociety and human nature. By expoſing the errors and imperfections of our knowledge, he led mankind into the only right way of ſupplying the one, and reforming the other: he taught them to know their wants. He even went farther, and himſelf pointed out to them the general methods of correction and improvement in the whole circle of arts and ſciences. This work he firſt publiſhed in Engliſh: but to render it of more extenſive uſe, he recommended a tranſlation of it into Latin to Dr. Playfer of Cambridge. Playfer, with the ſcrupulous accuracy of a grammarian, was more attentive to faſhion his ſtyle to purity and roundneſs of periods, made out of the phraſeology he had gleaned from claſſic writers, than to render his author's meaning in clear and maſculine language. After the ſight of a ſpecimen or two, Sir Francis did not encourage him to proceed in it. He himſelf, after his retirement, very much enlarged and corrected the original, and with the aſſiſtance of ſome friends, turned the whole into Latin. This is the edition of 1623; and ſtands as the firſt part to his great Inſtauration of the Sciences.

Tenniſon's Baconiana, p. 25.

P. 27.

I have already obſerved that Cecil, now earl of Saliſbury, oppoſed the progreſs of our author's fortune under Elizabeth: and he ſeems to have obſerved the ſame conduct towards him in the preſent reign, till he had fixed himſelf in the king's confidence ſo firmly as to be above all fear of a rival. Beſides him, Sir Francis Bacon found a violent and laſting enemy in a man of his own profeſſion, Sir Edward Coke; who, with great parts, had many and ſignal failings. The quarrel betwixt them ſeems to have been perſonal: and it laſted to the end of their lives. Coke was jealous of Bacon's reputation in many parts of knowledge: by whom, again, he was envied for the high reputation he had acquired in one; each aiming to be admired, particularly, for that in which the other excelled. This affectation in two extraordinary men has ſomething in it very mean, and is not uncommon. The former was the greateſt lawyer of his time; but could be nothing more. If the latter was not ſo, we can aſcribe it only to his aiming at a more exalted character. The univerſality of his genius could not be confined within one inferior province of learning. If learning thus divided is not ſo proper to raiſe a ſingular name in one way, it ſerves to enlarge the underſtanding on every ſide, and to enlighten it in all its views. As the name of Sir Edward Coke will occur oftner than once in this hiſtory, and as he ſtood in particular competition to Bacon, I beg leave to dwell a little longer on his character. In his pleadings he was apt to inſult over miſery. Of this we have a deteſtable inſtance in his behaviour to Sir Walter Raleigh. He inveighed againſt that brave man on his trial with all the bitterneſs of cruelty, and in a ſtyle of ſuch abandoned railing as bordered almoſt on fury: I wiſh I could not add, that this bitterneſs, this intemperance of tongue, ſeem to be the genuine effuſions of his heart*. He converſed, it ſeems, more

Stephens's Collections, p. ix.

State Trials, Vol. I. p. 207, &c.

* The offices of Attorney and Solicitor General have been rocks upon which many aſpiring lawyers have made ſhipwreck of their virtue and human nature. Some of thoſe gentlemen have acted at the bar with

with books than men; and among the latter, with thoſe only to whom he could dictate and give the law. The conſequence of which was, that his converſation had all the air of a lecture; and that he retailed for new, a hundred ſtories that were either ſtale or trivial. He affected rallery, which was by no means his talent. His wit was often ill aimed, as it was always indelicate and vulgar; the rough horſe-play of a pedant. Though he had accumulated immenſe wealth, in his profeſſion and by ſeveral rich marriages, he was of a ſordid avarice; a ſevere maſter, a griping landlord; in proſperity inſolent, dejected and fawning in adverſity: the ſame poorneſs of ſpirit influencing his behaviour in both conditions. One example of this may ſerve in place of ſeveral: After his diſgrace, he ſubmiſſively courted Buckingham's brother to a match with his daughter: in the height of his favor, he had rejected the ſame propoſal with ſcorn. His profound ſkill in the common law has been univerſally allowed: and to this we cannot have a more unqueſtionable witneſs than Sir Francis Bacon; one every way fit to judge, and an enemy. He was raiſed to be Chief Juſtice of the Common Pleas in 1606, and of the King's Bench in 1613. On the bench he was above corruption: and had this ſaying frequently in his mouth, that a judge ſhould neither give nor take a bribe. In the caſe of Peacham, in the buſineſs of Commendams, he behaved himſelf with the honeſty and firmneſs of one who knew that a judge ought neither to be flattered nor menaced out of his integrity. Towards the latter part of his life, he ſtruck in with the country party in parliament, and ſtood in the breach againſt the arbitrary meaſures of James and Charles. He died in the reign of the latter, aged 88 years.

Vol. II. p. 542.

Bacon, Vol. III. Letter CXLV.

At length Sir Francis Bacon obtained the place he had ſo long expected: and in 1607 was declared Solicitor General. This preferment was the effect of many letters and much inſtance on his part, to the earl of Saliſbury, the lord chancellor Egerton, and the king himſelf. Neither do I find that he was ever promoted to any poſt without repeated and earneſt application to miniſters and favorites: a reflection that may ſerve at once to mortify, and inſtruct an ambitious man of parts.

An. 1607.

James had, from the beginning of his reign, paſſionately deſired an union of Scotland and England: but his unreaſonable partiality to the former, reckoning it as an equal half of the iſland, rendered the deſign abortive. Though Sir Francis Bacon labored this argument with all the arts of wit and reaſon, his eloquence, powerful as it was, had no effect on the houſe of commons. The parliament even ſhewed itſelf averſe to this union, in proportion as the court appeared zealous for it. The new ſovereign's conduct had alarmed them. They ſaw, that, with a ſtrong diſpoſition to be profuſe, he was abſolutely in the power of favorites; and that ſome of the leaſt valuable among his ſubjects were moſt in his favor. They ſaw farther, that he began already to propagate maxims of government deſtructive to liberty, and inconſiſtent with the whole tenor of the conſtitution. Theſe things filled obſerving men with apprehenſions for the future, which unhappily were but too well founded. The whole ſum of his politics, both now and afterwards, was to diſtaſte and alienate his ſubjects at home; to diſhonor both himſelf and them

as if they thought themſelves, by the duty of their places, abſolved from all the obligations of truth, honor, and decency. But their names are upon record, and will be tranſmitted to after ages with thoſe characters of reproach and abhorrence that are due to the worſt ſort of murderers; thoſe that murder under the ſanction of juſtice.

abroad.

abroad. It was a reign of embaſſies and negotiations, alike fruitleſs and expenſive: a reign of favorites and proclamations, of idle amuſements and arbitrary impoſitions. It was beſides the great era of flattery. The ancient national ſimplicity of manners which ever accompanies magnanimity, and manly freedom of ſpeech the noble effect of both, were now in a great meaſure loſt; altered and effeminated into proſtitute adulation and ſervile homage. This was become the faſhionable language among the clergy as well as laity, and James heard himſelf daily addreſſed to, by the titles of ſacred and divine: titles which diſcover the meanneſs rather than the dignity of human nature; and which, applied to him, were glaringly ridiculous. He had not one princely quality. The arts of governing a kingdom in peace he either did not, or would not underſtand: and his horror of war was conſtitutional and unconquerable. It may therefore ſeem unaccountable that a king of this temper ſhould treat his parliaments with more haughtineſs than any of his predeceſſors had ever done. But he had been told that England was neither to be exhauſted nor provoked: and his actions ſhewed that he believed ſo, according to the letter. The truth is, that as puſillanimity will talk bigger on ſome occaſions than true valor on any; he meant to make himſelf formidable to his people, that they might not diſcover how much he was afraid of them.

Though he did not ſucceed in the union of the kingdoms, he found his judges, in an affair of a ſimilar kind, more complaiſant than the great council of the nation had been: I mean the naturalization of all Scotſmen born ſince his acceſſion to the throne of England. This was adjudged by Sir Edward Coke in the great caſe of Calvin; as it had been argued at large before all the judges by Sir Francis Bacon. The affair is now no longer of importance to either kingdom: but one aſſertion of our author, on that occaſion, ought not to be forgot. He roundly affirms, that monarchies do not ſubſiſt like other governments, by a precedent law; and that ſubmiſſion to them is grounded upon nature.

Caſe of the *Poſt nati*, Vol. II. p. 514.

An. 1610.

In 1610 he publiſhed another treatiſe, intitled, Of the Wiſdom of the Ancients. This work bears the ſame ſtamp of an original and inventive genius with his other performances. Reſolving not to tread in the ſteps of thoſe who had gone before him, men, according to his own expreſſion, not learned beyond certain common places; he ſtrikes out a new tract for himſelf, and enters into the moſt ſecret receſſes of this wild and ſhadowy region; ſo as to appear new on a known and beaten ſubject. Upon the whole, if we cannot bring ourſelves readily to believe that there is all the phyſical, moral, and political meaning veiled under thoſe fables of antiquity, which he has diſcovered in them, we muſt own that it required no common penetration to be miſtaken with ſo great an appearance of probability on his ſide. Though it ſtill remains doubtful whether the ancients were ſo knowing as he attempts to ſhew they were, the variety and depth of his own knowledge are, in that very attempt, unqueſtionable.

An. 1613.

Hobart being advanced to the place of chief juſtice of the Common Pleas, Sir Francis Bacon ſucceeded him as Attorney General in 1613; about three months after the death of his kinſman and enemy the lord treaſurer Saliſbury: a miniſter fertile in expedients for ſupplying his maſter's wants, and well acquainted with the temper of England: a man of dexterity, craft, and intrigue, rather than a great man. The office that Bacon now entered upon was of exorbitant profit for that age. He owns, in one of his letters to the king, that it was worth to him 6000l. a year; and his employment of regiſter to the Star-chamber, which I mentioned above,

above, now brought him in 1600l. a year more. By what fatality was it that ſo extraordinary a man did not add to his other virtues that of a reaſonable oeconomy? Had he done ſo, it had preſerved him from one tranſcendent fault: and the other blemiſhes on his moral name had been loſt in the brightneſs of his intellectual qualities. But he was remarkably ſubject to the ſame weakneſs that ſo much diſhonored his maſter. His dependents had him wholly in their power, and ſquandered his fortune away, ſhamefully and without meaſure. In a private family, this begot diſorder, neceſſity, corruption: and all England beheld, from the ſame management in adminiſtring the public, the ſame effects; only more felt and fatal, as they were univerſal.

It was not however till the year 1611 that James abandoned himſelf to one ſole favorite. About that time was brought to court Robert Car a Scotſman, then in the firſt bloom of his youth, and of diſtinguiſhed beauty; by which he at once engaged the king's attention, and in a little while ingroſſed all his affection. As he was wholly illiterate, James himſelf would needs be his preceptor: and it muſt have been a ſcene altogether new and ridiculous, to ſee the ſovereign of three kingdoms daily inſtructing, in the firſt elements of grammar, the man who was ſhortly after to govern thoſe kingdoms. In his bounty to this ſtripling, he obſerved no other meaſure but that of his paſſion, which was as extreme as it ſeemed unaccountable. Car, in four or five years of favor, from a mere adventurer was raiſed to be earl of Somerſet: and amaſſed an enormous eſtate of nineteen thouſand pounds a year in land; beſides plate, money, and jewels to the amount of two hundred thouſand pounds more. And yet he deſerves a place in hiſtory, only for his ſcandalous amour with the counteſs of Eſſex; for procuring her to be divorced from her huſband, and for combining with her to poiſon his friend, who had diſſuaded him from that ill ſtep. The fate of Sir Thomas Overbury; the dark and dreadful ſcene of guilt that uſhered it in; and the part thoſe two great criminals acted in that tragedy, are recounted by all hiſtorians. Though the horrible tranſaction lay yet wrapt up in darkneſs, and was not diſcovered till two years after, remorſe and the upbraidings of conſcience purſued Somerſet every where. Through all the ſplendor of fortune and favor, the trouble of his mind was viſible in his countenance, in his whole deportment. He grew by degrees to neglect his perſon and dreſs; his ſprightlineſs of temper left him: and his converſation, from being gay and entertaining, was become cold, ſerious, and gloomy. This alteration in him was quickly followed by a change in the king's affections; which had no deeper or more ſolid foundation than theſe external and ſlight accompliſhments. The courtiers, whom envy and intereſt render extremely ſharp-ſighted, quickly diſcovered this change, and improved it. Luckily for their deſigns, there now appeared at court another young man, fitted by nature to draw the curioſity of James, and to ſupplant the earl of Somerſet in his favor. This was the famous George Villiers, the younger ſon of a good family in Leiceſterſhire; afterwards duke of Buckingham. As the ſurpriſing elevation of this youth had a particular influence on the future fortunes, and even on the fall, of Sir Francis Bacon, his character will deſerve a place at large in this hiſtory.

Truth brought to light, p. 89.

An. 1613.

Coke.

An. 1615.

Wilſon, p. 75.

His mother, who could not give him a fortune, beſtowed on him ſuch an education as might enable him to acquire one, eſpecially in a court like this. The advantages he owed to nature, ſuch as a handſome face, a body exactly proportioned, an eaſe and gracefulneſs in his motions, ſhe had taken care to improve with

that

that elegance of manners, that artificial politeneſs, and ſkill of excelling in trifles, which are the laſt finiſhings of a French education. In a word, he was juſt returned from his travels, and accompliſhed in all thoſe agreeable and frivolous arts, which were a certain recommendation to the favor of James. The earls of Pembroke and Bedford, with ſome other lords who were ſecret enemies to Somerſet, after dreſſing out this youth with a ſtudied exactneſs, placed him to advantage in the king's eye, at a comedy. That monarch was immediately ſmitten with his face, air, and appearance; which yet he endeavoured for ſome time to conceal. Nay he carried this diſſimulation ſo far, that he would needs be ſolicited by the queen to receive Villiers into his boſom: imagining the world would be thus deceived into a belief that he rather followed her advice, in this matter, than his own inclination. Such was the kingcraft on which he ſo highly valued himſelf. The queen was not eaſily prevailed with to take this ſtep; of which ſhe foreſaw all the conſequences. At laſt, however, ſhe yielded to the archbiſhop's importunity; telling him at the ſame time, that thoſe who labored moſt to promote Villiers might be the firſt to feel his ingratitude. Upon this he was immediately knighted, and declared gentleman of the bed-chamber: the herd of courtiers rivalling each other in their offers of friendſhip and ſervice to him. Some of them even deſcended to undertake his quarrels, and brave ſuch as were ſtill in Somerſet's intereſt.

Ruſhworth of Abbot, ch. 1.

Weldon, p. 84.

Among thoſe who courted the riſing favorite, none was more zealous than Sir Francis Bacon; as none was able to ſerve him more nobly, or more uſefully. Villiers had at this time ſenſe enough to feel his inexperience in buſineſs, and therefore had recourſe to our author for his advice: which he gave him fully in a letter, ſtill extant among his works; written with ſo ſuperior a judgment and ſo much honeſt freedom, that it does honour equally to his head and heart. He has ranged his thoughts under ſeven or eight principal topics of conſideration, and entered into an accurate detail of what a miniſter ought to know and practiſe. In another letter to him, he has theſe remarkable words: "It is now time that you "ſhould refer your actions chiefly to the good of your ſovereign, and your coun-"try. It is the life of a beaſt always to eat, and never to exerciſe. In this de-"dication of yourſelf to the public, I recommend to you principally that which I "think was never done ſince I was born, and which, not done, hath bred almoſt "a wilderneſs and ſolitude in the king's ſervice: which is, that you countenance "and encourage, and advance able and virtuous men in all kinds, degrees, and "profeſſions." This excellent advice the favorite received with thankfulneſs; and neglected.

Bacon, Vol. II. p. 257.

An. 1616.

Though the king's paſſion was now wholly diverted upon a new object, he ſtill affected to treat Somerſet with kindneſs and diſtinction; even after the diſcovery of his being an accomplice in poiſoning Sir Thomas Overbury had rendered this diſſimulation not only mean but criminal. Yet he continued it to the laſt, embracing with fondneſs the man whom he had ſecrely ordered to be arreſted: and intreating him to haſten his return, when he believed he ſhould never ſee him more. In ſuch trifles he was fond to exert his talent of political management. The earl's unhappy paſſion for the young counteſs of Eſſex was the ſource of all his misfortunes, and drew after it the moſt terrible conſequences: ending, as I have already obſerved, in the murder of his friend; in the ruin of himſelf, and of her to whom he had treacherouſly ſacrificed that friend. The whole affair is diſplayed at full length in our author's charges againſt thoſe two prime agents in

Wilſon, p. 81.

that

that infernal conſpiracy. They were both found guilty, ſentenced to die, and afterwards pardoned by the king, notwithſtanding his ſolemn imprecations to the contrary, on himſelf and his poſterity. May 24, 25 State-tryals, Vol. I. p. 334, 348.

Certain hiſtorians have remarked, that there was ſomething, in the behaviour of Somerſet before his trial, ſingular and myſterious; and that his maſter likewiſe ſeemed to labor under a ſecret anxiety of mind, equally ſurpriſing. The earl, they pretend, ſaid aloud in the Tower, that the king durſt not bring him to a tryal. Others reject this account as a downright calumny, invented merely to fix a black and cruel imputation on that prince's memory: or affirm at leaſt that it was founded only in popular rumor and malicious conjecture. But that there was more in it than conjecture, may be proved by undoubted authority; by ſome original letters of Sir Francis Bacon, then Attorney General, and particularly employed in this very affair. Thoſe letters have, I think, eſcaped the obſervation of all our writers: I ſhall therefore quote from them ſuch paſſages as may ſerve to throw ſome light on this dark tranſaction, though not enough perhaps to diſcover the darker motives that influenced the king's and the earl's behaviour in it.

James himſelf ſelected certain perſons to examine Somerſet with all ſecrecy, and marked out to them the particular articles on which they were to interrogate him. They had withal orders to work upon his obſtinate temper by every method of perſuaſion and terror: to give him now hopes of the king's compaſſion and mercy; and now to aſſure him that the evidence was full to convict him, ſo as there needed neither confeſſion nor ſupply of examination. Bacon, who was one of them, adds that they found his deportment ſober and modeſt, different apparently from other times. In another letter he has theſe remarkable words: "That the ſame little charm "which may be ſecretly infuſed into Somerſet's ear ſome hours before his tryal, was "excellently well thought of by his Majeſty: only I could wiſh it a little enlarged; "for if it be no more but to ſpare his blood, he hath a kind of proud humour "that may over-work the medicine." All this was to be done with much caution and privacy; for the very ſerjeants, appointed to manage part of the tryal, were not yet in the ſecret how the king would have it carried on: and therefore Bacon, to cover from them what he knew of the matter, deſired that ſome general heads of direction might be ſent to them all. From hence it appears that James ſhewed an extreme ſolicitude about the earl's behaviour, and the event of this affair. To what can it be attributed? His affection for Somerſet was extinguiſhed: and he lay under the ſtrongeſt obligations of public honor and juſtice not to ſcreen, from the cenſure of the law, a man whoſe guilt was of the moſt crying enormity. The earl's ſtanding mute, or denying that guilt, eſpecially as the proofs of it were ſtrong and pregnant, could bring no poſſible imputation on his name. Why then all this dark practice? all theſe artifices of the perſons who examined him, only to make him ſubmit to be tried, and to keep him in due temper during his tryal? There is ſtill more. James ordered his Attorney General to forecaſt and put in writing every poſſible caſe with regard to the tryal, and accompany them with his own opinion on each; that no ſurpriſe might happen, but that things duly foreſeen might have their directions and remedies in readineſs. Accordingly Sir Francis Bacon ſent a writing of that purport, on which there are ſeveral obſervations in the king's own hand. I will only quote one paſſage from it: "All theſe points of "mercy and favour to Somerſet are to be underſtood with this limitation; if he "do not, by his contemptuous and inſolent carriage at the bar, make himſelf in-

Bacon, Vol. III. Letter cxxxvi.

Vol. III. Letter cxxxix.

Letter cxxxviii.

" capable and unworthy of them." The king's remark in the margin is in theſe words: " That danger is well to be foreſeen, leſt he upon the one part commit unpardon- " able errors; and I on the other part ſeem to puniſh him in the ſpirit of revenge." Somerſet was not to be tried for any offence againſt the king; but for the barbarous murder of a private man and his friend. What then means the contemptuous carriage that is ſo much apprehended? What are the unpardonable errors it may lead him to commit? If he reflected on a maſter, to whom he had been ſo much obliged, only for giving him up to a fair and equal tryal, to a tryal by many circumſtances rendered inevitable; that would, in the opinion of all mankind, only aggravate his crime, and furniſh a new motive to that maſter for letting the ſentence of juſtice paſs upon him in all its rigor. After theſe particulars, I may venture to mention a fact related by Sir Antony Weldon, who ſays, that when the lieutenant of the Tower, Sir George More, came and told the earl he muſt prepare for his tryal on the morrow, he abſolutely refuſed to appear unleſs they dragged him to it by violence; adding, that the king durſt not bring him to tryal. Aſtoniſhed at ſuch raſh and dangerous expreſſions, the lieutenant, though it was then midnight, went and demanded an audience of the king, to inform him of what had paſſed. James, upon hearing his ſtory, burſt into a paſſion of tears, and intreated More to uſe his utmoſt ſkill upon his priſoner and ſoothe him, by whatever means, into proper temper and ſubmiſſion. This More undertook to do, and by a ſtratagem effected it. Weldon affirms he had this ſtory from the lieutenant's own mouth: and tho' he is a partial writer, and indulges himſelf in a humor of licentious ſcandal, the authentic vouchers I have produced, render his anecdote not improbable. Other circumſtances, mentioned by thoſe who have profeſſedly written of this reign, I therefore omit, and ſhall only add, that there is in the Cabala a letter to king James from Somerſet after his condemnation, of a very peculiar turn. He deſires that his eſtate may be continued to him intire, in a ſtyle rather of expoſtulation and demand than of humility and ſupplication: and through the affected obſcurity of ſome expreſſions, one may diſcover, that there was an important ſecret in his keeping, of which the king dreaded a diſcovery. The iſſue was, that James continued to him a penſion of four thouſand pounds a year, as long as he lived.

Court of K. James I. p. 105.

Cabala, P. 204. edit 1691.

Prince Henry died in the year 1612, univerſally lamented. His excellent qualities had endeared him to the love and expectations of all England. Germanicus was not more the darling of the Roman people: and the untimely end of both thoſe princes was univerſally believed to have been procured by poiſon. He had expreſſed, on all occaſions, an abhorrence of minions, and an utter contempt of Somerſet: he had even declared a firm reſolution, to humble both him and the family into which he was allied, if ever he came to reign. Whether the unaccountable tranſaction I have been relating has any reference to the death of this amiable prince, or whether it does not point rather to an affair of a very different nature, the reader is left to determine.

Villiers, now without a rival in the king's affections, was every day receiving new proofs of his bounty; at the ſame time that he more than ſhared with him the exerciſe of his authority. In the courſe of a few years he was made Gentleman of the bed-chamber, Maſter of the horſe, Knight of the garter, earl, marquis and duke of Buckingham, Chief juſtice in eyre of all the foreſts, and lord High Admiral of England. One of thoſe prodigies of fortune, who riſe now and then upon

on the world, as the vulgar imagine of comets, at once to aſtoniſh and ſcourge it: a ſignal inſtance of the wantonneſs of ſovereign power, and how far it may inſult human kind in exalting and adorning what it ſhould neglect or contemn. He drew up after him an obſcure kindred, numerous and indigent, beſtowed on them places of truſt and profit, married them into the nobleſt families, and graced them all with dignities, which were to be ſupported at the common expence of a whole people; to whom if any one of them was merely harmleſs, it was his utmoſt praiſe. After having read, not only what the enemies of this favorite have ſaid againſt him, but all that his partizans have alledged on his behalf, I do not find, during the whole time of his influence under two reigns, an influence ſupreme and unbounded, that he ever projected one ſcheme for the benefit of his country, or ever executed one undertaking to its honor; the only great criterion by which we ought to judge thoſe men that adminiſter the public. The breaking off the Spaniſh match at laſt was ſolely a ſacrifice to his own vanity and reſentment. On the caprice of this youth, however, the firſt and ableſt men in the kingdom were to depend entirely, for their acceſs at court, for their advancement, for any opportunity of being able to ſerve their country and their ſovereign. Sir Francis Bacon was ſenſible of this, and courted his friendſhip with a particular application. But he muſt have felt all the ſervitude and diſagreeableneſs of his ſituation, when, to be well with the king, he found it neceſſary to turn ſteward to the eſtate newly beſtowed on this young man; to ſtudy the ways and means of improving his lands, and of rendering his places moſt profitable to him. It is true he found his account in this ſervice; as it proved the ſureſt means of his own preferment: but, to a great and worthy mind, preferment ſo meanly obtained is diſgrace, only a little diſguiſed and gilded over.

Bacon, Vol. III. Letter CLXVI.

The lord chancellor Egerton, broken with age and infirmities, had often petitioned the king to be diſmiſſed from his laborious employment. He was now ſeventy-ſeven years old, and had preſided in the court of chancery from the year 1596, with an unblemiſhed reputation as a judge in private caſes; but his public conduct had been always framed to the directions of the court with an obſequiouſneſs, of dangerous example in one, who held ſo great and important a truſt. To this high dignity Sir Francis Bacon privately aſpired: and as it was the utmoſt ſcope of his ambition, he had aimed all his endeavours in the king's ſervice to merit it at his hands. He took care, at the ſame time, to ſtrengthen his pretenſions by the credit of Buckingham. His ambition even made him deſcend to artifices, that are as common in courts, as they are mean and unwarrantable; for he endeavoured to ruin in the king's good opinion ſuch men as the voice of the public might probably deſign to the ſame office, and whom he therefore conſidered as his rivals. He was particularly jealous of Sir Edward Coke, and repreſented him as one who abounded in his own ſenſe; one who affected popularity, and likely to court the good will of the nation at the hazard of the prerogative. For himſelf, he placed his great merit in obedience and ſubmiſſion; in the intereſt he had among the Commons, and in being able to influence the lower houſe of parliament: a ſervice which he magnifies as more important in a Chancellor, than to judge in equity between party and party. This opinion of his own popularity in the nation was not groundleſs. The parliament that met in 1614, though extremely out of humour with the miniſters in general, diſtinguiſhed him by an uncommon mark of favor and confidence. An objection having been ſtarted in the houſe

Cabala, p. 219.

Vol. III. Letter CXXVII.

Petyt's *Platita Parliam.* p. 174.

of commons, that a ſeat there was incompatible with the office of Attorney General, which required his frequent attendance in the upper houſe: the commons, from their particular regard for Sir Francis Bacon, and for that time only, overruled the objection; and he was accordingly allowed to take his place among them. If I obſerve farther, that the king raiſed him to the dignity of a privy-counſellor while he was ſtill in this very office, it will be inſtead of many inſtances to ſhew, with what an addreſsful prudence he ſteered his courſe betwixt the court and the nation. He was thus favored by a prince, who exacted from all his ſervants an implicit ſubmiſſion to his maxims of government: he gave no umbrage to a parliament whom theſe maxims had rendered jealous of the prince, and of almoſt every man in his favor. But to return.

An. 1617.

Theſe inſinuations had their deſired effect. Upon the chancellor's voluntary reſignation of the ſeals, they were given to Sir Francis Bacon, with the title of lord Keeper, on the ſeventh of March 1617. To what intereſt he more particularly owed this promotion we may learn from his letter of acknowledgement, written that very day, to the earl of Buckingham.

Vol. III. Letter CLXIX.

A few days after he had the ſeals delivered to him, the king went a progreſs into Scotland, carrying with him the favorite, who was likewiſe his prime miniſter: for to him all buſineſs, public or private, was addreſſed; and, according to his fancy, for the moſt part determined. The great affair that employed the deliberations of his council about this time, and had a fatal influence on his conduct ever after, was the marriage of prince Charles with the Infanta of Spain. In this reſolution, though contrary to all the rules of good policy, he perſiſted for ſeven years together; againſt his own intereſt, againſt the univerſal voice of his people: only to procure the imaginary honor of an alliance with a crowned head; for all other alliances he thought below his dignity. Sir Francis Bacon, who ſaw through the vanity and danger of this intention, but who wanted reſolution to be greatly honeſt, contented himſelf with inſinuating ſoftly, that it would be neceſſary to have the council unanimous in their ſuffrage on the occaſion, whatever might be their private ſentiments. This hint was not ſufficient to open the king's eyes. On the contrary, he run blindfold into the ſnare that Gundamor was ſpreading for him. That famous ſtateſman, as much by his buffooneries as by his talent for intrigue, had gained an abſolute aſcendant over James, leading him on from error to error: till in the end he made him ſacrifice his conſcience to the pope, and his honor to the reſentments of Philip, in the murder of his braveſt ſubject Sir Walter Raleigh; the laſt terror of Spain, and the only ſurviving favorite of queen Elizabeth. The Dutch too made advantage of the king's weakneſs and neceſſities. As the cautionary towns were ſtill in the hands of the Engliſh, the States were under ſome apprehenſions that the Spaniſh miniſtry might prevail upon James, who could not poſſibly conceal his fondneſs for the match in treaty, to put thoſe important places into their power. They knew at the ſame time that his treaſury was exhauſted, and that his courtiers were inſatiable. To bring their purpoſe about, they ceaſed all at once to pay the Engliſh who garriſoned thoſe places, as by their treaties they were obliged to do. Complaint being made of this to the Dutch envoy at London, he inſinuated, as from himſelf, to ſome of the miniſters, that if king James would deſire it of the States, they would, out of conſideration for him, take up money at an exorbitant intereſt, and in one payment diſcharge the whole debt due to the crown of England. This ſtratagem took effect. James wrote to the

Bacon, Vol. II. Letter CLXXV.

Rapin.

he States; and the matter was immediately put into negotiation. The penſionary Barnevelt, whom they ſent over, conducted the affair with ſo much addreſs, that the king agreed to deliver up the cautionary towns for leſs than three millions of florins, in lieu of eight millions they had engaged to pay Elizabeth, beſides the intereſt that had been running on for eighteen years. Such are the events of this reign; fit only to depreſs the writer, and diſtaſte the reader.

During the king's abſence in Scotland there happened an affair, otherwiſe of ſmall importance, but as it lets us into the true genius of thoſe times, and ſerves to ſhew in what miſerable ſubjection the favorite held all thoſe who were in public employments. He was upon the point of ruining Sir Francis Bacon, the perſon he had juſt contributed to raiſe, not for any error or negligence in their maſter's ſervice, but merely for an opinion given in a thing that only regarded his own family. Indeed ſuch was the levity, ſuch the inſolence of his power, that the capricious removal of men from their places, became the prime diſtinction of his thirteeen years favor: which, as biſhop Hacket obſerves, was like a ſweeping flood, that at every ſpring-tide takes from one land, to caſt what it has taken upon another. The affair was this. The year before, my lord Coke had been removed from his place of Chief Juſtice and diſgraced: the court having found him, in ſeveral inſtances, no friend to arbitrary will and pleaſure, or to the prerogative, as it was called; but reſolutely bent to maintain the integrity and honor of his poſt. One Peacham had been accuſed of inſerting in a ſermon ſeveral paſſages accounted treaſonable, for it ſeems they reflected on the miniſtry; but in a ſermon never preached, nor ever intended to be made public. The king, who was beyond meaſure jealous on this head, fearing the man might either be acquitted on his tryal, or not condemned to capital puniſhment, had ordered his attorney general Bacon to ſound the judges before-hand, and gather their opinions ſecretly and apart. My lord Coke obſtinately refuſed to declare his; looking on this auricular taking of opinions, for ſo he named it, as not according to the cuſtom of the realm, but new and of pernicious tendency. About the ſame time he had determined a cauſe at common law. The plaintiff, who thought himſelf injured, would not abide by his deciſions, but applied to chancery for relief: where the defendant refuſed to appear, diſclaiming the authority of that court: in which he was ſupported by the Chief Juſtice, who threatened the Chancellor with a premunire, grounded on a ſtatute made 27th Ed. III. for thus invading the limits of his juriſdiction. The king, who thought his prerogative ſtruck at anew in this attack on the court of his abſolute power, as Bacon ſtyles it, had the matter examined before the council; who condemned the Chief Juſtice for what he had done, and obliged him to make a ſubmiſſion on his knees. But what completed the diſtaſte taken at him, was his behaviour in a cauſe of the biſhop of Litchfield and Coventry, to whom the king had granted a vacant church in *commendam*. Serjeant Chiborne, who was counſel againſt the biſhop, in arguing the caſe had maintained ſeveral poſitions, reckoned prejudicial and derogatory to the king's ſupreme and imperial power, which was affirmed to be diſtinct from, and of a higher nature than his ordinary authority. Informed of this, James, by his attorney general Bacon, ordered the judges to ſtay further proceedings in that buſineſs, till they had conſulted with him. The judges aſſembled, and unanimouſly agreed, that they could not obey this order; that the letter they had received was contrary to law; that by their oath and the duty of their places they were not to delay juſtice; that they had therefore proceeded in the

Life of Abp. Williams, part 2. p. 19.

Vol. III. Letter CXII.

Bacon, Vol. III. Letter CXXVIII, CXLV.

Letter CXLV, CXLVIII.

the cauſe at the time fixed: and of this they certified the king in a writing under all their hands. Upon this remonſtrance, he writ them an angry letter, and peremptorily commanded them to ſtay all proceedings, till his return to London. They were then ſummoned before the council, and ſharply reprimanded for ſuffering the popular lawyers to queſtion his prerogative, which was repreſented as ſacred and tranſcendent, not to be handled or mentioned in vulgar argument. At laſt raiſing his voice to frighten them into ſubmiſſion, he put this queſtion to them ſeverally: "If, at any time, in a caſe depending before the judges, he conceived it to concern him either in profit or power, and thereupon required to conſult with them, and that they ſhould ſtay proceedings in the mean time; whether they ought not to ſtay them accordingly?" They all, the Chief Juſtice only excepted, acknowledged it their duty to do ſo. His anſwer deſerves to be for ever remembered: "That when ſuch a caſe happened, he would do that which ſhould be fit for a judge to do."

Bacon, Vol. III. Letter CXLVIII.

Yet this great lawyer, who had the honeſt courage to reſiſt the king to his face, wanted that independence of mind which alone enables a man to bear ſolitude, and an acquaintance with himſelf. His diſgrace, which reflected more honor on him than all his preferments, he was unable to ſupport; and therefore he ſoon after ſued to be reinſtated in the king's favor. To recover it, he meanly enough courted the favorite with an offer, which he would not hear of when it was formerly made to him. While in power, he had refuſed to give his daughter in marriage to Sir John Villiers, not without marks of diſreſpect: he now ſubmiſſively intreated the ſame perſon to honor him with his alliance: and employed Secretary Winwood to inform the earl of Buckingham of his extreme concern for what had paſſed with regard to the earl's brother; that he now paſſionately wiſhed the treaty might be renewed and accompliſhed: adding, that they ſhould make their own terms of ſettlement, if his propoſal was accepted. As the young lady was not only a celebrated beauty, but a great fortune, the perſon moſt intereſted made no difficulty to cloſe with this propoſal: and his mother recommended it to her ſecond ſon with warmth. This alarmed the lord keeper Bacon. Ever jealous of Coke's reputation, and at odds with him, he dreaded his alliance with ſo powerful a family. His imagination ſuggeſted to him all the danger that threatened his preſent and future fortunes from this union: and he could not forget that he had lately treated his antagoniſt with a freedom that rather inſulted than admoniſhed him. Theſe apprehenſions made him caſt about how to defeat the intended match, by raiſing ſuch objections to it, as might touch the king and his favorite in point of public honor and advantage. His letters to both on that occaſion, are written with the perplexity of a man who fears ſomething he is unwilling to own; which yet his prudence paſſes over with a ſeeming unconcern, to enlarge only upon conſiderations that regard thoſe whom he would be thought to ſerve. But this management proved ineffectual. It was reſented by the earl of Buckingham, and checked by a rough anſwer from the king. The lady Compton too, informed of the part he was acting, gave a looſe to her tongue, and railed at him with a bitterneſs natural to women when they are thwarted in any favorite purſuit of intereſt or paſſion. Having thus, to prevent a diſtant and uncertain danger, involved himſelf in one that was real and immediate, he made no ſcruple to change ſides at once; to go directly againſt his former opinion; and to offer unaſked his intereſt in the young lady's mother for promoting the match he had juſt been laboring

Letter CLXXX, CLXXXI.

Letter CXLII, to L. Coke.

laboring to diſappoint. On ſuch trivial accidents do the fortunes of miniſters depend: and to ſuch little and ſhameful arts is ambition often obliged to ſtoop. Nor even thus did he preſently regain his credit with Buckingham. The family continued to load him with reproaches: and he remained long under that agony of heart which an aſpiring man muſt feel, when his power and dignity are at the mercy of a king's minion, young and giddy with his elevation, and who thinks himſelf offended. They were however reconciled at laſt; and their friendſhip, if obſequiouſneſs in one to all the humours of the other deſerves the name of friendſhip, continued without interruption for ſome years; while Buckingham went on daily to place and diſplace the great officers of the crown, as wantonneſs of fancy, or anger, or intereſt led him; to recommend or diſcountenance every private perſon who had a ſuit depending in any court, juſt as he was influenced; to authorize and protect every illegal project, that could ſerve moſt ſpeedily to enrich himſelf or his kindred. In a word he became formidable even to the maſter who had raiſed him from the duſt, and who ſhould have ſtill awed him by his authority: and this amidſt the diſſipation of a life, given up to idle amuſements, or ſullied with criminal pleaſures. Letter CLXXXIV.

In the beginning of 1619, Sir Francis Bacon was created lord high Chancellor of England, and ſhortly after baron of Verulam; which title he exchanged the year following, for that of viſcount St. Albans. Such events in his life as theſe may be paſſed over ſlightly: he was ſo great a man, that external honors could add no luſtre to his name. Indeed had they been the immediate reward of thoſe nobler ſervices he had done, and was ſtill meditating to do his country, they might deſerve more particular notice, for the ſake of him who beſtowed them. An. 1619.

Neither the weight and variety of buſineſs, nor the pomps of a court, could divert his attention from the ſtudy of philoſophy. Thoſe were his avocations and incumbrances; this was his beloved employment, and almoſt the only pleaſure in which he indulged his freer and better hours. He gave to the public in 1620 his *Novum Organon*, as a ſecond part to his grand Inſtauration of the Sciences: a work that for twelve years together he had been methodizing, altering, and poliſhing; till he had labored the whole into a ſeries of aphoriſms, as it now appears. Of all his writings this ſeems to have undergone the ſtricteſt reviſion, and to be finiſhed with the ſevereſt judgment. Indeed the form into which it is caſt admits of nothing foreign, of nothing merely ornamental. The lights and embelliſhments of imagination, the grace and harmony of ſtyle, are rejected here, as beauties either ſuperfluous, or of an inferior nature. The author has, beſides, made uſe of ſeveral terms in a new and peculiar ſenſe, which may have diſcouraged ſome readers, as it has made others imagine them equally unintelligible with the horrors of a vacuum, the quiddities, and ſubſtantial forms, of the philoſophy which he attempted to diſcredit: and therefore, of all his writings it has been the leaſt read, or underſtood. It was intended as a more uſeful, a more extenſive logic than the world had yet been acquainted with: an art not converſant about ſyllogiſms, and modes of argumentation, that may be ſerviceable ſometimes in arranging truths already known, or in detecting fallacies that lie concealed among our own reaſonings and thoſe of other men; but an art inventive of arts: productive of new diſcoveries, real, important, and of general uſe to human life. This he propoſed, by turning our attention from notions to things; from thoſe ſubtle and frivolous ſpeculations that dazzle, not enlighten, the underſtanding, to a ſober and ſenſible inveſtigation of the An. 1620.

the laws and powers of nature, in a way becoming ſages who make truth and information the ſole aim of their inquiries. In order to this, his firſt endeavour was to weed out of the mind ſuch errors as naturally grow in it, or have been planted there by education, and cheriſhed by the influence of men, whoſe writings had long claimed a right of preſcription to rule and miſlead mankind. To a mind thus prepared for inſtruction, he propoſes the ſecond and ſcientifical part of his ſcheme, the true method of interpreting nature, by fact and obſervation; by ſound and genuine induction, widely differing from that puerile art which till then had ſolely prevailed in philoſophy. His requires a ſufficient, an accurate collection of inſtances, gathered with ſagacity and recorded with impartial plainneſs, on both ſides of the queſtion: from which, after viewing them in all poſſible lights, to be ſure that no contradictory inſtances can be brought, ſome portion of uſeful truth, leading on to further diſcoveries, may be at laſt fairly deduced. In this way, experiments and reaſonings grow up together, to ſupport and illuſtrate each other mutually, in every part of ſcience.

An. 1621. As we are now approaching towards the moſt memorable event of our author's public life, which ended in a melancholy reverſe of his fortune and honor, it will be neceſſary to trace, ſtep by ſtep, the cauſes that produced it: eſpecially as the affair has not been hitherto conſidered in the point of view that renders it moſt intereſting and inſtructive. It will, I believe, appear with evidence, that, whatever his crimes might be, he was ſacrificed to the ſafety of another, far more criminal than himſelf: and that this was the act of an ill-judging maſter, with whom it was a greater merit to be amuſing in any degree, than to be ſerviceable in the greateſt.

Among the weakneſſes of king James, his vanity was the moſt pernicious to his own family, and to the nation in general. He placed an infinite value on certain chimerical advantages that met in his perſon; on that inherent right by which, he pretended, the crown of England was devolved to him; on his long acquaintance with the prime myſteries of government, and on his uncommon accompliſhments in learning. His favorite maxim was, that he who knows not how to diſſemble, knows not how to reign: but he ſeems not to have heard of a ſecond maxim, without which the firſt cannot be ſucceſsful, even for a time; to conceal every appearance of cunning, and to deceive under the guiſe of candor and good faith. He, on the contrary, ſhewed his whole game at once, to his own ſubjects and to foreigners alike: ſo that in his attempts upon the former, in his negotiations with the latter, this Solomon was the only dupe. A great ſhare of learning he certainly had, but of learning that a king ought not to be acquainted with; the very refuſe of the ſchools, which ſerved for little elſe but to furniſh him with an impertinent fluency, on every ſubject: and he indulged himſelf in the ſovereign pedantry of ſetting it to ſhew, on every occaſion. On all theſe heads, he was extolled without meaſure by the moſt peſtilent of flatterers, grave and reverend eccleſiaſtics: for which, and becauſe they encouraged him in an unprincely application of his talent, he, on many occaſions, made his power the mean inſtrument to gratify their paſſions and luſt of dominion. They, in return, found out for him a title antecedent and ſuperior to human laws, even a divine right of being weak or wicked, without control. And this doctrine, horrible as it is, they dared to derive from Scripture: where, if it could be found, which to affirm were blaſphemy, it would be the triumph of infidelity, and demonſtration that thoſe ſacred writings were

were inſpired, not by God, but by ſome being, his oppoſite and the enemy of all goodneſs. This doctrine, meeting with his own perverted habits of thinking, made king James look upon his ſubjects as ſlaves; upon his parliaments as uſurpers of a power to which they had no right, or at beſt a precarious one: and he had now, for ſeven years together, affected to govern without them; to ſet up an intereſt ſeparate from that of his people, and to ſupply his wants by all ways and means, but ſuch as the conſtitution preſcribed. Theſe methods were ſuggeſted to him by the worſt enemies of the commonwealth, the tribe of projectors and monopoliſts: miſcreants who ſheltered themſelves under the name and influence of Buckingham, and who repaid his protection extravagantly, at the expence of a people whom they were grinding and devouring. His mother too, now created a counteſs in her own right, a woman born for miſchief, of a meddling ſpirit and inſatiably greedy, was deep in the guilt of theſe tranſactions; forwarding every bad project that brought her in money; and, by the mighty power ſhe had over her ſon, ſucceeding in every ſcandalous job ſhe undertook. Under an adminiſtration like this, when England was in effect governed by a diſſolute youth, himſelf in the hands of an intriguing, rapacious woman, it cannot be ſurpriſing that the people were vexed and plundered by illegal patents, by monopolies, by other miſchievous projects, calculated to enrich a few, and to ruin thouſands. To all theſe patents, however procured, the chancellor had readily, almoſt implicitly, affixed the ſeal, as the mere creature of Buckingham: or if he ever ventured to inſinuate that any of them were contrary to law, his remonſtrance was too fearful and unſupported to produce any effect. This is the great ſtain on his character, that he deſerted, or neglected, the poſt of honor where providence had placed him, on the frontier, if I may ſo ſpeak, betwixt Prerogative and Liberty; that, if he did not encourage, he at leaſt connived at, the invaſions that were every day making into the latter. Yet this was againſt his inclination, as well as againſt his better ſenſe of things; for as he knew well that his maſter's true intereſt lay in a good underſtanding with his people, he had often adviſed him to call frequent parliaments, and to throw himſelf on the affections of the nation for the ſupport of his government. Though ſuch advice was repugnant to all the maxims by which that monarch wiſhed to eſtabliſh his power; though he had reſolved to lay parliaments aſide for ever, as daring encroachers upon his prerogative, who made themſelves greater and their prince leſs than became either: yet he was now prevailed upon to meet the two houſes once more. Indeed the exigency of his affairs rendered it neceſſary. His ſubjects, it is true, were haraſſed and pillaged; but he was ſtill in extreme want of money: thoſe wretches, to whom he delegated his authority, leaving to him little elſe beſides the public hatred, occaſioned by their rapines committed in his name. Add to this, that the juncture appeared favorable for obtaining large ſupplies from the commons. As the whole body of the nation expreſſed an uncommon zeal for recovering the Palatinate to his unfortunate ſon-in-law, he had reaſon to expect, that, on aſſurance of his entering heartily into a war, they would vote him conſiderable aids of money; which he might afterwards divert, as he actually did, to other purpoſes that better ſuited his genius and notions. Hacket, p. 50.

A parliament was accordingly ſummoned: and it met on the 20th of January 1621. The king was not wholly miſtaken in his conjecture: for the commons immediately voted him two intire ſubſidies; but went at the ſame time into a ſtrict inquiry into thoſe arbitrary impoſitions, that, in a period of ſeven years, were be-

come inſupportable to the people. Among the monopolies, in particular, there were three of flagrant injuſtice and oppreſſion. Certain perſons had obtained patents from the king, which impowered them to ſet an annual fine on ſuch as kept inns or alehouſes throughout England. Without a licence from the patentees, no man could hold either: and whoever would not readily pay the ſum, at which thoſe low inſtruments of power thought fit to exciſe him, was ſure of being harraſſed and plundered, or thrown into a jail. This proved a fruitful ſource of vexations, and fell heavy on the poorer ſort. The third was yet more enormous; a patent for the ſole making and vending of gold and ſilver lace, which had been granted to two infamous tools of the favorite, Mompeſſon and Michel; the Dudley and Empſon of that age. The firſt a man of fortune, whoſe ſole ambition was to make himſelf conſidered, though but by his crimes: the other an obſcure juſtice of the peace, who, in a remote quarter of the town, picked up a ſordid maintenance from the ſtews. They had, it ſeems, ſhamefully abuſed the power their excluſive patent gave them, by putting off, for true, great quantities of counterfeit lace, wrought up and embaſed with copper, or other materials of a poiſonous nature: and whoever preſumed to make or ſell any other was cruelly puniſhed, by fine and impriſonment. In theſe outrages they were the more daring, becauſe Sir Edward Villiers, half-brother to the favorite, was aſſociated into their patent, though not named in it. Theſe, with many other grievances, were laid open in parliament, and ſeverely cenſured. But the commons did not ſtop here. They were for carrying their ſearch up to the prime cauſe of all grievances, in order to diſcover by whoſe influence the ſeveral patents had been procured, and how they had paſſed the ſeals. Complaints were brought into the houſe, about the ſame time, of corrupt practices even in the high court of Equity. This alarmed the king for his chancellor, and ſtill more for his minion: as private intimation had been ſent to Buckingham, of a ſevere ſcrutiny that was making into all his management, and of frequent meetings that were held, with great ſecrecy, by certain members of the lower houſe; in order to fix on him the guilt of whatever was moſt unjuſtifiable and oppreſſive. Buckingham's creatures, anxious and alarmed at this intelligence, perſuaded him that he could ſecure impunity to himſelf and them, only by bringing his maſter forthwith to diſſolve the parliament: and James had certainly been frightened into that raſh and hazardous ſtep, but for the ſober remonſtrances of Williams dean of Weſtminſter. That politic courtier adviſed him to cancel at once, by proclamation, all monopolies and vexatious grants; to ſacrifice inferior criminals to the public reſentment, and to ſoothe the parliament with an aſſurance that this reformation was firſt propoſed by his favorite, on finding how much he had been abuſed by deſigning and knaviſh projectors. This counſel the king reſolved to follow; but it did not wholly free him from the perplexity he was under. The chancellor, whom his intereſt led him to preſerve, was openly accuſed of corruption: the favorite, whom his tenderneſs could not reſign, was ſecretly, and therefore more dangerouſly attacked; as the encourager, if not the author, of whatever was deemed moſt illegal and oppreſſive. To ſave both, at this juncture, would be impoſſible: and he found he muſt either part with the object of his inclinations, or with the oracle of his counſels. How ſuch a prince would determine, is eaſy to gueſs. His paſſion prevailed over his reaſon: and my lord St. Albans was made the ſcape-goat of Buckingham. He was even obliged to abandon his defence. As he had gained univerſal eſteem by his learning; and as his eloquence

Hatchet, p. 49. Wilſon.

Cabala, Letter 11.

Buſhel's Abridg. Poſt. p. 2, 3.

eloquence was equal to his parts, ſuperior and commanding, the king would not hazard his appearing before the lords to plead his own cauſe. In the courſe of ſuch an inquiry, he might have diverted the public odium from himſelf, by laying open the long ſeries of bad adminiſtration to which he had been privy; the many illegal patents he had been compelled to paſs: and all this came full home to Buckingham, the great object of national vengeance. The faults too, imputed to himſelf, he might have extenuated ſo far as to procure a great mitigation of the cenſure, that muſt otherwiſe fall upon him in its utmoſt rigor. All this he foreſaw and felt; but the king abſolutely commanded him not to be preſent at his tryal: promiſing on his royal word, to ſcreen him in the laſt determination; or if that could not be, to reward him afterwards with ample retribution of protection and favor. He obeyed, and was undone.

On the twelfth of March, a committee for inſpecting into the abuſes of the courts of juſtice was appointed by the commons. Some days after, Sir Robert Philips, a gentleman eminent for public ſpirit and humanity, reported from thence to the houſe, that complaints had been brought before them, by two perſons, againſt the lord Chancellor, for bribery and corruption. This report he made, not only without bitterneſs, but in terms of great regard and tenderneſs for the accuſed; moving that the buſineſs might be preſented to the peers, ſingly and without exaggeration. At a conference, on the nineteenth, between certain members of both houſes, the lords agreed to take the matter into their ſpeedy conſideration. As ſoon as this affair was become the public talk, a new croud of accuſers appeared, and charged home the unhappy chancellor with other and flagrant inſtances of bribery; ſuch perſons eſpecially as had courted him with preſents, and afterwards received a judgment unfavorable to their expectations: animated more by that diſappointment, than by the iniquity of his deciſions; for it does not appear that any of his decrees were ever reverſed. He was all this while confined to his houſe by an indiſpoſition, real or pretended; but, if his body was in health, what muſt have been the condition of his mind, in this interval of ſuſpenſe and anxiety? a great mind, already ſelf-convicted, yet exquiſitely ſenſible to good fame, which it has long enjoyed, and is upon the point of loſing for ever! His reflections, whether he looked back on the paſt, or forward to the proſpect before him, muſt have been terrible: as they were at the ſame time inflamed by peculiar circumſtances of ſhame and confuſion; that he was now, at the age of ſixty-one, falling a victim to the rapine and inſolence of his domeſtics, which he had weakly connived at, rather than to any faults of his own.

State Tryals, Vol. I. p. 353, etc.

Ruſhworth's Coll. Vol. I.

On the twenty-ſixth of March, the king came to the houſe of peers; and in expreſſions of ſtudied popularity, owned the errors of his government, exclaimed againſt the patents complained of, frankly gave up to juſtice the leſſer criminals concerned in them: and all this for the ſake of his favorite, whom in the end he endeavoured to ſcreen, by the pooreſt reaſons imaginable. Indeed, no good reaſons could be alledged in defence of him, who was the greateſt criminal; and without whoſe concurrence the wretches in queſtion could not have been guilty. The lords were not impoſed upon by this ſpeech: however, thinking it ſufficient to have reduced their ſovereign to the neceſſity of an apology, they feigned to be of his opinion. Thus, Buckingham eſcaped for the preſent; to accumulate new guilt, and to fall at laſt, ignobly, by a private hand: after he had been devoted, by the curſes of a whole people, and more ſolemnly ſtill by the denunciations of their re-

preſentatives. After a receſs of three weeks, the houſe met again: but the weight of their indignation fell ſingly, and therefore without mercy, on the chancellor. They were not ſatisfied with his letter of general confeſſion, though delivered to them by the prince of Wales; in which he renounced all juſtification of himſelf, and ſued for no other favor, "but that his penitent ſubmiſſion might be his ſen-"tence, and the loſs of the ſeals his puniſhment." He was obliged to put in a particular anſwer to every point of his accuſation: which he did on the firſt of May, 1621; acknowledging, in the moſt explicit words, the corruption charged upon him in twenty eight ſeveral articles, and throwing his cauſe entirely on the compaſſion of his judges. His ſentence was, "to undergo a fine of forty thou-"ſand pounds; to be impriſoned in the Tower during the king's pleaſure; to be "for ever uncapable of any office, place, or employment in the commonwealth; "and never to ſit again in parliament, or come within the verge of the court." Thus he loſt the great privilege of his peerage; a ſeverity unuſual except in caſes of treaſon and attainder.

The laſt article of his charge furniſhes matter for much reflection. It alledges, "that he had given way to great exactions in his ſervants, both in reſpect of pri-"vate ſeals, and otherwiſe for ſealing injunctions." This indulgence to his domeſtics, which was certainly extreme, has been generally, and I believe truly, reckoned the principal cauſe of thoſe irregularities that drew on his diſgrace. Liberal in his own temper, or rather profuſe beyond the condition of a man who means to preſerve his integrity, he allowed his family in every kind of extravagance: and as many of his retinue were young, diſſipated, giddy in the purſuit of pleaſure, they ſquandered without meaſure, where they were indulged without control*. Whether he did not diſcover this error till it was too late, or whether a ſoul like his, loſt in the greatneſs and immenſity of its own views, could not attend to that detail of little and diſagreeable particulars, which yet oeconomy requires; however that was, to ſupport his ordinary train of living, he fell into corruption himſelf, and connived at it in his dependents. Thus we behold him, a memorable example of all that is great and exalted, of all that is little and low, in man. Such inconſiſtencies in our human nature cannot but alarm and terrify even thoſe who are moſt confirmed in a habit of virtue.

Wilſon. Buſhel's Abridg. Poſt. p. 2.

After a ſhort confinement in the Tower, the king reſtored him to his liberty, and forgave the fine in which the parliament had amerced him. As this fine was very conſiderable, he managed ſo as to have it aſſigned over to ſome of his friends, under the notion of being his creditors: and we find Williams, his ſucceſſor in the ſeals, complaining heavily of this ſtratagem; as if he thereby intended to defraud thoſe perſons to whom he was really in debt, who were many and in danger of being ruined by his fall. But I am inclined to hope, that he made uſe of this artifice with a more innocent view; namely, to procure himſelf a ſhort reſpite from their importunities, till he could ſettle his private affairs, extremely perplexed by former ill management, and now by the loſs of his employments rendered deſperate. That I may not be obliged to mention any more an affair, alike ungrateful to the reader and writer, I will obſerve here, that about three years after this, he

Caba'a, p. 263. Ed. 1691.

* One day, during his tryal, as he was paſſing through a room where ſeveral of his domeſtics were ſitting; upon their getting up to ſalute him, Sit down, my maſters, he cried; your riſe hath been my fall.

petitioned

petitioned king James for a total remiſſion of his cenſure: "to the end that this "blot of ignominy might be removed from him, and from his memory with poſteri- "ty." What lay in a king's power, James readily granted, a full and entire pardon of his whole ſentence†. Poſterity likewiſe, to which he appealed, has ſeemed unwilling to remember that he ever offended: and thoſe who recorded his failings, like thoſe who have made obſervations on the ſpots in the ſun, neither pretend to diminiſh his real brightneſs in himſelf, nor deny his univerſal influence on the world of learning. Thus he withdrew from the glare of a public ſtation into the ſhade of retirement and ſtudious leiſure; often lamenting, that ambition and falſe glory had ſo long diverted him from the nobleſt as well as the moſt uſeful employments of a reaſonable being: mortified, no doubt, into theſe ſentiments, by a ſevere conviction, in his own perſon, of the inſtability and emptineſs of all human grandeur.

Bacon, Vol. III. Letter ccxciv. Caba'a, p. 249.

Buſhel's Abridg. Poſt. p. 3.

Hitherto we have followed him through the buſtle and obliquity of buſineſs. We ſhall find him henceforth in a more pleaſing, though a leſs conſpicuous ſituation; freed from the ſervitude of a court; from an intolerable attendance there, on the vices and follies of men every way his inferiors (for in this reign no one could riſe to power on more honorable terms:) in a condition now to purſue the native bent of his genius; to live to himſelf, and for the advantage, not of one age, or one people only, but of all mankind, and all times to come.

The firſt conſiderable work he engaged in, after his retirement, was the hiſtory of Henry the ſeventh; which he undertook at the deſire of king James, and publiſhed in the year 1622. Whatever ſome writers may have inſinuated of his melancholy and dejection, we find every where, in this performance, evident traces of a ſpirit unbroken by age, and unſubdued by misfortunes. It has been highly applauded, and as much condemned: a proof that it has more than common merit. And we may venture to affirm, that, whatever its faults are, they ariſe from no want of vigor in the underſtanding, or of warmth in the imagination of the writer. King James affected to conſider his great grandfather Henry as a perfect model for the imitation of other monarchs: and as his was the reign of flattery, this quickly grew to be the prevalent and faſhionable opinion at court. Though in truth, that prince's character was, in every part of it, unamiable; and his conduct, on many occaſions, weak or wicked. If my lord Bacon has not wholly eſcaped the infection of his age; if he has here and there attempted to brighten the imperfections, and throw in ſhades the bad features of the original he was drawing; yet, through theſe ſoftenings, we can eaſily ſee this king as he was, and in all his genuine deformity. Suſpicion and avarice, his own hiſtorian acknowledges, were the chief ingredients in his compoſition: and therefore his politics, both at home and abroad, were narrow, ſelfiſh, and falſe. Void of all great and extenſive prudence, he endeavoured to ſupply that want by temporary ſhifts, and the little expedients of cunning. By theſe he commonly had the luck to extricate himſelf out of difficulties, which a wiſer man would have timely foreſeen, and a better man have wholly prevented. But as his genius was unſociable and ſolitary, the darkneſs in his temper paſſed on mankind for depth and ſagacity in his underſtanding. His avarice too, was ſordid and ſhameleſs. Nothing ſeemed mean, nothing unjuſt in his eyes, that could fill his coffers: and merely to fill them, for of wealth he had no

An. 1622.

Bacon, Vol. III. p. 30.

p. 272.

† Accordingly he was ſummoned to the firſt parliament of king Charles.

enjoyment,

enjoyment, he deſcended to arts of rapine no leſs ſcandalous than they were oppreſſive.

I have acknowledged that my lord Bacon's hiſtory has been taxed of partiality, and I will not diſſemble that his ſtyle has been objected to, as full of affectation, full of falſe eloquence. But that was the vice, not of the man, but of the times he lived in: and particularly of a court, that, after the ſovereign's example, delighted in the tinſel of wit and writing, in the poor ingenuity of punning and quibbling.

His Eſſays have, of all his works, been moſt current, and are ſtill very juſtly eſteemed. Towards the cloſe of his life he greatly enlarged them both in number and weight; and publiſhed them anew, not only in Engliſh, but in a more univerſal language, which, he imagined, may preſerve them as long as books ſhall laſt. As they are intended not to amuſe but inſtruct; as they are neither a ſatire on human nature, nor the ſchool of ſcepticiſm; Monſieur de Voltaire obſerves, that they have been leſs popular than the Maxims of Rochefoucault, or the Eſſays of Montagne. A remark that does my lord Bacon honor; who was too great a man to court a reputation from the multitude, by ſacrificing to that malignity, or indulging that curious extravagance, which too many readers, I am afraid, expect to find gratified, even in writings of a moral kind.

Lettres ſur les Anglois, p. 88.

Of the other works which he compoſed in this laſt ſcene of his life, I forbear to make mention here: they will be all enumerated in another place. Let me only obſerve, that nothing can give a more exalted idea of the fruitfulneſs and vigor of his genius, than the number and nature of thoſe writings. Under the diſcouragement of a public cenſure, broken in his health, broken in his fortunes, he enjoyed his retirement not above five years: a little portion of time! yet he found means to crowd into it what might have been the whole buſineſs, and the glory too, of a long and fortunate life. Some of his former pieces he methodized and enriched: ſeveral new ones he compoſed, no leſs conſiderable for the greatneſs and variety of the arguments he treated, than for his manner of treating them. Nor are they works of mere erudition and labor, that require little elſe but ſtrength of conſtitution and obſtinate application: they are original efforts of genius and reflection, on ſubjects either new, or handled in a manner that makes them ſo. His notions he drew from his own fund: and they were ſolid, comprehenſive, ſyſtematical; the diſpoſition of his whole plan throwing light and grace on all the particular parts. In conſidering every ſubject, he ſeems to have placed himſelf in a point of view ſo advantageous and elevated, that he could from thence diſcover a whole country round him, and mark out the ſeveral ſpots of it, diſtinctly and with eaſe. Theſe characters are equally due to the works in which he made ſome progreſs, and to thoſe he could only attempt.

Wilſon.

His ſuppoſed poverty has been much inſiſted on, not only by our own writers, but by foreigners. Some of the former have aſſerted, that he languiſhed out a ſolitary being in obſcurity and indigence: and among the latter, Le Clerc, who was led into the ſame notion by a paſſage in one of Howel's letters, has animadverted with an honeſt indignation on the meanneſs of that prince, who could leave ſuch a man as he was to ſtruggle, in his declining age, both with penury and affliction. I believe the matter has been exaggerated. Perhaps he did not enjoy affluence or entire eaſe of fortune: but his ordinary income muſt have placed him above ſordid want and anxiety. Dr. Rawley, who lived long in his family, affirms that the king

king had given him, out of the Broad Seal and Alienation office, to the value of eighteen hundred pounds a year; which, with his own lands amounting to a third part more, he retained to his death. But then he had treaſured up nothing in his proſperous condition againſt the day of adverſity: and his penſion was not only precarious, but ill-paid, by a king, who, inſtead of huſbanding his revenues for great or good purpoſes, was daily laviſhing them away, in fruitleſs negotiations, or on the leaſt deſerving of his ſubjects. Add to theſe things, that my lord Bacon lay all this time under the incumbrance of a vaſt debt; and that he had doubtleſs expended very conſiderable ſums in procuring or making experiments. Even thoſe, whom we ſee cloſe and ſparing on every other occaſion, are yet profuſe in gratifying a favorite paſſion. From all which aroſe that diſtreſs and thoſe difficulties into which he was often plunged. That they were many and great, we can entertain no doubt *. It is but too ſtrongly confirmed to us by ſome unuſual expreſſions in his letters to king James; where we find him pouring out his heart in complaints and ſupplications of ſuch a ſtrain, as every one who reveres his memory will wiſh he had never uttered. Thoſe who inſiſt on the meanneſs, thoſe who plead for the dignity, of human nature, may, in this one man, find abundant matter to ſupport their ſeveral opinions. But, let us draw a veil over imperfections, and at the ſame time acknowledge, that a very ordinary penetration may ſerve to diſcover remarkable blemiſhes and failings in the moſt comprehenſive minds, in the greateſt characters, that ever adorned mortality.

Bacon, Vol. III. Letter CCLXXVI.

King James died in 1625; after an inglorious and a fatal reign of three and twenty years: deſpiſed by foreigners, deſpiſed and hated by his own ſubjects. The miſchievous notions he broached, the perverſe conduct he held, gave riſe to thoſe diviſions that quickly after involved his kingdoms in all the guilt and miſery of a civil war: that ſhook the Britiſh conſtitution to its foundations, and in the end overturned it; tho apparently framed to laſt for ages, as it had been ages in building up and perfecting.

An. 1625.

His unfortunate chancellor ſurvived him ſomething above a year. The multiplicity of buſineſs and ſtudy in which he had been long engaged, but above all the anguiſh of mind he ſecretly labored under, had undermined and broken into his health. After having been for ſome time infirm and declining, he owed his death at laſt to an exceſs, not unbecoming a philoſopher; in purſuing, with more application than his ſtrength could bear, certain experiments touching the conſervation of bodies. He was ſo ſuddenly ſtruck in his head and ſtomach, that he found himſelf obliged to retire into the earl of Arundel's houſe at Highgate, near which he then happened to be. There he ſickened of a fever, attended with a defluxion on his breaſt; and, after a week's illneſs, expired; on the ninth of April, in the ſixty-ſixth year of his age. How he bore this indiſpoſition, or what diſcourſes he held at the nearer approaches of death, no account is to be found; an omiſſion which every reader muſt feel and regret: as nothing can awaken the attention, nothing affect the heart of man more ſtrongly than the behaviour of eminent perſonages in their laſt moments; in that only ſcene of life wherein we are all ſure, later or ſooner, to reſemble them. There remains only a letter, the laſt he ever wrote, addreſſed to that nobleman under whoſe roof he died; in which he compares himſelf

An. 1626.

Bacon, Vol. III. Letter CCC.

* It appears by a letter of Buckingham to him, that he aſked for the provoſtſhip of Eaton college, and was refuſed it.

to

to a celebrated philoſopher of antiquity, Pliny the elder; who loſt his life by inquiring, with too dangerous a curioſity, into the firſt great eruption of Veſuvius.

Thus lived and died the lord chancellor Bacon †.

Sir Thomas Meautys.

He was buried privately in St. Michael's church near St. Alban's. The ſpot that contains his remains lay obſcure and undiſtinguiſhed, till the gratitude of a private man, formerly his ſervant, erected a monument to his name and memory. In another country, in a better age, his monument would have ſtood a public proof in what veneration the whole ſociety held a citizen, whoſe genius did them honor, and whoſe writings will inſtruct their lateſt poſterity.

Baconiana, p. 203.

One paſſage in his will is remarkable. After bequeathing his ſoul and body in the uſual form, he adds, "my name and memory I leave to foreign nations; and "to mine own countrymen, after ſome time be paſſed over." As to the former, he was, even in his life-time, looked upon with admiration by the moſt eminent men that France and Italy could then boaſt of; and by ſome of them viſited, as one whoſe talents were an ornament, not only to his age, but to human nature itſelf. When the marquis D'Effiat brought into England the princeſs Henrietta-Maria, wife to Charles the firſt, he paid a viſit to my lord Bacon; who, being then ſick in bed, received him with the curtains drawn. "You reſemble the "angels, ſaid that miniſter to him: we hear thoſe beings continually talked of, "we believe them ſuperior to mankind, and we never have the conſolation to ſee "them." Among his countrymen, the names, alone, of thoſe who have adopted his notions, and proceeded on his plan, are his higheſt encomium. To paſs over a long line of philoſophers, all illuſtrious; he reckons in the liſt of his followers a Boyle, a Locke, a Newton himſelf.

Voltaire, Lettres ſur les Anglois, p. 82.

Rawley's Life of Bacon.

One ſingularity there was in his temperament, not eaſily to be accounted for: in every eclipſe of the moon, whether he obſerved it or not, he was certainly ſeized with a ſudden fit of fainting; which left him without any remaining weakneſs, as ſoon as the eclipſe ended. He was of a middling ſtature; his forehead ſpacious and open, early impreſſed with the marks of age; his eye lively and penetrating; his whole appearance venerably pleaſing: ſo that the beholder was inſenſibly drawn to love, before he knew how much reaſon there was to admire him. In this reſpect, we may apply to my lord Bacon what Tacitus finely obſerves of his father in law, Agricola: a good man you would readily have judged him to be, and been pleaſed to find him a great man.

Evelyn of Medals, p. 340.

Thoſe talents that commonly appear ſingle in others, and they too men of reputation, ſhone forth in him united and eminent. All his cotemporaries, even

† He continued ſingle till after forty, and then took to wife a daughter of alderman Barnham of London, with whom he received a plentiful fortune, but had by her no children: and ſhe out-lived him upwards of twenty years. Such readers as have any curioſity to know what regimen he obſerved, may take the following account of it in the words of his chaplain. "His diet was rather plentiful and liberal than "reſtrained. In his younger years he was much given to the finer and lighter ſorts of meats: but after-"wards he preferred the ſtronger, ſuch as the ſhambles afforded; as thoſe which bred the more firm and "ſubſtantial juices, and leſs diſſipable. He did not, you may be ſure, neglect that himſelf, which he ſo "much extolled to others in his writings, the frequent uſe of nitre; whereof he took the quantity of about "three grains in thin warm broth every morning, for thirty years together. His ordinary phyſic was 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 leſs. His receipt for the gout, which conſtantly gave him eaſe within two "hours, is ſet down in the end of the Natural Hiſtory." See Vol. I. p. 430.

thoſe

thoſe who hated the courtier, ſtand up and bear witneſs together to the ſuperior abilities of the writer and pleader, of the philoſopher and companion. In converſation, he could aſſume the moſt differing characters, and ſpeak the language proper to each, with a facility that was perfectly natural; or the dexterity of the habit concealed every apppearance of art: a happy verſatility of genius, which all men wiſh to arrive at, and one or two, once in an age, are ſeen to poſſeſs. In public, he commanded the attention of his hearers, and had their affections wholly in his power. As he accompanied what he ſpoke with all the expreſſion and grace of action, his pleadings, that are now perhaps read without emotion, never failed to awaken in his audience the ſeveral paſſions he intended they ſhould feel. This is not a picture of him drawn from fancy: it is copied, and that but in miniature, after another taken by one who knew him well; a good judge of merit, and ſeldom known to err, at leaſt in heightening a favorable likeneſs. As a philoſopher, it is ſcarce hyperbolical to ſay of him, in Mr. Addiſon's words, that he had the ſound, diſtinct, comprehenſive knowledge of Ariſtotle, with all the beautiful lights, graces, and embelliſhments of Cicero. To this commendation of his talents, the learned throughout Europe have given their common ſanction, and own him for the father of the only valuable philoſophy, that of fact and obſervation.

Oſborn's Advice to a ſon.

B. Johnſon, in his Diſcoveries.

It remains then to conſider him, more particularly than we have hitherto done, in this moſt known and conſpicuous part of his character; where his merit is unqueſtionably great and entirely his own. For, to the writings of the ancients he was not, he could not, be obliged. They had either miſtaken the right road to natural knowledge; or if any of them ſtruck into it by chance, finding the way difficult, obſcure, and tedious, they ſoon abandoned it for ever. He owed to himſelf alone, to a certain intellectual ſagacity, that beam of true diſcernment which ſhewed him at once, and as it were by intuition, what the moſt painful inquirers, for more than twenty ages backward, had ſearched after in vain. And here let me obſerve towards him the ſame impartiality I have hitherto aimed at: and, in order to know what he really did as a philoſopher, place before the reader a ſhort view of the ſtate of learning in Europe, from the dark period of Gothiciſm down to the ſixteenth century. But let me at the ſame time acknowledge, that this account will be only a rude and imperfect ſketch: conſiſting of a few detached particulars, without much order or method.

Although the great era of ignorance has been fixed, juſtly enough, to thoſe times when the northern nations, like a mighty inundation, overſpread the face of Europe; yet it is no leſs certain that barbariſm and corruption were entered into arts and ſciences ere the ſavages had made any impreſſion on the Roman empire. Under them indeed, that darkneſs which had been long growing on the world, and gradually extinguiſhing every light of knowledge, ſoon became total, and threatened to be perpetual. In the eighth century, we find that the higheſt ambition of the clergy was to vie with one another in chanting the public ſervice, which yet they hardly underſtood. This important emulation run ſo high between the Latin and French prieſthood, that Charlemagne, who was then at Rome, found it neceſſary to interpoſe, and decide the controverſy in perſon. The monk, who relates this affair with a moſt circumſtantial exactneſs, adds, that the emperor intreated pope Adrian to procure him certain perſons, who might teach his ſubjects the firſt principles of grammar and arithmetic; arts that were then utterly unknown in his dominions. This warlike monarch, though his own education had been ſo far neg-

An. 787.

Joannis Launoii Op. t. iv. p. 2.

lected that he had never learned to write, discovered by his natural good sense, the value of knowledge, and set himself to be its promoter and patron. He even allowed a public school to be opened in the imperial palace, under the direction of our famous countryman Alcuin; on whom he chiefly relied for introducing into France some tincture of that philosophy which was still remaining in Britain. But how slow and ineffectual the progress of any learning must have been, we may guess from an edict of the council of Challons, in the next century; which earnestly exhorts all monasteries to be careful in having their manuals of devotion correctly tran-
813. scribed: lest, while they piously mean to ask of God one thing, some inaccurate manu-
Launoii, p. 3. script may betray them into praying for the quite contrary.

As to Britain, if learning had still some footing there in the eighth century, it was
Hist. et antiq. univer. Oxon. p. 13. so totally exterminated from thence in the ninth; that, throughout the whole kingdom of the West-Saxons, no man could be found who was scholar enough to instruct our king Alfred, then a child, even in the first elements of reading: so that he was in his twelfth year before he could name the letters of the alphabet. When that renowned prince ascended the throne, he made it his study to draw his people out of the sloth and stupidity in which they lay: and became, as much by his own example, as by the encouragement he gave to learned men, the great restorer of arts in his dominions. And here we are called upon to observe, that as France had been formerly obliged to England in the person of Alcuin, who planted the sciences there under Charlemagne; our island now received the same friendly assistance from thence by Grimbald, whom king Alfred had invited hither, and made chancellor of Ox-
879. ford. Such events as these are too considerable, in the literary history of the ninth age, to be passed over unobserved. The rise of a noted grammarian, the voyage of an applauded doctor, are recorded by the chroniclers of that century, with the same reverence that an ancient writer would mention the appearance of a Lycurgus, or a Timoleon; of a lawgiver who new-models a state, or a hero who rescues a whole people from slavery.

But these fair appearances were of short duration. A night of thicker darkness quickly overspread the intellectual world: and in the moral, followed a revolution still more deplorable. To common sense and piety, succeeded dreams and fables, visionary legends and ridiculous penances. The clergy, now utter strangers to all good learning, instead of guiding a rude and vicious laity by the precepts of the gospel, which they no longer read, amused them with forged miracles, or overawed them by the ghostly terrors of demons, spectres and chimeras. This was more easy, and more profitable too, than the painful example of a virtuous life. The profound depravity that was spread through all conditions of men, ecclesiastic and secular, appears in nothing more plain than in the reasons assigned for calling several councils about this time. In one, new canons were to be made, forbidding adultery, incest, and the practice of pagan superstitions: as if these things had not till then been ac-
Giannone, Istor. di Napoli, l. 5. counted criminal. In another, it was found necessary to declare, that a number of angels worshipped universally under certain names were altogether unknown: and that the church could not warrant the particular invocation of more than three. A third, which the empress Irene had summoned for the reformation of discipline, ordained, that no prelate should thenceforth convert his episcopal palace into a common inn; nor in consideration only of any sum of money given him by one man, curse and excommunicate another. A fourth and fifth censure the indecency of avowed concubinage:

binage: and enjoin that friers and nuns ſhould no longer converſe or live promiſcuouſly in the ſame convent.

The ſee of Rome, which ſhould have been a pattern to the reſt, was of all chriſtian churches the moſt licentious *; and the pontifical chair often filled with men, who, inſtead of adorning their ſacred character, made human nature itſelf deteſtable: a truth by many catholic writers acknowledged and lamented. Several popes were by their ſucceſſors excommunicated, their acts abrogated, and the ſacraments adminiſtered by them pronounced invalid. No leſs than ſix were expelled by others who uſurped their ſeat; two were aſſaſſinated: and the infamous Theodora, infamous even in that age, by her credit in the holy city obtained the triple crown for the moſt avowed of her gallants, who aſſumed the name of John the tenth. Another of the ſame name was called to govern the chriſtian world at the age of twenty one; a baſtard ſon of Pope Sergius who died eighteen years before. If ſuch were the men who arrogated to themſelves titles and attributes peculiar to the Deity, can we wonder at the greateſt enormities among lay-men? Their ſtupidity kept pace with the diſſolution of their manners, which was extreme: they ſtill preſerved, for the very clergy we have been ſpeaking of, a reverence they no longer had for their God. The moſt abandoned among them, miſcreants, familiar with crimes that humanity ſtartles at, would yet, at the hazard of their lives, defend the immunities of a church, a conſecrated utenſil, or a donation made to a convent. In ſuch times as thoſe, it were in vain to look for uſeful learning and philoſophy. Not only the light of ſcience, but of reaſon, ſeems to have been well-nigh extinguiſhed.

Idem, l. 7.

John XI.

It was not till late, after the ſack of Conſtantinople by the Turks, that the writings of Ariſtotle began to be univerſally known and ſtudied. They were then, by certain fugitive Greeks, who had eſcaped the fury of the Ottoman arms, brought away and diſperſed through the Weſtern parts of Europe. Some particular treatiſes of his, it is true, had been long made public; but chiefly in tranſlations from the Arabic, done by men who, far from rendering faithfully the author's ſenſe, hardly underſtood his language. Theſe however gave birth to the ſcholaſtic philoſophy; that motley offſpring of error and ingenuity; and to ſpeak freely, the features of both parents were all along equally blended in the complexion of the daughter. To trace at length the riſe, progreſs, and variations of this philoſophy, would be an undertaking not only curious but inſtructive, as it would unfold to us all the mazes in which the force, the ſubtlety, the extravagance of human wit can loſe themſelves: till not only profane learning but divinity itſelf was at laſt, by the refined frenzy of thoſe who taught both, ſubtilized into mere notion and air.

An. 1453.

* The book intitled, *The tax of the Roman Chancery*, publiſhed firſt at Rome, in the year 1514, furniſhes us with a flagrant inſtance of this in the following paſſage, which I chooſe not to tranſlate. "Abſolutio à lapſu carnis ſuper quocunque actu libidinoſo commiſſo per *Clericum*, etiam cum *monialibus*, intra "et extra ſepta monaſterii; aut cum *conſanguineis* vel affinibus, aut filia ſpirituali, aut quibuſdam aliis, ſive "ab unoquoque de per ſe, ſive ſimul ab omnibus abſolutio petatur, cum *dispenſatione* ad *ordines* et *beneficia*, "cum inhibitione, tur. 36, duc. 3. Si vero cum illis petatur *abſolutio* etiam a crimine commiſſo *contra naturam*, vel cum *brutis*, cum diſpenſatione, ut ſupra, et cum inhibitione, tur. 60, duc. 12, carl. 16. Si vero "petatur tantum abſolutio a crimine *contra naturam*, vel cum *brutis*, cum diſpenſatione et inhibitione, turon. 36, duc. 9. Abſolutio pro *Moniali*, quae ſe permiſit *pluries* cognoſci intra et extra ſepta monaſterii, "cum *rehabilitate* ad *dignitates* illius ordinis, etiam *abbatialem*, turon. 36. duc. 9." In the edition of Boiſle-duc, there is "Abſolutio pro *eo*, qui *interfecit* patrem, matrem, ſororem, uxorem.... g. 5, vel 7." Vide Bayle, art. Banck.

Their philoſophy was neither that of Ariſtotle entirely, nor altogether differing from his. Whatever opinions the firſt founders of it had been able to draw, from Boetius his Latin commentator, or from the wretched tranſlations abovementioned, theſe they methodized and illuſtrated, each according to his ſeveral talent, and the genius of the age he lived in. But this, inſtead of producing one regular and conſiſtent body of ſcience, even from wrong principles, ended in a monſter, made up of parts every where miſhapen and diſſimilar. Add to this, that they left natural knowledge wholly uncultivated; to hunt after occult qualities, abſtract notions, and queſtions of impertinent curioſity, by which they rendered the very logic their labours chiefly turned upon intricate, uſeleſs, unintelligible.

An. 1050. An. 1320. Alſtedius, in his chronology of the ſchoolmen, has divided their hiſtory into three principal periods or ſucceſſions: the firſt beginning with Lanfranc, archbiſhop of Canterbury, who floriſhed about the middle of the eleventh century; and ending with Albert the Great two ages later: the ſecond, that commences from him, determining in Durand; as the third and laſt ended in Luther, at the reformation. Morhoff, however, ſtrenuouſly contends, that Rucelinus, an Engliſhman, was properly the father of the ſchoolmen: and that to him the ſect of the Nominaliſts owed its riſe and credit. He adds, that it revived afterwards in the perſon of Occam, another of our countrymen, and the perpetual antagoniſt of Duns Scotus, who had declared for the Realiſts, and was reckoned their ableſt champion. The learned reader needs not be told, that the ſcholaſtic doctors were all diſtinguiſhed into theſe two ſects; formidable party-names which are now as little known or mentioned as the controverſies that once occaſioned them. It is ſufficient to ſay, that, like all other parties, they hated each other heartily; treated each other as heretics in logic: and that their diſputes were often ſharp and bloody; ending not only in the metaphorical deſtruction of common ſenſe and language, but in the real mutilation and death of the combatants. For, to the diſgrace of human reaſon, mankind in all their controverſies, whether about a notion or a thing, a predicament or a province, have made their laſt appeal to brute force and violence. The titles* with which theſe leaders were honored by their followers, on account of the ſublime reveries they taught, are at once magnificent and abſurd: and prove rather the ſuperlative ignorance of thoſe times, than any tranſcendent merit in the men to whom they were applied. From this cenſure we ought nevertheleſs to except one, who was a prodigy of knowledge for the age he lived in, and is acknowledged as ſuch by the age to which I am writing. I mean the renowned frier Bacon, who ſhone forth ſingly through the profound darkneſs of thoſe times; but rather dazzled than enlightened the weaker eyes of his cotemporaries. As if the name of Bacon were auſpicious to philoſophy, this man, not only without aſſiſtance or encouragement, but inſulted and perſecuted, by the unconquerable force of his genius penetrated far into the myſteries of nature, and made ſo many new diſcoveries in aſtronomy and perſpective, in mechanics and chemiſtry, that the moſt ſober writers even now cannot mention them without ſome marks of emotion and wonder. It is Dr. Friend's obſervation, that he was almoſt the only aſtronomer of his age: and the reformation of the calendar, by him attempted and in a manner perfected, is a noble proof of his ſkill in that ſcience. The conſtruction of

Polyhiſtor. Tom. II. P. 73, &c.

* The profound, the ſubtile, the marvellous, the indefatigable, the irrefragable, the angelic, the ſeraphic, the fountain of life, light of the world, *etc.*

ſpectacles,

ſpectacles, of teleſcopes, of all ſorts of glaſſes that magnify or diminiſh objects, the compoſition of gunpowder (which Bartholdus Swartz is thought to have firſt hit upon almoſt a century later) are ſome of the many inventions with juſtice aſcribed to him. For all which, he was in his life-time calumniated, impriſoned, oppreſſed: and after his death wounded in his good name, as a magician who had dealt in arts, infernal and abominable. He tells us, that there were but four perſons then in Europe who had made any progreſs in the mathematics; and in chemiſtry yet fewer: that thoſe who undertook to tranſlate Ariſtotle were every way unequal to the taſk: and that his writings, which, rightly underſtood, Bacon conſidered as the fountain of all knowledge, had been lately condemned and burned, in a ſynod held at Paris.

The works of that celebrated ancient have, in truth, more exerciſed the hatred and admiration of mankind, than thoſe of all the other philoſophers together: Launoy enumerates no leſs than thirty-ſeven fathers of the church who have ſtigmatized his name, and endeavoured to reprobate his doctrines. Morhoff has reckoned up a ſtill greater number of his commentators, who were at the ſame time implicitly his diſciples: and yet both theſe authors are far from having given a complete liſt either of his friends or enemies. In his life-time he was ſuſpected of irreligion, and, by the pagan prieſthood, marked out for deſtruction: the ſucceſſors of thoſe very men were his partizans and admirers. His works met with much the ſame treatment from the chriſtian clergy: ſometimes proſcribed for heretical; ſometimes triumphant and acknowledged the great bulwark of orthodoxy. Launoy has written a particular treatiſe on the ſubject, and mentioned eight different revolutions in the fortune and reputation of Ariſtotle's philoſophy. To paſs over the intermediate changes, I will juſt mention two, that make a full and ridiculous contraſt. In the above-mentioned council held at Paris about the year 1209, the biſhops there cenſured his writings, without diſcrimination, as the peſtilent ſources of error and hereſy; condemned them to the flames, and commanded all perſons, on pain of excommunication, not to read, tranſcribe, or keep any copies of them. They went farther, and delivered over to the ſecular arm no leſs than ten perſons, who were burned alive, for certain tenets, drawn, as thoſe learned prelates had heard, from the pernicious books in queſtion. In the ſixteenth century, thoſe very books were not only read with impunity, but every where taught with applauſe: and whoever diſputed their orthodoxy, I had almoſt ſaid their infallibility, was perſecuted as an infidel and miſcreant. Of this the ſophiſter Ramus is a memorable inſtance. Certain animadverſions of his on the peripatetic philoſophy occaſioned a general commotion in the learned world. The univerſity of Paris took the alarm hotly, and cried out againſt this attempt as deſtructive of all good learning, and of fatal tendency to religion itſelf. The affair was brought before the parliament; and appeared of ſo much conſequence to Francis the firſt, that he would needs take it under his own immediate cogniſance. The edict is ſtill extant, which declares Ramus inſolent, impudent, and a lyar. His books are thereby for ever condemned, ſuppreſſed, aboliſhed: and what is a ſtrain of unexampled ſeverity, the miſerable author is ſolemnly interdicted from tranſcribing, even from reading his own compoſitions!

Lib. de varia Ariſt. fortuna, Tom. IV.

Polyhiſtor. Tom. II.

Launoii, ubi ſupra.

Launoii, tom. IV. p. 206.

10th of May, An. 1543.

We might from hence be led to imagine, that when the authority of an ancient philoſopher was held ſo ſacred, philoſophy itſelf muſt have been thoroughly underſtood, and cultivated with uncommon ſucceſs; but the attachment of thoſe doctors

tors was to a name, not to truth, or valuable ſcience: and our author very juſtly compares them to the olympic wreſtlers, who abſtained from neceſſary labors, that they might be fit for ſuch as were not ſo. Under their management, it was a philoſophy of words and notions, that ſeemed to exclude the ſtudy of nature; that, inſtead of inquiring into the properties of bodies, into the laws of motion by which all effects are produced, was converſant only in logical definitions, diſtinctions, and abſtractions, utterly barren and unproductive of any advantage to mankind. The great aim of thoſe ſolemn triflers was rather to perplex a diſpute, than to clear up any point of uſeful diſquiſition; to triumph over an enemy, than to enlarge the knowledge, or better the morals of their followers. So that this captious philoſophy was a real obſtacle to all advances in ſound learning, human and divine. After it had been adopted into the chriſtian Theology, far from being of uſe to explain and aſcertain myſteries, it ſerved to darken and render doubtful the moſt neceſſary truths; by the chicanery of argumentation with which it ſupplied each ſect, in defence of their peculiar and favorite illuſions. To ſo extravagant a height did they carry their idolatry of Ariſtotle, that ſome of them diſcovered, or imagined they diſcovered in his writings, the doctrine of the Trinity; that others publiſhed formal diſſertations to prove the certainty of his ſalvation, though a heathen: and that a patriarch of Venice is ſaid to have called up the devil expreſsly, in order to learn from him the meaning of a hard word in Ariſtotle's Phyſics. But the crafty demon, who perhaps did not underſtand it himſelf, anſwered in a voice ſo low and inarticulate, that the good prelate knew not a word he ſaid. This was the famous Hermolaus Barbaro: and the Greek word, that occaſioned his taking ſo extraordinary a ſtep, is the Entelechia of the Peripatetics; from whence the ſchoolmen raiſed their ſubſtantial forms, and which Leibnitz, towards the end of the laſt century, attempted to revive in his theory of motion.

Bacon's Apothegms.

Bayle, art. Barbaro.

The reformation itſelf, that diffuſed a new light over Europe, that ſet men upon inquiring into errors and prepoſſeſſions of every kind, ſerved only to confirm the dominion of this philoſophy: proteſtants as well as papiſts entrenching themſelves behind the authority of Ariſtotle, and defending their ſeveral tenets by the weapons with which he furniſhed them. This unnatural alliance of theology with the peripatetic doctrines rendered his opinions not only venerable but ſacred: they were reckoned as the land-marks of both faith and reaſon, which to pull up or remove would be daring and impious. Innovations in philoſophy, it was imagined, would gradually ſap the very foundations of religion, and in the end lead to downright atheiſm. If that veil of awful obſcurity, which then covered the face of nature, ſhould be once drawn; the raſh curioſity of mankind would lead them to account for all appearances in the viſible world, by ſecond cauſes, by the powers of matter and mechaniſm: and thus they might come inſenſibly to forget or neglect the great original cauſe of all. This kind of reaſoning convinced the multitude, over-awed the wiſer few, and effectually put a ſtop to the progreſs of uſeful knowledge.

Such, in general, were the diſpoſitions of mankind when Sir Francis Bacon came into the world; whom we will not conſider as the founder of a new ſect, but as the great aſſertor of human liberty; as one who reſcued reaſon and truth from the ſlavery in which all ſects alike had, till then, held them. As a plauſible hypotheſis, a ſhining theory, are more amuſing to the imagination, and a ſhorter way to fame, than the patient and humble method of experimenting, of purſuing nature through

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all her labyrinths by fact and obſervation; a philoſophy built on this principle, could not, at firſt, make any ſudden or general revolution in the learned world. But its progreſs, like that of time, quiet, ſlow, and ſure, has in the end been mighty and univerſal. He was not however the firſt among the moderns who ventured to diſſent from Ariſtotle. Ramus, Patricius, Bruno, Severinus, to name no more, had already attacked the authority of that tyrant in learning, who had long reigned as abſolutely over the opinions of men, as his reſtleſs pupil had of old affected to do over their perſons. But theſe writers invented little that was valuable themſelves, however juſtly they might reprehend many things in him. And as to the real improvements made in ſome parts of natural knowledge before our author appeared, by Gilbert, Harvey, Copernicus, father Paul, and ſome few others, they are well known, and have been deſervedly celebrated. Yet there was ſtill wanting one great and comprehenſive plan, that might embrace the almoſt infinite varieties of ſcience, and guide our inquiries aright in all. This Sir Francis Bacon firſt conceived, in its utmoſt extent; to his own laſting honor, and to the general utility of mankind. If we ſtand ſurpriſed at the happy imagination of ſuch a ſyſtem, our ſurpriſe redoubles upon us when we reflect, that he invented and methodized this ſyſtem, perfected ſo much, and ſketched out ſo much more of it, amidſt the drudgery of buſineſs and the civil tumults of a court. Nature ſeems to have intended him peculiarly for this province, by beſtowing on him with a liberal hand all the qualities requiſite: a fancy voluble and prompt to diſcover the ſimilitudes of things; a judgment ſteddy and intent to note their ſubtleſt differences; a love of meditation and enquiry; a patience in doubting; a ſlowneſs and diffidence in affirming; a facility of retracting; a careful anxiety to plan and diſpoſe. A mind of ſuch a caſt, that neither affected novelty, nor idolized antiquity, that was an enemy to all impoſture, muſt have had a certain congeniality and relation to truth. Theſe characters, which, with a noble confidence, he has applied to himſelf, are obvious and eminent in his Inſtauration of the Sciences: a work by him deſigned, not as a monument to his own fame, but a perpetual legacy to the common benefit of others. He has divided the whole of it into ſix capital parts; with a ſhort account of which we ſhall cloſe this imperfect relation of his life and writings. Bacon, Vol. IV. p. 4, 5.

1. The firſt part of this Inſtauration propoſes a general ſurvey of human knowledge: and this he executed in that admirable treatiſe intitled, The Advancement of Learning. As he intended to raiſe a new and laſting ſtructure of philoſophy, founded not in arbitrary opinions or ſpecious conjectures, but in truth and experience; it was abſolutely neceſſary to his deſign, firſt to review accurately the ſtate of learning as it then ſtood, through all its provinces and diviſions. To do this effectually required, with an uncommon meaſure of knowledge, a diſcernment not only exquiſite but univerſal: the whole intellectual world was ſubjected to its examination and cenſure. That he might not loſe himſelf on a ſubject ſo vaſt and of ſuch variety; he has, according to the three faculties of the ſoul, memory, fancy, underſtanding, ranged the numerous train of arts under three great claſſes, hiſtory, poetry, philoſophy. Theſe may be conſidered as the principal trunks from which ſhoot forth, in prodigious diverſity, the leſſer parts and branches of ſcience. Whatever is deficient, erroneous, or ſtill wanting in each, he has pointed out at large: together with the propereſt means for amending the defects, for rectifying the errors, and for ſupplying the omiſſions in all. Upon the whole, he was not only well acquainted with every thing that had been diſcovered in books before De augmentis ſcientiarum.

before his time, and able to pronounce critically on thoſe diſcoveries: he ſaw clearly, and at the end of this treatiſe has marked out in one general chart, the ſeveral tracts of ſcience that lay ſtill neglected or unknown. And to ſay truth, ſome of the moſt valuable improvements ſince made have grown out of the hints and notices ſcattered through this work: from which the moderns have ſelected, each according to his fancy, one or more plants to cultivate and bring to perfection.

Novum Organon.

2. The deſign of the Novum Organon, which ſtands as the ſecond part to his Inſtauration, and may be reckoned the moſt conſiderable, was to raiſe and enlarge the powers of the mind, by a more uſeful application of its reaſoning faculty to all the different objects that philoſophy conſiders. In this place, our author offers to the world a new and better logic; calculated not to ſupply arguments for controverſy, but arts for the uſe of mankind; not to triumph over an enemy by the ſophiſtry of diſputation, but to ſubdue nature itſelf by experiment and inquiry. As it differs from the vulgar logic in its aim, it varies no leſs from that captious art in the form of demonſtrating: for it generally rejects ſyllogiſm, as an inſtrument rather hurtful than ſerviceable to the inveſtigation of nature, and uſes in its ſtead a ſevere and genuine induction. Not the trivial method of the ſchools, that, proceeding on a ſimple and ſuperficial enumeration, pronounces at once from a few particulars, expoſed to the danger of contradictory inſtances: but an induction that examines ſcrupulouſly the experiment in queſtion, views it in all poſſible lights, rejects and excludes whatever does not neceſſarily belong to the ſubject, then, and not till then, concluding from the affirmatives left. A croud of inſtances might be brought to ſhew how greatly this method of inquiry has proſpered in the hands of the moderns; and how fruitful it has been of new diſcoveries, unknown and unimagined by antiquity. But I will only mention one that may ſtand in place of many; the Optics of our immortal Newton: where, in a variety of experiments, he has annalyſed the nature and properties of light itſelf, of the moſt ſubtile of all bodies, with an accuracy, a preciſion, that could hardly have been expected from examining the groſſeſt and moſt palpable. From whence, by the method of induction, he has raiſed the nobleſt theory that any age or country can ſhew.

Phaenomena univerſi.

3. It has been the fate of almoſt every conſiderable ſcheme for the good of mankind to be treated, at firſt, as viſionary, or impracticable, merely for being new. This our author foreſaw, and endeavoured to obviate, in the third part of his Inſtauration; by furniſhing materials himſelf towards a natural and experimental hiſtory; a work which he thought ſo indiſpenſably neceſſary, that without it the united endeavours of all mankind, in all ages, would be inſufficient to rear and perfect the great ſtructure of the ſciences. He was aware too, that even men of freer and more extenſive notions, who reliſhed his new logic, might be deterred from reducing it to practice, by the difficulties they would meet with in experimenting, according to the rules by him preſcribed. He therefore led the way to other inquirers, in his *Sylva Sylvarum*, or hiſtory of nature: which, however imperfect in many reſpects, ought to be looked upon as extenſive and valuable for that age, when the whole work was to be begun. This collection, which did not appear till after his death, has been generally conſidered as detached from, and independent on his general plan: and therefore his deſign in making and recording theſe experiments has not been duly attended to by the reader. They are a common

mon repoſitory or ſtore-houſe of materials, not arranged for ornament and ſhow, but thrown looſely together for the ſervice of the philoſopher: who may from thence ſelect ſuch as fit his preſent purpoſe; and with them, by the aid of that organ or engine already deſcribed, build up ſome part of an axiomatical philoſophy, which is the crown and completion of this ſyſtem. The phaenomena of the univerſe he ranges under three principal diviſions; the hiſtory of generations or the production of all ſpecies according to the common laws of nature; that of pretergenerations or of births deviating from the ſtated rule; and thirdly, the hiſtory of nature as confined or aſſiſted, changed or tortured by the art of man: which laſt diſcloſes to us a new face of things, and as it were another world of appearances. The uſe of ſuch a hiſtory he reckons two-fold; either the knowledge of qualities in themſelves: or to ſerve for the firſt matter of a true and uſeful philoſophy. With this view only did our author make and gather together the miſcellaneous collection I am ſpeaking of. That many particular experiments have been found doubtful or falſe, cannot be wondered at: the whole was then a tract of ſcience uncultivated and deſert. If ſeveral conſiderable men, treading in the path he ſtruck out for them, have gone farther and ſurveyed it more exactly than he did, yet to him is the honor of their diſcoveries in a manner due. It was Columbus alone who imagined there might be a new world; and who had the noble boldneſs to go in ſearch of it, through an ocean unexplored and immenſe. He ſucceeded in the attempt; and led his followers into a ſpacious continent, rich and fruitful. If ſucceeding adventurers have penetrated farther than he into its ſeveral regions, marked out and diſtinguiſhed them with more accuracy; the reſult of theſe diſcoveries has leſs extended their fame than it has raiſed and enlarged his. Bacon, Vol. IV. p. 391.

4. After theſe preparations, nothing ſeems wanting but to enter at once on the laſt and moſt exalted kind of philoſophy: but the author judged, that, in an affair ſo complicated and important, ſome other things ought to precede, partly for inſtruction, and partly for preſent uſe. He therefore interpoſed a fourth and fifth part: the former of which he named *Scala Intellectus*, or a ſeries of ſteps by which the underſtanding might regularly aſcend in its philoſophical reſearches. For this purpoſe, he propoſed examples of inquiry and inveſtigation, agreeable to his own method, in certain ſubjects; ſelecting ſuch eſpecially as are of the nobleſt order, and moſt widely differing from one another; that inſtances of every ſort might not be wanting. The fourth part then was to contain a particular application and illuſtration of the ſecond. In this light we chooſe to conſider the ſix monthly hiſtories which he propoſed to write on ſix principal topics in natural hiſtory: namely, of winds; of life and death; of rarefaction and condenſation; of the three chemical principles, ſalt, ſulphur, mercury; of bodies heavy and light; of ſympathy and antipathy. The firſt three, in the order I have here placed them, he proſecuted at ſome length; and in a manner that ſhews with what a happy ſagacity he could apply his own rules to the interpretation of nature. The wonder is, that other inquirers ſince his time have done ſo little towards perfecting the two firſt mentioned, things of ſo great concern to human ſociety, and to every individual. As to the three laſt, we have only a ſhort introduction to each: death having prevented him from writing any thing on the ſubjects themſelves. Such is our condition here: whoever is capable of planning uſeful and extenſive ſchemes dies always too ſoon for mankind, even in the moſt advanced age. Scala Intellectus.

Anticipationes philoſ. ſecundae.

5. Of the fifth part he has left nothing but the title and ſcheme. It was indeed to be only a temporary ſtructure, raiſed with ſuch materials as he himſelf had either invented, or tried, or improved; not according to the due form of genuine induction, but by the ſame common uſe of the underſtanding that others had employed. And this was to remain no longer than till he had raiſed,

Philoſophia prima, ſive activa.

6. The ſixth and ſublimeſt part of this grand Inſtauration, to which all the precedent are merely ſubſervient: a philoſophy purely axiomatical and ſcientific; flowing from that juſt, caſtigated, genuine manner of inquiry, which the author firſt invented and applied. But this he deſpaired of being able to accompliſh: and the learned of all countries from his days have been only laboring ſome ſeparate or leſſer parts of this amazing edifice, which ages to come may not ſee finiſhed according to the model left them by this one man.

Such, and ſo unlimited were his views for the univerſal advancement of ſcience; the noble aim to which he directed all his philoſophic labors. What Cæſar ſaid, in compliment, to Tully may, with ſtrict juſtice, be applied to him; that it was more glorious to have extended the limits of human wit, than to have enlarged the bounds of the Roman world. Sir Francis Bacon really did ſo: a truth acknowledged not only by the greateſt private names in Europe, but by all the public ſocieties of its moſt civilized nations. France, Italy, Germany, Britain, I may add even Ruſſia, have taken him for their leader, and ſubmitted to be governed by his inſtitutions. The empire he has erected in the learned world is as univerſal as the free uſe of reaſon: and one muſt continue, till the other is no more.

PHILO-

PHILOSOPHICAL
WORKS.

THE

TWO BOOKS

OF

FRANCIS BACON,

OF THE

PROFICIENCE and ADVANCEMENT

OF

LEARNING,

DIVINE and HUMAN.

TO THE KING.

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THE FIRST BOOK OF *FRANCIS BACON:* OF THE PROFICIENCE and ADVANCEMENT OF LEARNING, DIVINE and HUMAN.

TO THE KING.

THERE were under the law, excellent king, both daily ſacrifices, and free-will offerings: the one proceeding upon ordinary obſervance, the other upon a devout chearfulneſs: in like manner there belongeth to kings from their ſervants, both tribute of duty, and preſents of affection. In the former of theſe, I hope I ſhall not live to be wanting, according to my moſt humble duty, and the good pleaſure of your majeſty's employments: for the latter, I thought it more reſpective to make choice of ſome oblation, which might rather refer to the propriety and excellency of your individual perſon, than to the buſineſs of your crown and ſtate.

Wherefore repreſenting your majeſty many times unto my mind, and beholding you not with the inquiſitive eye of preſumption, to diſcover that which the Scripture telleth me is inſcrutable, but with the obſervant eye of duty and admiration: leaving aſide the other parts of your virtue and fortune, I have been touched, yea,

and poſſeſſed with an extreme wonder at thoſe your virtues and faculties, which the philoſophers call intellectual: the largeneſs of your capacity, the faithfulneſs of your memory, the ſwiftneſs of your apprehenſion, the penetration of your judgment, and the facility and order of your elocution: and I have often thought, that of all the perſons living that I have known, your majeſty were the beſt inſtance to make a man of Plato's opinion, that all knowledge is but remembrance, and that the mind of man by nature knoweth all things, and hath but her own native and original notions (which by the ſtrangeneſs and darkneſs of this tabernacle of the body are ſequeſtered) again revived and reſtored: ſuch a light of nature I have obſerved in your majeſty, and ſuch a readineſs to take flame, and blaze from the leaſt occaſion preſented, or the leaſt ſpark of another's knowledge delivered. And as the Scripture ſaith of the wiſeſt king, *That his heart was as the ſands of the ſea*; which though it be one of the largeſt bodies, yet it conſiſteth of the ſmalleſt and fineſt portions: ſo hath God given your majeſty a compoſition of underſtanding admirable, being able to compaſs and comprehend the greateſt matters, and nevertheleſs to touch and apprehend the leaſt; whereas it ſhould ſeem an impoſſibility in nature, for the ſame inſtrument to make itſelf fit for great and ſmall works. And for your gift of ſpeech, I call to mind what Cornelius Tacitus ſaith of Auguſtus Caeſar; *Auguſto proſluens, et quae principem deceret, eloquentia fuit*: For, if we note it well, ſpeech that is uttered with labour and difficulty, or ſpeech that ſavoureth of the affectation of art and precepts, or ſpeech that is framed after the imitation of ſome pattern of eloquence, though never ſo excellent; all this hath ſomewhat ſervile, and holding of the ſubject. But your majeſty's manner of ſpeech is indeed prince-like, flowing as from a fountain, and yet ſtreaming and branching itſelf into nature's order, full of facility and felicity, imitating none, and inimitable by any. And as in your civil eſtate there appeareth to be an emulation and contention of your majeſty's virtue with your fortune; a virtuous diſpoſition with a fortunate regiment; a virtuous expectation, when time was, of your greater fortune, with a proſperous poſſeſſion thereof in the due time; a virtuous obſervation of the laws of marriage, with moſt bleſſed and happy fruit of marriage; a virtuous and moſt chriſtian deſire of peace, with a fortunate inclination in your neighbour princes thereunto: ſo likewiſe, in theſe intellectual matters, there ſeemeth to be no leſs contention between the excellency of your majeſty's gifts of nature, and the univerſality and perfection of your learning. For I am well aſſured, that this which I ſhall ſay is no amplification at all, but a poſitive and meaſured truth; which is, that there hath not been ſince Chriſt's time any king or temporal monarch, which hath been ſo learned in all literature and erudition, divine and human. For let a man ſeriouſly and diligently revolve and peruſe the ſucceſſion of the emperors of Rome, of which Caeſar the dictator, who lived ſome years before Chriſt, and Marcus Antoninus, were the beſt learned; and ſo deſcend to the emperors of Graecia, or of the Weſt; and then to the lines of France, Spain, England, Scotland, and the reſt, and he ſhall find this judgment is truly made. For it ſeemeth much in a king, if, by the compendious extractions of other mens wits and labours, he can take hold of any ſuperficial ornaments and ſhews of learning, or if he countenance and prefer learning and learned men: but to drink indeed of the true fountains of learning, nay, to have ſuch a fountain of learning in himſelf, in a king, and in a king born, is almoſt a miracle. And the more, becauſe there is met in your majeſty a rare conjunction, as well of divine and ſacred literature, as of profane and human; ſo as your majeſty ſtandeth inveſted of that triplicity, which in great veneration

ration was aſcribed to the ancient Hermes: the power and fortune of a king, the knowledge and illumination of a prieſt, and the learning and univerſality of a philoſopher. This propriety, inherent and individual attribute in your majeſty, deſerveth to be expreſſed, not only in the fame and admiration of the preſent time, nor in the hiſtory or tradition of the ages ſucceeding; but alſo in ſome ſolid work, fixed memorial, and immortal monument, bearing a character or ſignature, both of the power of a king, and the difference and perfection of ſuch a king.

Therefore I did conclude with myſelf, that I could not make unto your majeſty a better oblation, than of ſome treatiſe tending to that end, whereof the ſum will conſiſt of theſe two parts: the former, concerning the excellency of learning and knowledge, and the excellency of the merit and true glory in the augmentation and propagation thereof: the latter, what the particular acts and works are, which have been embraced and undertaken for the advancement of learning; and again, what defects and undervalues I find in ſuch particular acts: to the end, that though I cannot poſitively or affirmatively adviſe your majeſty, or propound unto you framed particulars; yet I may excite your princely cogitations to viſit the excellent treaſure of your own mind, and thence to extract particulars for this purpoſe, agreeable to your magnanimity and wiſdom.

IN the entrance to the former of theſe, to clear the way, and, as it were, to make ſilence, to have the true teſtimonies concerning the dignity of learning to be better heard, without the interruption of tacit objections; I think good to deliver it from the diſcredits and diſgraces which it hath received, all from ignorance, but ignorance ſeverally diſguiſed; appearing ſometimes in the zeal and jealouſy of divines, ſometimes in the ſeverity and arrogancy of politicians, and ſometimes in the errors and imperfections of learned men themſelves.

I hear the former ſort ſay, that knowledge is of thoſe things which are to be accepted of with great limitation and caution; that the aſpiring to overmuch knowledge, was the original temptation and ſin, whereupon enſued the fall of man; that knowledge hath in it ſomewhat of the ſerpent, and therefore where it entereth into a man it makes him ſwell; *Scientia inflat:* that Solomon gives a cenſure, *That there is no end of making books, and that much reading is a wearineſs of the fleſh*; and again in another place, *That in ſpacious knowledge there is much contriſtation, and that he that increaſeth knowledge increaſeth anxiety*; that St. Paul gives a caveat, *That we be not ſpoiled through vain philoſophy*; that experience demonſtrates how learned men have been arch-heretics, how learned times have been inclined to atheiſm, and how the contemplation of ſecond cauſes, doth derogate from our dependence upon God who is the firſt cauſe.

To diſcover then the ignorance and error of this opinion, and the miſunderſtanding in the grounds thereof, it may well appear theſe men do not obſerve or conſider, that it was not the pure knowledge of nature and univerſality, a knowledge by the light whereof man did give names unto other creatures in paradiſe, as they were brought before him according unto their proprieties, which gave occaſion to the fall; but it was the proud knowledge of good and evil, with an intent in man to give law unto himſelf, and to depend no more upon God's commandments, which was the form of the temptation. Neither is it any quantity of knowledge, how great ſoever, that can make the mind of man to ſwell; for nothing can fill, much leſs extend the ſoul of man, but God, and the contemplation of God; and therefore Solomon,

ſpeaking of the two principal ſenſes of inquiſition, the eye and the ear, affirmeth that the eye is never ſatisfied with ſeeing, nor the ear with hearing; and if there be no fulneſs, then is the continent greater than the content: ſo of knowledge itſelf, and the mind of man, whereto the ſenſes are but reporters, he defineth likewiſe in theſe words, placed after that calendar or ephemerides, which he maketh of the diverſities of times and ſeaſons for all actions and purpoſes; and concludeth thus: *God hath made all things beautiful, or decent, in the true return of their ſeaſons: Alſo he hath placed the world in man's heart, yet cannot man find out the work which God worketh from the beginning to the end:* declaring, not obſcurely, that God hath framed the mind of man as a mirror, or glaſs, capable of the image of the univerſal world, and joyful to receive the impreſſion thereof, as the eye joyeth to receive light; and not only delighted in beholding the variety of things, and viciſſitude of times, but raiſed alſo to find out and diſcern the ordinances and decrees, which throughout all thoſe changes are infallibly obſerved. And although he doth inſinuate, that the ſupreme or ſummary law of nature, which he calleth, *The work which God worketh from the beginning to the end, is not poſſible to be found out by man*; yet that doth not derogate from the capacity of the mind, but may be referred to the impediments, as of ſhortneſs of life, ill conjunction of labours, ill tradition of knowledge over from hand to hand, and many other inconveniencies, whereunto the condition of man is ſubject. For that nothing parcel of the world is denied to man's inquiry and invention, he doth in another place rule over, when he ſaith, *The ſpirit of man is as the lamp of God, wherewith he ſearcheth the inwardneſs of all ſecrets.* If then ſuch be the capacity and receipt of the mind of man, it is manifeſt, that there is no danger at all in the proportion or quantity of knowledge, how large ſoever, leſt it ſhould make it ſwell or out-compaſs itſelf; no, but it is merely the quality of knowledge, which be it in quantity more or leſs, if it be taken without the true corrective thereof, hath in it ſome nature of venom or malignity, and ſome effects of that venom, which is ventoſity or ſwelling. This corrective ſpice, the mixture whereof maketh knowledge ſo ſovereign, is charity, which the apoſtle immediately addeth to the former clauſe; for ſo he ſaith, *knowledge bloweth up, but charity buildeth up*; not unlike unto that which he delivereth in another place: *If I ſpake*, ſaith he, *with the tongues of men and angels, and had not charity, it were but as a tinkling cymbal*; not but that it is an excellent thing to ſpeak with the tongues of men and angels, but becauſe, if it be ſever'd from charity, and not referred to the good of men and mankind, it hath rather a ſounding and unworthy glory, than a meriting and ſubſtantial virtue. And as for that cenſure of Solomon, concerning the exceſs of writing and reading books, and the anxiety of ſpirit which redoundeth from knowledge; and that admonition of St. Paul, *That we be not ſeduced by vain philoſophy*; let thoſe places be rightly underſtood, and they do indeed excellently ſet forth the true bounds and limitations, whereby human knowledge is confined and circumſcribed; and yet without any ſuch contracting or coarctation, but that it may comprehend all the univerſal nature of things: for theſe limitations are three: the firſt, that we do not ſo place our felicity in knowledge, as to forget our mortality. The ſecond, that we make application of our knowledge, to give ourſelves repoſe and contentment, and not diſtaſte or repining. The third, that we do not preſume by the contemplation of nature to attain to the myſteries of God. For as touching the firſt of theſe, Solomon doth excellently expound himſelf in another place of the ſame book, where he ſaith; *I ſaw well that knowledge recedeth as far from ignorance, as light doth from darkneſs*;

neſs ; and that the wiſe man's eyes keep watch in his head, whereas the fool roundeth about in darkneſs : but withal I learned, that the ſame mortality involveth them both. And for the ſecond, certain it is, there is no vexation or anxiety of mind which reſulteth from knowledge, otherwiſe than merely by accident ; for all knowledge, and wonder (which is the ſeed of knowledge) is an impreſſion of pleaſure in itſelf : but when men fall to framing concluſions out of their knowledge, applying it to their particular, and miniſtring to themſelves thereby weak fears, or vaſt deſires, there groweth that carefulneſs and trouble of mind which is ſpoken of : for then knowledge is no mote *Lumen ſiccum*, whereof Heraclitus the profound ſaid, *Lumen ſiccum optima anima* ; but it becometh *Lumen madidum*, or *maceratum*, being ſteeped and infuſed in the humours of the affections. And as for the third point, it deſerveth to be a little ſtood upon, and not to be lightly paſſed over : for if any man ſhall think by view and inquiry into theſe ſenſible and material things to attain that light, whereby he may reveal unto himſelf the nature or will of God ; then indeed is he ſpoiled by vain philoſophy : for the contemplation of God's creatures and works produceth (having regard to the works and creatures themſelves) knowledge ; but having regard to God, no perfect knowledge, but wonder, which is broken knowledge. And therefore it was moſt aptly ſaid by one of Plato's ſchool, " That the " ſenſe of man carrieth a reſemblance with the ſun, which, as we ſee, openeth and " revealeth all the terreſtrial globe ; but then again it obſcureth and concealeth the " ſtars and celeſtial globe : ſo doth the ſenſe diſcover natural things, but it darken- " eth and ſhutteth up divine." And hence it is true, that it hath proceeded, that divers great learned men have been heretical, whilſt they have ſought to fly up to the ſecrets of the Deity by the waxen wings of the ſenſes : and as for the conceit, that too much knowledge ſhould incline a man to atheiſm, and that the ignorance of ſecond cauſes, ſhould make a more devout dependence upon God who is the firſt cauſe : Firſt, it is good to aſk the queſtion which Job aſked of his friends : *Will you lie for God, as one man will do for another, to gratify him ?* For certain it is, that God worketh nothing in nature but by ſecond cauſes ; and if they would have it otherwiſe believed, it is mere impoſture, as it were in favour towards God ; and nothing elſe but to offer to the author of truth the unclean ſacrifice of a lye. But farther, it is an aſſured truth, and a concluſion of experience, that a little or ſuperficial knowledge of philoſophy may incline the mind of man to atheiſm, but a farther proceeding therein doth bring the mind back again to religion ; for in the entrance of philoſophy, when the ſecond cauſes, which are next unto the ſenſes, do offer themſelves to the mind of man, if it dwell and ſtay there, it may induce ſome oblivion of the higheſt cauſe ; but when a man paſſeth on farther, and ſeeth the dependence of cauſes, and the works of providence ; then, according to the allegory of the poets, he will eaſily believe that the higheſt link of nature's chain muſt needs be tied to the foot of Jupiter's chair. To conclude therefore : let no man, upon a weak conceit of ſobriety, or an ill-applied moderation, think or maintain, that a man can ſearch too far, or be too well ſtudied in the book of God's word, or in the book of God's works ; divinity or philoſophy ; but rather let men endeavour an endleſs progreſs, or proficience in both ; only let men beware that they apply both to charity, and not to ſwelling ; to uſe, and not to oſtentation ; and again, that they do not unwiſely mingle, or confound theſe learnings together.

And as for the diſgraces which learning receiveth from politicians, they be of this nature ; that learning doth ſoften mens minds, and makes them more unapt for the honour

honour and exercise of arms; that it doth mar and pervert mens dispositions for matter of government and policy, in making them too curious and irresolute by variety of reading, or too peremptory or positive by strictness of rules and axioms, or too immoderate and overweening by reason of the greatness of examples, or too incompatible and differing from the times, by reason of the dissimilitude of examples; or at least, that it doth divert mens travels from action and business, and bringeth them to a love of leisure and privateness; and that it doth bring into states a relaxation of discipline, whilst every man is more ready to argue, than to obey and execute. Out of this conceit, Cato, surnamed the Censor, one of the wisest men indeed that ever lived, when Carneades the philosopher came in embassage to Rome, and that the young men of Rome began to flock about him, being allured with the sweetness and majesty of his eloquence and learning, gave counsel in open senate, that they should give him his dispatch with all speed, lest he should infect and inchant the minds and affections of the youth, and at unawares bring in an alteration of the manners and customs of the state. Out of the same conceit, or humour, did Virgil, turning his pen to the advantage of his country, and the disadvantage of his own profession, make a kind of separation between policy and government, and between arts and sciences, in the verses so much renowned, attributing and challenging the one to the Romans, and leaving and yielding the other to the Grecians; *Tu regere imperio populos, Romane, memento, Hae tibi erunt artes, etc.* So likewise we see that Anytus, the accuser of Socrates, laid it as an article of charge and accusation against him, that he did, with the variety and power of his discourses and disputations, withdraw young men from due reverence to the laws and customs of their country; and that he did profess a dangerous and pernicious science, which was, to make the worst matter seem the better, and to suppress truth by force of eloquence and speech.

But these, and the like imputations, have rather a countenance of gravity, than any ground of justice: for experience doth warrant, that both in persons and in times, there hath been a meeting and concurrence in learning and arms, flourishing and excelling in the same men, and the same ages. For, as for men, there cannot be a better, nor the like instance, as of that pair, Alexander the Great and Julius Caesar the dictator; whereof the one was Aristotle's scholar in philosophy, and the other was Cicero's rival in eloquence: or if any man had rather call for scholars that were great generals, than generals that were great scholars, let him take Epaminondas the Theban, or Xenophon the Athenian; whereof the one was the first that abated the power of Sparta, and the other was the first that made way to the overthrow of the monarchy of Persia. And this concurrence is yet more visible in times than in persons, by how much an age is a greater object than a man. For both in Ægypt, Assyria, Persia, Graecia, and Rome, the same times that are most renowned for arms, are likewise most admired for learning; so that the greatest authors and philosophers, and the greatest captains and governors, have lived in the same ages. Neither can it otherwise be: for as, in man, the ripeness of strength of the body and mind cometh much about an age, save that the strength of the body cometh somewhat the more early; so in states, arms and learning, whereof the one correspondeth to the body the other to the soul of man, have a concurrence or near sequence in times.

And for matter of policy and government, that learning should rather hurt, than enable thereunto, is a thing very improbable: we see it is accounted an error to commit a natural body to empiric physicians, which commonly have a few pleasing

ing receipts, whereupon they are confident and adventurous, but know neither the cauſes of diſeaſes, nor the complexions of patients, nor peril of accidents, nor the true method of cures: we ſee it is a like error to rely upon advocates or lawyers which are only men of practice, and not grounded in their books, who are many times eaſily ſurpriſed, when matter falleth out beſides their experience, to the prejudice of the cauſes they handle: ſo, by like reaſon, it cannot be but a matter of doubtful conſequence, if ſtates be managed by empiric ſtateſmen, not well mingled with men grounded in learning. But contrariwiſe, it is almoſt without inſtance contradictory, that ever any government was diſaſtrous that was in the hands of learned governors. For howſoever it hath been ordinary with politic men to extenuate and diſable learned men by the names of pedants; yet in the records of time it appeareth, in many particulars, that the governments of princes in minority (notwithſtanding the infinite diſadvantage of that kind of ſtate) have nevertheleſs excelled the government of princes of mature age, even for that reaſon which they ſeek to traduce, which is, that by that occaſion the ſtate hath been in the hands of pedants: for ſo was the ſtate of Rome for the firſt five years, which are ſo much magnified, during the minority of Nero, in the hands of Seneca, a pedant: ſo it was again, for ten years ſpace or more, during the minority of Gordianus the younger, with great applauſe and contentation in the hands of Miſitheus, a pedant: ſo was it before that, in the minority of Alexander Severus, in like happineſs, in hands not much unlike, by reaſon of the rule of the women, who were aided by the teachers and preceptors. Nay, let a man look into the government of the biſhops of Rome, as by name, into the government of Pius Quintus, and Sextus Quintus, in our times, who were both at their entrance eſteemed but as pedantical friers, and he ſhall find that ſuch popes do greater things, and proceed upon truer principles of ſtate, than thoſe which have aſcended to the papacy from an education and breeding in affairs of ſtate and courts of princes; for although men bred in learning are perhaps to ſeek in points of convenience, and accommodating for the preſent, which the Italians call *ragioni di ſtato*, whereof the ſame Pius Quintus could not hear ſpoken with patience, terming them inventions againſt religion and the moral virtues; yet on the other ſide, to recompenſe that, they are perfect in thoſe ſame plain grounds of religion, juſtice, honour, and moral virtue, which if they be well and watchfully purſued, there will be ſeldom uſe of thoſe other, no more than of phyſic in a ſound or well-dieted body. Neither can the experience of one man's life furniſh examples and precedents for the events of one man's life: for as it happeneth ſometimes that the grandchild, or other deſcendent, reſembleth the anceſtor more than the ſon; ſo many times occurrences of preſent times may ſort better with ancient examples, than with thoſe of the later or immediate times: and laſtly, the wit of one man can no more countervail learning, than one man's means can hold way with a common purſe.

And as for thoſe particular ſeducements, or indiſpoſitions of the mind for policy and government, which learning is pretended to inſinuate; if it be granted that any ſuch thing be, it muſt be remembered withal, that learning miniſtreth in every of them greater ſtrength of medicine or remedy, than it offereth cauſe of indiſpoſition or infirmity: for if, by a ſecret operation, it makes men perplexed and irreſolute, on the other ſide, by plain precept, it teacheth them when and upon what ground to reſolve; yea, and how to carry things in ſuſpenſe without prejudice, till they reſolve: if it make men poſitive and regular, it teacheth them what things are in

their

their nature demonſtrative, and what are conjectural; and as well the uſe of diſtinctions and exceptions, as the latitude of principles and rules. If it miſlead by diſproportion, or diſſimilitude of examples, it teacheth men the force of circumſtances, the errors of compariſons, and all the cautions of application; ſo that in all theſe it doth rectify more effectually than it can pervert. And theſe medicines it conveyeth into mens minds much more forcibly by the quickneſs and penetration of examples. For let a man look into the errors of Clement the ſeventh, ſo lively deſcribed by Guicciardine, who ſerved under him, or into the errors of Cicero, painted out by his own pencil in his epiſtles to Atticus, and he will fly apace from being irreſolute. Let him look into the errors of Phocion, and he will beware how he be obſtinate or inflexible. Let him but read the fable of Ixion, and it will hold him from being vaporous or imaginative. Let him look into the errors of Cato the ſecond, and he will never be one of the Antipodes, to tread oppoſite to the preſent world.

And for the conceit, that learning ſhould diſpoſe men to leiſure and privateneſs, and make men ſlothful; it were a ſtrange thing if that, which accuſtometh the mind to a perpetual motion and agitation, ſhould induce ſlothfulneſs; whereas contrariwiſe it may be truly affirmed, that no kind of men love buſineſs for itſelf, but thoſe that are learned: for other perſons love it for profit; as an hireling, that loves the work for the wages; or for honour, as becauſe it beareth them up in the eyes of men, and refreſheth their reputation, which otherwiſe would wear; or becauſe it putteth them in mind of their fortune, and giveth them occaſion to pleaſure and diſpleaſure; or becauſe it exerciſeth ſome faculty wherein they take pride, and ſo entertaineth them in good humour and pleaſing conceits toward themſelves; or becauſe it advanceth any other their ends. So that, as it is ſaid of untrue valours, that ſome mens valours are in the eyes of them that look on; ſo ſuch mens induſtries are in the eyes of others, or at leaſt in regard of their own deſignments: only learned men love buſineſs, as an action according to nature, as agreeable to health of mind, as exerciſe is to health of body, taking pleaſure in the action itſelf, and not in the purchaſe: ſo that of all men they are the moſt indefatigable, if it be towards any buſineſs which can hold or detain their mind.

And if any man be laborious in reading and ſtudy, and yet idle in buſineſs and action, it groweth from ſome weakneſs of body, or ſoftneſs of ſpirit; ſuch as Seneca ſpeaketh of: *Quidam tam ſunt umbratiles, ut putent in turbida eſſe, quicquid in luce eſt*; and not of learning: well may it be, that ſuch a point of a man's nature may make him give himſelf to learning, but it is not learning that breedeth any ſuch point in his nature.

And that learning ſhould take up too much time or leiſure: I anſwer; the moſt active or buſy man, that hath been or can be, hath, no queſtion, many vacant times of leiſure, while he expecteth the tides and returns of buſineſs (except he be either tedious and of no diſpatch, or lightly and unworthily ambitious to meddle in things that may be better done by others:) and then the queſtion is but, how thoſe ſpaces and times of leiſure ſhall be filled and ſpent; whether in pleaſures, or in ſtudies; as was well anſwered by Demoſthenes to his adverſary Æſchines, that was a man given to pleaſure, and told him, that his orations did ſmell of the lamp: "Indeed, ſaid Demoſthenes, there is a great difference between the things that you "and I do by lamp-light." So as no man need doubt, that learning will expulſe buſineſs; but rather it will keep and defend the poſſeſſion of the mind againſt idleneſs

idleneſs and pleaſure, which otherwiſe at unawares may enter, to the prejudice of both.

Again, for that other conceit, that learning ſhould undermine the reverence of laws and government, it is aſſuredly a mere depravation and calumny, without any ſhadow of truth. For to ſay, that a blind cuſtom of obedience ſhould be a ſurer obligation, than duty taught and underſtood; it is to affirm, that a blind man may tread ſurer by a guide, than a ſeeing man can by a light. And it is without all controverſy, that learning doth make the minds of men gentle, generous, amiable, and pliant to government; whereas ignorance makes them churliſh, thwarting, and mutinous: and the evidence of time doth clear this aſſertion, conſidering that the moſt barbarous, rude, and unlearned times have been moſt ſubject to tumults, ſeditions, and changes.

And as to the judgment of Cato the Cenſor, he was well puniſhed for his blaſphemy againſt learning, in the ſame kind wherein he offended; for when he was paſt threeſcore years old, he was taken with an extreme deſire to go to ſchool again, and to learn the Greek tongue, to the end to peruſe the Greek authors; which doth well demonſtrate, that his former cenſure of the Grecian learning was rather an affected gravity, than according to the inward ſenſe of his own opinion. And as for Virgil's verſes, though it pleaſed him to brave the world in taking to the Romans the art of empire, and leaving to others the arts of ſubjects; yet ſo much is manifeſt, that the Romans never aſcended to that height of empire, till the time they had aſcended to the height of other arts. For in the time of the two firſt Cæſars, which had the art of government in greateſt perfection, there lived the beſt poet, Virgilius Maro; the beſt hiſtoriographer, Titus Livius; the beſt antiquary, Marcus Varro; and the beſt, or ſecond orator, Marcus Cicero, that to the memory of man are known. As for the accuſation of Socrates, the time muſt be remembered when it was proſecuted; which was under the thirty tyrants, the moſt baſe, bloody, and envious perſons that have governed; which revolution of ſtate was no ſooner over, but Socrates, whom they had made a perſon criminal, was made a perſon heroical, and his memory accumulate with honours divine and human: and thoſe diſcourſes of his, which were then termed corrupting of manners, were after acknowledged for ſovereign medicines of the mind and manners, and ſo have been received ever ſince till this day. Let this therefore ſerve for anſwer to politicians, which, in their humorous ſeverity, or in their feigned gravity, have preſumed to throw imputations upon learning; which redargution, nevertheleſs (ſave that we know not whether our labours may extend to other ages) were not needful for the preſent, in regard of the love and reverence towards learning, which the example and countenance of two ſo learned princes, queen Elizabeth, and your majeſty, being as Caſtor and Pollux, *lucida ſidera*, ſtars of excellent light and moſt benign influence, hath wrought in all men of place and authority in our nation.

Now therefore we come to that third ſort of diſcredit, or diminution of credit, that groweth unto learning from learned men themſelves, which commonly cleaveth faſteſt: it is either from their fortune, or from their manners, or from the nature of their ſtudies. For the firſt, it is not in their power; and the ſecond is accidental; the third only is proper to be handled: but becauſe we are not in hand with true meaſure, but with popular eſtimation and conceit, it is not amiſs to ſpeak ſomewhat of the two former. The derogations therefore, which grow to learning from

the fortune or condition of learned men, are either in reſpect of ſcarcity of means, or in reſpect of privateneſs of life, and meanneſs of employments.

Concerning want, and that it is the caſe of learned men uſually to begin with little, and not to grow rich ſo faſt as other men, by reaſon they convert not their labours chiefly to lucre and increaſe: It were good to leave the common place in commendation of poverty to ſome frier to handle, to whom much was attributed by Machiavel in this point; when he ſaid, "That the kingdom of the clergy had been long be-"fore at an end, if the reputation, and reverence towards the poverty of friers "had not borne out the ſcandal of the ſuperfluities and exceſſes of biſhops and "prelates." So a man might ſay, that the felicity and delicacy of princes and great perſons had long ſince turned to rudeneſs and barbariſm, if the poverty of learning had not kept up civility and honour of life: but, without any ſuch advantages, it is worthy the obſervation, what a reverend and honoured thing poverty of fortune was, for ſome ages, in the Roman ſtate, which nevertheleſs was a ſtate without paradoxes: for we ſee what Titus Livius ſaith in his introduction: *Caeterum aut me amor negotii ſuſcepti fallit, aut nulla unquam reſpublica nec major, nec ſanctior, nec bonis exemplis ditior fuit; nec in quam tam ſerae avaritia luxuriaque immigraverint; nec ubi tantus ac tam diu paupertati ac parſimoniae honos fuerit.* We ſee likewiſe, after that the ſtate of Rome was not itſelf, but did degenerate, how that perſon, that took upon him to be counſellor to Julius Cæſar after his victory, where to begin his reſtoration of the ſtate, maketh it of all points the moſt ſummary to take away the eſtimation of wealth: *Verum haec, et omnia mala pariter cum honore pecuniae deſinent, ſi neque magiſtratus, neque alia vulgo cupienda, venalia erunt.* To conclude this point, as it was truly ſaid, that *rubor eſt virtutis color*, though ſometimes it comes from vice: ſo it may be fitly ſaid that *paupertas eſt virtutis fortuna*; though ſometimes it may proceed from miſgovernment and accident. Surely Solomon hath pronounced it both in cenſure, *Qui feſtinat ad divitias, non erit inſons*; and in precept; *Buy the truth, and ſell it not*; and ſo of wiſdom and knowledge; judging that means were to be ſpent upon learning, and not learning to be applied to means. And as for the privateneſs, or obſcureneſs (as it may be in vulgar eſtimation accounted) of life of contemplative men; it is a theme ſo common, to extol a private life not taxed with ſenſuality and ſloth, in compariſon, and to the diſadvantage of a civil life, for ſafety, liberty, pleaſure, and dignity, or at leaſt freedom from indignity, as no man handleth it, but handleth it well: ſuch a conſonancy it hath to mens conceits in the expreſſing, and to mens conſents in the allowing. This only I will add, that learned men forgotten in ſtates, and not living in the eyes of men, are like the images of Caſſius and Brutus in the funeral of Junia; of which not being repreſented, as many others were, Tacitus ſaith, *Eo ipſo praefulgebant, quod non viſebantur.*

And for meanneſs of employment, that which is moſt traduced to contempt, is, that the government of youth is commonly allotted to them; which age, becauſe it is the age of leaſt authority, it is transferred to the diſeſteeming of thoſe employments wherein youth is converſant, and which are converſant about youth. But how unjuſt this traducement is (if you will reduce things from popularity of opinion to meaſure of reaſon) may appear in that, we ſee men are more curious what they put into a new veſſel, than into a veſſel ſeaſoned; and what mould they lay about a young plant, than about a plant corroborate; ſo as the weakeſt terms and times of all things uſe to have the beſt applications and helps. And will you hearken

to the Hebrew Rabbins? *Your young men ſhall ſee viſions, and your old men ſhall dream dreams:* ſay they, youth is the worthier age, for that viſions are nearer apparitions of God, than dreams. And let it be noted, that howſoever the condition of life of pedants hath been ſcorned upon theatres, as the ape of tyranny; and that the modern looſeneſs or negligence hath taken no due regard to the choice of ſchoolmaſters and tutors; yet the ancient wiſdom of the beſt times did always make a juſt complaint, that ſtates were too buſy with their laws, and too negligent in point of education: which excellent part of ancient diſcipline hath been in ſome ſort revived of late times, by the colleges of the jeſuits; of whom, although in regard of their ſuperſtition I may ſay, *quo meliores, eo deteriores*; yet in regard of this, and ſome other points concerning human learning and moral matters, I may ſay, as Ageſilaus ſaid to his enemy Pharnabaſus, *Talis quum ſis, utinam noſter eſſes.* And thus much touching the diſcredits drawn from the fortunes of learned men.

As touching the manners of learned men, it is a thing perſonal and individual: and no doubt there be amongſt them, as in other profeſſions, of all temperatures; but yet ſo as it is not without truth, which is ſaid, that *abeunt ſtudia in mores*, ſtudies have an influence and operation upon the manners of thoſe that are converſant in them.

But upon an attentive and indifferent review, I, for my part, cannot find any diſgrace to learning can proceed from the manners of learned men not inherent to them as they are learned; except it be a fault (which was the ſuppoſed fault of Demoſthenes, Cicero, Cato the ſecond, Seneca, and many more) that, becauſe the times they read of are commonly better than the times they live in, and the duties taught better than the duties practiſed, they contend ſometimes too far to bring things to perfection, and to reduce the corruption of manners to honeſty of precepts, or examples of too great height. And yet hereof they have caveats enough in their own walks. For Solon, when he was aſked whether he had given his citizens the beſt laws, anſwered wiſely, "Yea, of ſuch as they would receive:" and Plato, finding that his own heart could not agree with the corrupt manners of his country, refuſed to bear place or office; ſaying, "That a man's country was to be uſed as his parents were, that is, with humble perſuaſions, and not with conteſtations." And Cæſar's counſellor put in the ſame caveat, *Non ad vetera inſtituta revocans, quae jampridem corruptis moribus ludibrio ſunt:* and Cicero noteth this error directly in Cato the ſecond, when he writes to his friend Atticus; *Cato optime ſentit, ſed nocet interdum reipublicae; loquitur enim tanquam in republica Platonis, non tanquam in faece Romuli.* And the ſame Cicero doth excuſe and expugn the philoſophers for going too far, and being too exact in their preſcripts, when he ſaith, *Iſti ipſi praeceptores virtutis, et magiſtri videnter fines officiorum paulo longius, quam natura vellet, protuliſſe, ut cum ad ultimum animo contendiſſemus, ibi tamen, ubi oportet, conſiſteremus:* and yet himſelf might have ſaid, *Monitis ſum minor ipſe meis*; for it was his own fault, though not in ſo extreme a degree.

Another fault likewiſe much of this kind hath been incident to learned men; which is, that they have eſteemed the preſervation, good and honour of their countries or maſters, before their own fortunes or ſafeties. For ſo ſaith Demoſthenes unto the Athenians: "If it pleaſe you to note it, my counſels unto you are "not ſuch, whereby I ſhould grow great amongſt you, and you become little "amongſt the Grecians: but they be of that nature, as they are ſometimes not "good for me to give, but are always good for you to follow." And ſo Seneca,

after he had conſecrated that *Quinquennium Neronis* to the eternal glory of learned governors, held on his honeſt and loyal courſe of good and free counſel, after his maſter grew extremely corrupt in his government. Neither can this point otherwiſe be; for learning endueth mens minds with a true ſenſe of the frailty of their perſons, the caſualty of their fortunes, and the dignity of their ſoul and vocation: ſo that it is impoſſible for them to eſteem that any greatneſs of their own fortune can be a true or worthy end of their being and ordainment; and therefore are deſirous to give their account to God, and ſo likewiſe to their maſters under God (as kings and the ſtates that they ſerve) in theſe words; *Ecce tibi lucrefeci*, and not *Ecce mihi lucrefeci:* whereas the corrupter ſort of mere politicians, that have not their thoughts eſtabliſhed by learning in the love and apprehenſion of duty, nor ever look abroad into univerſality, do refer all things to themſelves, and thruſt themſelves into the centre of the world, as if all lines ſhould meet in them and their fortunes; never caring, in all tempeſts, what becomes of the ſhip of ſtate, ſo they may ſave themſelves in the cockboat of their own fortune; whereas men that feel the weight of duty, and know the limits of ſelf-love, uſe to make good their places and duties, though with peril. And if they ſtand in ſeditious and violent alterations, it is rather the reverence which many times both adverſe parties do give to honeſty, than any verſatile advantage of their own carriage. But for this point of tender ſenſe, and faſt obligation of duty, which learning doth endue the mind withal, howſoever fortune may tax it, and many in the depth of their corrupt principles may deſpiſe it, yet it will receive an open allowance, and therefore needs the leſs diſproof or excuſation.

Another fault incident commonly to learned men, which may be more probably defended than truly denied, is, that they fail ſometimes in applying themſelves to particular perſons: which want of exact application ariſeth from two cauſes; the one, becauſe the largeneſs of their mind can hardly confine itſelf to dwell in the exquiſite obſervation or examination of the nature and cuſtoms of one perſon: for it is a ſpeech for a lover, and not for a wiſe man: *Satis magnum alter alteri theatrum ſumus.* Nevertheleſs I ſhall yield, that he that cannot contract the ſight of his mind, as well as diſperſe and dilate it, wanteth a great faculty. But there is a ſecond cauſe, which is no inability, but a rejection upon choice and judgment: for the honeſt and juſt bounds of obſervation, by one perſon upon another, extend no farther, but to underſtand him ſufficiently, whereby not to give him offence, or whereby to be able to give him faithful counſel, or whereby to ſtand upon reaſonable guard and caution, in reſpect of a man's ſelf: but to be ſpeculative into another man, to the end to know how to work him, or wind him, or govern him, proceedeth from a heart that is double and cloven, and not entire and ingenuous; which as in friendſhip it is want of integrity, ſo towards princes or ſuperiors is want of duty. For the cuſtom of the Levant, which is, that ſubjects do forbear to gaze or fix their eyes upon princes, is in the outward ceremony barbarous, but the moral is good: for men ought not, by cunning and bent obſervations, to pierce and penetrate into the hearts of kings, which the Scripture hath declared to be inſcrutable.

There is yet another fault (with which I will conclude this part) which is often noted in learned men, that they do many times fail to obſerve decency and diſcretion in their behaviour and carriage, and commit errors in ſmall and ordinary points of action, ſo as the vulgar ſort of capacities do make a judgment of them in greater matters,

matters, by that which they find wanting in them in ſmaller. But this conſequence doth often deceive men, for which I do refer them over to that which was ſaid by Themiſtocles, arrogantly and uncivilly being applied to himſelf out of his own mouth; but, being applied to the general ſtate of this queſtion, pertinently and juſtly; when, being invited to touch a lute, he ſaid, "he could not fiddle, but he "could make a ſmall town a great ſtate." So, no doubt, many may be well ſeen in the paſſages of government and policy, which are to ſeek in little and punctual occaſions. I refer them alſo to that which Plato ſaid of his maſter Socrates, whom he compared to the gallypots of apothecaries, which on the outſide had apes and owls, and antiques, but contained within ſovereign and precious liquors and confections; acknowledging, that to an external report he was not without ſuperficial levities and deformities, but was inwardly repleniſhed with excellent virtues and powers. And ſo much touching the point of manners of learned men.

But in the mean time I have no purpoſe to give allowance to ſome conditions and courſes baſe and unworthy, wherein divers profeſſors of learning have wronged themſelves, and gone too far; ſuch as were thoſe trencher philoſophers, which in the later age of the Roman ſtate were uſually in the houſes of great perſons, being little better than ſolemn paraſites; of which kind, Lucian maketh a merry deſcription of the philoſopher that the great lady took to ride with her in her coach, and would needs have him carry her little dog, which he doing officiouſly, and yet uncomely, the page ſcoffed, and ſaid, "That he doubted, the philoſopher of a Stoic "would turn to be a Cynic." But above all the reſt, the groſs and palpable flattery, whereunto many, not unlearned, have abaſed and abuſed their wits and pens, turning, as Du Bartas ſaith, Hecuba into Helena, and Fauſtina into Lucretia, hath moſt diminiſhed the price and eſtimation of learning. Neither is the modern dedication of books and writings, as to patrons to be commended: for that books, ſuch as are worthy the name of books, ought to have no patrons, but truth and reaſon. And the ancient cuſtom was, to dedicate them only to private and equal friends, or to intitle the books with their names; or if to kings and great perſons, it was to ſome ſuch as the argument of the book was fit and proper for: but theſe and the like courſes may deſerve rather reprehenſion than defence.

Not that I can tax or condemn the morigeration or application of learned men to men in fortune. For the anſwer was good that Diogenes made to one that aſked him in mockery, "How it came to paſs that philoſophers were the followers of "rich men, and not rich men of philoſophers?" He anſwered ſoberly, and yet ſharply, "Becauſe the one ſort knew what they had need of, and the other did "not." And of the like nature was the anſwer which Ariſtippus made, when having a petition to Dionyſius, and no ear given to him, he fell down at his feet; whereupon Dionyſius ſtay'd, and gave him the hearing, and granted it; and afterward ſome perſon, tender on the behalf of Philoſophy, reproved Ariſtippus, that he would offer the profeſſion of philoſophy ſuch an indignity, as for a private ſuit to fall at a tyrant's feet. But he anſwered, "It was not his fault, but it was the fault "of Dionyſius that he had his ears in his feet." Neither was it accounted weakneſs, but diſcretion in him that would not diſpute his beſt with Adrianus Cæſar; excuſing himſelf, "That it was reaſon to yield to him that commanded thirty le-"gions." Theſe and the like applications, and ſtooping to points of neceſſity and convenience, cannot be diſallowed: for though they may have ſome outward baſe-

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neſs, yet in a judgment truly made, they are to be accounted ſubmiſſions to the occaſion, and not to the perſon.

Now I proceed to thoſe errors and vanities, which have intervened amongſt the ſtudies themſelves of the learned, which is that which is principal and proper to the preſent argument; wherein my purpoſe is not to make a juſtification of the errors, but, by a cenſure and ſeparation of the errors, to make a juſtification of that which is good and ſound, and to deliver that from the aſperſion of the other. For we ſee, that it is the manner of men to ſcandalize and deprave that which retaineth the ſtate and virtue, by taking advantage upon that which is corrupt and degenerate; as the heathens in the primitive church uſed to blemiſh and taint the Chriſtians with the faults and corruptions of heretics. But nevertheleſs I have no meaning at this time to make any exact animadverſion of the errors and impediments in matters of learning, which are more ſecret and remote from vulgar opinion, but only to ſpeak unto ſuch as do fall under, or near unto, a popular obſervation.

There be therefore chiefly three vanities in ſtudies, whereby learning hath been moſt traduced. For thoſe things we do eſteem vain, which are either falſe or frivolous, thoſe which either have no truth, or no uſe: and thoſe perſons we eſteem vain, which are either credulous or curious; and curioſity is either in matter, or words: ſo that in reaſon as well as in experience, there fall out to be theſe three diſtempers, as I may term them, of learning: the firſt fantaſtical learning; the ſecond, contentious learning; and the laſt delicate learning; vain imaginations, vain altercations, and vain affectations; and with the laſt I will begin.

Martin Luther, conducted no doubt by an higher providence, but in diſcourſe of reaſon, finding what a province he had undertaken againſt the biſhop of Rome, and the degenerate traditions of the church, and finding his own ſolitude, being no ways aided by the opinions of his own time, was enforced to awake all antiquity, and to call former times to his ſuccour, to make a party againſt the preſent time. So that the ancient authors, both in divinity, and in humanity, which had long time ſlept in libraries, began generally to be read and revolved. This by conſequence did draw on a neceſſity of a more exquiſite travel in the languages original, wherein thoſe authors did write, for the better underſtanding of thoſe authors, and the better advantage of preſſing and applying their words. And thereof grew again a delight in their manner of ſtyle and phraſe, and an admiration of that kind of writing; which was much furthered and precipitated by the enmity and oppoſition, that the propounders of thoſe primitive, but ſeeming new, opinions had againſt the ſchoolmen, who were generally of the contrary part, and whoſe writings were altogether in a differing ſtile and form, taking liberty to coin, and frame new terms of art to expreſs their own ſenſe, and to avoid circuit of ſpeech, without regard to the pureneſs, pleaſantneſs, and, as I may call it, lawfulneſs, of the phraſe or word. And again, becauſe the great labour then was with the people, of whom the Phariſees were wont to ſay, *Execrabilis iſta turba, quae non novit legem*; for the winning and perſuading of them, there grew of neceſſity in chief price and requeſt, eloquence and variety of diſcourſe, as the fitteſt and forcibleſt acceſs into the capacity of the vulgar ſort: ſo that theſe four cauſes concurring, the admiration of ancient authors, the hate of the ſchoolmen, the exact ſtudy of languages, and the efficacy of preaching, did bring in an

an affected ſtudy of eloquence, and *copia* of ſpeech, which then began to flouriſh. This grew ſpeedily to an exceſs; for men began to hunt more after words than matter; and more after the choiceneſs of the phraſe, and the round and clean compoſition of the ſentence, and the ſweet falling of the clauſes, and the varying and illuſtration of their works with tropes and figures, than after the weight of matter, worth of ſubject, ſoundneſs of argument, life of invention, or depth of judgment. Then grew the flowing and watry vein of Oſorius, the Portugal biſhop, to be in price. Then did Sturmius ſpend ſuch infinite and curious pains upon Cicero the orator, and Hermogenes the rhetorician, beſides his own books of periods, and imitation, and the like. Then did Car of Cambridge, and Aſcham, with their lectures and writings, almoſt deify Cicero and Demoſthenes, and allure all young men, that were ſtudious, unto that delicate and poliſhed kind of learning. Then did Eraſmus take occaſion to make the ſcoffing echo; *Decem annos conſumpſi in legendo Cicerone:* and the echo anſwered in Greek, Ὄνε, *Aſine.* Then grew the learning of the ſchoolmen to be utterly deſpiſed as barbarous. In ſum, the whole inclination and bent of thoſe times was rather towards *copia*, than weight.

Here therefore is the firſt diſtemper of learning, when men ſtudy words, and not matter: whereof though I have repreſented an example of late times, yet it hath been, and will be *ſecundum majus et minus* in all time. And how is it poſſible but this ſhould have an operation to diſcredit learning, even with vulgar capacities, when they ſee learned mens works like the firſt letter of a patent, or limned book; which though it hath large flouriſhes, yet it is but a letter? It ſeems to me that Pygmalion's frenzy is a good emblem or portraiture of this vanity: for words are but the images of matter, and except they have life of reaſon and invention, to fall in love with them is all one, as to fall in love with a picture.

But yet, notwithſtanding, it is a thing not haſtily to be condemned, to clothe and adorn the obſcurity, even of philoſophy itſelf, with ſenſible and plauſible elocution; for hereof we have great examples in Xenophon, Cicero, Seneca, Plutarch, and of Plato alſo in ſome degree; and hereof likewiſe there is great uſe: for ſurely, to the ſevere inquiſition of truth, and the deep progreſs into philoſophy, it is ſome hindrance; becauſe it is too early ſatisfactory to the mind of man, and quencheth the deſire of farther ſearch, before we come to a juſt period: but then, if a man be to have any uſe of ſuch knowledge in civil occaſions, of conference, counſel, perſuaſion, diſcourſe, or the like; then ſhall he find it prepared to his hands in thoſe authors which write in that manner. But the exceſs of this is ſo juſtly contemptible, that as Hercules, when he ſaw the image of Adonis, Venus's minion, in a temple, ſaid in diſdain, *Nil ſacri es*; ſo there is none of Hercules's followers in learning, that is, the more ſevere and laborious ſort of inquirers into truth, but will deſpiſe thoſe delicacies and affectations, as indeed capable of no divineneſs. And thus much of the firſt diſeaſe or diſtemper of learning.

The ſecond, which followeth, is in nature worſe than the former: for as ſubſtance of matter is better than beauty of words, ſo, contrariwiſe, vain matter is worſe than vain words; wherein it ſeemeth the reprehenſion of St. Paul was not only proper for thoſe times, but prophetical for the times following; and not only reſpective to divinity, but extenſive to all knowledge: *Devita profanas vocum novitates, et oppoſitiones falſi nominis ſcientiae.* For he aſſigneth two marks and badges of ſuſpected and falſified ſcience: the one, the novelty and ſtrangeneſs of terms; the other, the ſtrictneſs of poſitions, which of neceſſity doth induce oppoſitions, and

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ſo queſtions and altercations. Surely, like as many ſubſtances in nature which are ſolid, do putrify and corrupt into worms; ſo it is the property of good and ſound knowledge, to putrify and diſſolve into a number of ſubtle, idle, unwholſom, and, as I may term them, vermiculate queſtions, which have indeed a kind of quickneſs, and life of ſpirit, but no ſoundneſs of matter, or goodneſs of quality. This kind of degenerate learning did chiefly reign amongſt the ſchoolmen, who, having ſharp and ſtrong wits, and abundance of leiſure, and ſmall variety of reading; but their wits being ſhut up in the cells of a few authors, chiefly Ariſtotle their dictator, as their perſons were ſhut up in the cells of monaſteries and colleges, and knowing little hiſtory, either of nature or time, did out of no great quantity of matter, and infinite agitation of wit, ſpin out unto us thoſe laborious webs of learning, which are extant in their books. For the wit and mind of man, if it work upon matter, which is the contemplation of the creatures of God, worketh according to the ſtuff, and is limited thereby: but if it work upon itſelf, as the ſpider worketh his web, then it is endleſs, and brings forth indeed cobwebs of learning, admirable for the fineneſs of thread and work, but of no ſubſtance or profit.

This ſame unprofitable ſubtilty or curioſity is of two ſorts; either in the ſubject itſelf that they handle, when it is a fruitleſs ſpeculation, or controverſy, whereof there are no ſmall number both in divinity and philoſophy, or in the manner or method of handling of a knowledge, which amongſt them was this; upon every particular poſition or aſſertion to frame objections, and to thoſe objections, ſolutions; which ſolutions were for the moſt part not confutations, but diſtinctions: whereas indeed the ſtrength of all ſciences is, as the ſtrength of the old man's faggot, in the band. For the harmony of a ſcience, ſupporting each part the other, is and ought to be the true and brief confutation and ſuppreſſion of all the ſmaller ſort of objections. But, on the other ſide, if you take out every axiom, as the ſticks of the faggot, one by one, you may quarrel with them, and bend them, and break them at your pleaſure: ſo that as was ſaid of Seneca, *Verborum minutiis rerum frangit pondera*; ſo a man may truly ſay of the ſchoolmen, *Quaeſtionum minutiis ſcientiarum frangunt ſoliditatem.* For were it not better for a man in a fair room, to ſet up one great light, or branching candleſtick of lights, than to go about with a ſmall watch candle into every corner? And ſuch is their method, that reſts not ſo much upon evidence of truth proved by arguments, authorities, ſimilitudes, examples, as upon particular confutations and ſolutions of every ſcruple, cavillation, and objection; breeding for the moſt part one queſtion, as faſt as it ſolveth another; even as in the former reſemblance, when you carry the light into one corner, you darken the reſt: ſo that the fable and fiction of *Scylla* ſeemeth to be a lively image of this kind of philoſophy or knowledge, who was transformed into a comely virgin for the upper parts; but then, *Candida ſuccinctam, latrantibus inguina monſtris:* ſo the generalities of the ſchoolmen are for a while good and proportionable; but then, when you deſcend into their diſtinctions and deciſions, inſtead of a fruitful womb, for the uſe and benefit of man's life, they end in monſtrous altercations, and barking queſtions. So as it is not poſſible but this quality of knowledge muſt fall under popular contempt, the people being apt to contemn truth upon occaſion of controverſies and altercations, and to think they are all out of their way which never meet: and when they ſee ſuch digladiation about ſubtilties, and matters of no uſe or moment, they eaſily fall upon that judgment of Dionyſius of Syracuſe, *Verba iſta ſunt ſenum otioſorum.*

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Notwithſtanding, certain it is that if thoſe ſchoolmen to their great thirſt of truth, and unwearied travel of wit, had joined variety and univerſality of reading and contemplation, they had proved excellent lights, to the great advancement of all learning and knowledge; but as they are, they are great undertakers indeed, and fierce with dark keeping: but as in the inquiry of the divine truth, their pride inclined to leave the oracle of God's word, and to vaniſh in the mixture of their own inventions; ſo in the inquiſition of nature, they ever left the oracle of God's works, and adored the deceiving and deformed images, which the unequal mirror of their own minds, or a few received authors or principles, did repreſent unto them. And thus much for the ſecond diſeaſe of learning.

For the third vice or diſeaſe of learning, which concerneth deceit or untruth, it is of all the reſt the fouleſt; as that which doth deſtroy the eſſential form of knowledge; which is nothing but a repreſentation of truth; for the truth of being, and the truth of knowing are one, differing no more than the direct beam, and the beam reflected. This vice therefore brancheth itſelf into two ſorts; delight in deceiving, and aptneſs to be deceived; impoſture and credulity; which although they appear to be of a diverſe nature, the one ſeeming to proceed of cunning, and the other of ſimplicity; yet certainly they do for the moſt part concur: for as the verſe noteth,

Percontatorem fugito, nam garrulus idem eſt:

an inquiſitive man is a pratler: ſo upon the like reaſon, a credulous man is a deceiver: as we ſee it in fame, that he that will eaſily believe rumours, will as eaſily augment rumours, and add ſomewhat to them of his own; which Tacitus wiſely noteth, when he ſaith, *Fingunt ſimul creduntque:* ſo great an affinity hath fiction and belief.

This facility of credit, and accepting or admitting things weakly authorized or warranted, is of two kinds, according to the ſubject: for it is either a belief of hiſtory, as the lawyers ſpeak, matter of fact; or elſe of matter of art and opinion: as to the former, we ſee the experience and inconvenience of this error in eccleſiaſtical hiſtory, which hath too eaſily received and regiſtered reports and narrations of miracles wrought by martyrs, hermits, or monks of the elder ſort, and other holy men, and their relicks, ſhrines, chapels, and images: which though they had a paſſage for time, by the ignorance of the people, the ſuperſtitious ſimplicity of ſome, and the politic toleration of others, holding them but as divine poeſies: yet after a period of time, when the miſt began to clear up, they grew to be eſteemed but as old wives fables, impoſtures of the clergy, illuſions of ſpirits, and badges of antichriſt, to the great ſcandal and detriment of religion.

So in natural hiſtory, we ſee there hath not been that choice and judgment uſed as ought to have been, as may appear in the writings of Plinius, Cardanus, Albertus, and divers of the Arabians, being fraught with much fabulous matter, a great part not only untried, but notoriouſly untrue, to the great derogation of the credit of natural philoſophy with the grave and ſober kind of wits: wherein the wiſdom and integrity of Ariſtotle is worthy to be obſerved, that, having made ſo diligent and exquiſite a hiſtory of living creatures, hath mingled it ſparingly with any vain or feigned matter; and yet, on the other ſide, hath caſt all prodigious narrations, which he thought worthy the recording, into one book: excellently diſcerning that matter of manifeſt truth, ſuch, whereupon obſervation and rule was to be built, was not to be mingled or weakened with matter of doubtful credit; and yet

again, that rarities and reports that ſeem incredible, are not to be ſuppreſſed or denied to the memory of men.

And as for the facility of credit which is yielded to arts and opinions, it is likewiſe of two kinds, either when too much belief is attributed to the arts themſelves, or to certain authors in any art. The ſciences themſelves which have had better intelligence and confederacy with the imagination of man, than with his reaſon, are three in number: aſtrology, natural magic, and alchemy; of which ſciences, nevertheleſs, the ends or pretences are noble. For aſtrology pretendeth to diſcover that correſpondence, or concatenation, which is between the ſuperior globe and the inferior. Natural magic pretendeth to call and reduce natural philoſophy from variety of ſpeculations to the magnitude of works; and alchemy pretendeth to make ſeparation of all the unlike parts of bodies, which in mixtures of nature are incorporate. But the derivations and proſecutions to theſe ends, both in the theories, and in the practices, are full of error and vanity; which the great profeſſors themſelves have ſought to veil over and conceal by enigmatical writings, and referring themſelves to auricular traditions and ſuch other devices, to ſave the credit of impoſtors: and yet ſurely to alchemy this right is due, that it may be compared to the huſbandman whereof Æſop makes the fable; that, when he died, told his ſons, that he had left unto them gold buried under ground in his vineyard; and they digged over all the ground, and gold they found none; but by reaſon of their ſtiring and digging the mould about the roots of their vines, they had a great vintage the year following: ſo aſſuredly the ſearch and ſtir to make gold hath brought to light a great number of good and fruitful inventions and experiments, as well for the diſcloſing of nature, as for the uſe of man's life.

And as to the overmuch credit that hath been given unto authors in ſciences, in making them dictators, that their words ſhould ſtand; and not conſuls to give advice; the damage is infinite that ſciences have received thereby, as the principal cauſe that hath kept them low, at a ſtay, without growth or advancement. For hence it hath come, that in arts mechanical, the firſt deviſer comes ſhorteſt, and time addeth and perfecteth: but in ſciences, the firſt author goeth fartheſt, and time loſeth and corrupteth. So we ſee, artillery, ſailing, printing, and the like, were groſsly managed at the firſt, and by time accommodated and refined: but contrariwiſe the philoſophies and ſciences of Ariſtotle, Plato, Democritus, Hippocrates, Euclides, Archimedes, of moſt vigour at the firſt, are by time degenerate and imbaſed; whereof the reaſon is no other, but that in the former many wits and induſtries have contributed in one; and in the latter, many wits and induſtries have been ſpent about the wit of ſome one, whom many times they have rather depraved than illuſtrated. For as water will not aſcend higher than the level of the firſt ſpring-head from whence it deſcendeth, ſo knowledge derived from Ariſtotle, and exempted from liberty of examination, will not riſe again higher than the knowledge of Ariſtotle. And therefore although the poſition be good, *Oportet diſcentem credere*; yet it muſt be coupled with this, *Oportet edoctum judicare*: for diſciples do owe unto maſters only a temporary belief, and a ſuſpenſion of their own judgment till they be fully inſtructed, and not an abſolute reſignation, or perpetual captivity: and therefore, to conclude this point, I will ſay no more; but ſo let great authors have their due, as time, which is the author of authors, be not deprived of his due, which is, farther and farther to diſcover truth. Thus I have gone over theſe three diſeaſes of learning; beſides the which, there

are ſome other rather peccant humours than formed diſeaſes, which nevertheleſs are not ſo ſecret and intrinſic, but that they fall under a popular obſervation and traducement, and therefore are not be paſſed over.

The firſt of theſe is the extreme affecting of two extremities: the one antiquity, the other novelty; wherein it ſeemeth the children of time do take after the nature and malice of the father. For as he devoureth his children, ſo one of them ſeeketh to devour and ſuppreſs the other, while antiquity envieth there ſhould be new additions, and novelty cannot be content to add, but it muſt deface; ſurely, the advice of the prophet is the true direction in this matter, *State ſuper vias antiquas, et videte quaenam ſit via recta, et bona, et ambulate in ea.* Antiquity deſerveth that reverence, that men ſhould make a ſtand thereupon, and diſcover what is the beſt way; but when the diſcovery is well taken, then to make progreſſion. And to ſpeak truly, *Antiquitas ſaeculi, juventus mundi.* Theſe times are the ancient times when the world is ancient, and not thoſe which we account ancient *ordine retrogrado*, by a computation backward from ourſelves.

Another error, induced by the former, is a diſtruſt that any thing ſhould be now to be found out, which the world ſhould have miſſed and paſſed over ſo long time; as if the ſame objection were to be made to time, that Lucian maketh to Jupiter, and other the heathen gods, of which he wondereth that they begot ſo many children in old time, and begot none in his time; and aſketh whether they were become ſeptuagenery, or whether the law Papia, made againſt old mens marriages, had reſtrained them. So it ſeemeth men doubt, leſt time is become paſt children and generation; wherein, contrariwiſe, we ſee commonly the levity and inconſtancy of mens judgments, which till a matter be done, wonder that it can be done; and, as ſoon as it is done, wonder again that it was no ſooner done; as we ſee in the expedition of Alexander into Aſia, which at firſt was prejudged as a vaſt and impoſſible enterpriſe: and yet afterwards it pleaſeth Livy to make no more of it than this; *Nil aliud, quam bene auſus eſt vana contemnere:* and the ſame happened to Columbus in the weſtern navigation. But in intellectual matters it is much more common; as may be ſeen in moſt of the propoſitions of Euclid, which till they be demonſtrated, they ſeem ſtrange to our aſſent; but being demonſtrated, our mind accepteth of them by a kind of relation, as the lawyers ſpeak, as if we had known them before.

Another error that hath alſo ſome affinity with the former, is a conceit, that of former opinions or ſects, after variety and examination, the beſt hath ſtill prevailed, and ſuppreſſed the reſt: ſo as, if a man ſhould begin the labour of a new ſearch, he were but like to light upon ſomewhat formerly rejected, and by rejection brought into oblivion; as if the multitude, or the wiſeſt, for the multitude's ſake, were not ready to give paſſage, rather to that which is popular and ſuperficial, than to that which is ſubſtantial and profound: for the truth is, that time ſeemeth to be of the nature of a river or ſtream, which carrieth down to us that which is light and blown up, and ſinketh and drowneth that which is weighty and ſolid.

Another error, of a diverſe nature from all the former, is the over early and peremptory reduction of knowledge into arts and methods; from which time commonly ſciences receive ſmall or no augmentation. But as young men, when they knit and ſhape perfectly, do ſeldom grow to a farther ſtature: ſo knowledge, while it is in aphoriſms and obſervations, it is in growth; but when it once is comprehended in exact methods, it may perchance be farther poliſhed and illuſtrated,

and accommodated for uſe and practice; but it increaſeth no more in bulk and ſubſtance.

Another error which doth ſucceed that which we laſt mentioned, is, that after the diſtribution of particular arts and ſciences, men have abandoned univerſality, or *philoſophia prima*; which cannot but ceaſe, and ſtop all progreſſion. For no perfect diſcovery can be made upon a flat or a level: neither is it poſſible to diſcover the more remote, and deeper parts of any ſcience, if you ſtand but upon the level of the ſame ſcience, and aſcend not to a higher ſcience.

Another error hath proceeded from too great a reverence, and a kind of adoration of the mind and underſtanding of man: by means whereof, men have withdrawn themſelves too much from the contemplation of nature, and the obſervations of experience, and have tumbled up and down in their own reaſon and conceits. Upon theſe intellectualiſts, which are, notwithſtanding, commonly taken for the moſt ſublime and divine philoſophers, Heraclitus gave a juſt cenſure, ſaying, "Men ſought truth in their own little worlds, and not in the great and common "world;" for they diſdain to ſpell, and ſo by degrees to read in the volume of God's works; and contrariwiſe, by continual meditation and agitation of wit, do urge and as it were invocate their own ſpirits to divine, and give oracles unto them, whereby they are deſervedly deluded.

Another error that hath ſome connexion with this latter, is, that men have uſed to infect their meditations, opinions, and doctrines, with ſome conceits which they have moſt admired, or ſome ſciences which they have moſt applied; and given all things elſe a tincture according to them, utterly untrue and improper. So hath Plato intermingled his philoſophy with theology, and Ariſtotle with logic; and the ſecond ſchool of Plato, Proclus, and the reſt, with the mathematics. For theſe were the arts which had a kind of primogeniture with them ſeverally. So have the alchemiſts made a philoſophy out of a few experiments of the furnace; and Gilbertus, our countryman, hath made a philoſophy out of the obſervations of a loadſtone. So Cicero, when, reciting the ſeveral opinions of the nature of the ſoul, he found a muſician, that held the ſoul was but a harmony, ſaith pleaſantly, *Hic ab arte ſua non receſſit, etc.* But of theſe conceits Ariſtotle ſpeaketh ſeriouſly and wiſely, when he ſaith, *Qui reſpiciunt ad pauca, de facili pronuntiant.*

Another error is an impatience of doubt, and haſte to aſſertion without due and mature ſuſpenſion of judgment. For the two ways of contemplation are not unlike the two ways of action, commonly ſpoken of by the ancients: the one plain and ſmooth in the beginning, and in the end impaſſable; the other rough and troubleſome in the entrance, but after a while fair and even: ſo it is in contemplation; if a man will begin with certainties, he ſhall end in doubts; but if he will be content to begin with doubts, he ſhall end in certainties.

Another error is in the manner of the tradition and delivery of knowledge, which is for the moſt part magiſterial and peremptory; and not ingenuous and faithful, in a ſort, as may be ſooneſt believed; and not eaſilieſt examined. It is true, that in compendious treatiſes for practice, that form is not to be diſallowed. But in the true handling of knowledge, men ought not to fall either, on the one ſide, into the vein of Velleius the Epicurean: *Nil tam metuens, quam ne dubitare aliqua de re videretur:* nor, on the other ſide, into Socrates his ironical doubting of all things; but to propound things ſincerely, with more or leſs aſſeveration, as they ſtand in a man's own judgment proved more or leſs.

Other

Other errors there are in the ſcope that men propound to themſelves, whereunto they bend their endeavours: for whereas the more conſtant and devote kind of profeſſors of any ſcience ought to propound to themſelves to make ſome additions to their ſcience, they convert their labours to aſpire to certain ſecond prizes; as to be a profound interpreter, or commentator; to be a ſharp champion or defender; to be a methodical compounder or abridger: and ſo the patrimony of knowledge cometh to be ſometimes improved, but ſeldom augmented.

But the greateſt error of all the reſt, is the miſtaking or miſplacing of the laſt or fartheſt end of knowledge: for men have entered into a deſire of learning and knowledge, ſometimes upon a natural curioſity, and inquiſitive appetite; ſometimes to entertain their minds with variety and delight; ſometimes for ornament and reputation; and ſometimes to enable them to victory of wit and contradiction; and moſt times for lucre and profeſſion; and ſeldom ſincerely to give a true account of their gift of reaſon, to the benefit and uſe of men: as if there were ſought in knowledge a couch, whereupon to reſt a ſearching and reſtleſs ſpirit; or a terras, for a wandering and variable mind to walk up and down with a fair proſpect; or a tower of ſtate, for a proud mind to raiſe itſelf upon; or a fort or commanding ground, for ſtrife and contention; or a ſhop, for profit, or ſale; and not a rich ſtore-houſe, for the glory of the Creator, and the relief of man's eſtate. But this is that which will indeed dignify and exalt knowledge, if contemplation and action may be more nearly and ſtraitly conjoined and united together than they have been; a conjunction like unto that of the two higheſt planets, Saturn, the planet of reſt and contemplation, and Jupiter, the planet of civil ſociety and action: howbeit, I do not mean, when I ſpeak of uſe and action, that end before-mentioned of the applying of knowledge to lucre and profeſſion; for I am not ignorant how much that diverteth and interrupteth the proſecution and advancement of knowledge, like unto the golden ball thrown before Atalanta, which while ſhe goeth aſide and ſtoopeth to take up, the race is hinder'd;

Declinant curſus, aurumque volubile tollit.

Neither is my meaning, as was ſpoken of Socrates, to call philoſophy down from heaven to converſe upon the earth; that is, to leave natural philoſophy aſide, and to apply knowledge only to manners and policy. But as both heaven and earth do conſpire and contribute to the uſe and benefit of man; ſo the end ought to be, from both philoſophies to ſeparate and reject vain ſpeculations, and whatſoever is empty and void, and to preſerve and augment whatſoever is ſolid and fruitful: that knowledge may not be, as a courteſan, for pleaſure and vanity only, or as a bond-woman, to acquire and gain to her maſter's uſe; but as a ſpouſe, for generation, fruit, and comfort.

Thus have I deſcribed and opened, as by a kind of diſſection, thoſe peccant humours, the principal of them, which have not only given impediment to the proficience of learning, but have given alſo occaſion to the traducement thereof: wherein if I have been too plain, it muſt be remember'd, *Fidelia vulnera amantis, ſed doloſa oſcula malignantis.*

This, I think, I have gained, that I ought to be the better believed in that which I ſhall ſay pertaining to commendation; becauſe I have proceeded ſo freely in that which concerneth cenſure. And yet I have no purpoſe to enter into a laudative of learning, or to make a hymn to the muſes, though I am of opinion that it is long ſince their rites were duly celebrated: but my intent is, without varniſh

or

or amplification, juſtly to weigh the dignity of knowledge in the balance with other things, and to take the true value thereof by teſtimonies and arguments divine and human.

First therefore, let us ſeek the dignity of knowledge in the archetype or firſt platform, which is in the attributes and acts of God, as far as they are revealed to man, and may be obſerved with ſobriety; wherein we may not ſeek it by the name of learning; for all learning is knowledge acquired, and all knowledge in God is original: and therefore we muſt look for it by another name, that of wiſdom or ſapience, as the Scriptures call it.

It is ſo then, that in the work of the creation we ſee a double emanation of virtue from God; the one referring more properly to power, the other to wiſdom; the one expreſſed in making the ſubſiſtence of the matter, and the other in diſpoſing the beauty of the form. This being ſuppoſed, it is to be obſerved, that, for any thing which appeareth in the hiſtory of the creation, the confuſed maſs and matter of heaven and earth was made in a moment; and the order and diſpoſition of that chaos, or maſs, was the work of ſix days; ſuch a note of difference it pleaſed God to put upon the works of power, and the works of wiſdom: wherewith concurreth, that in the former it is not ſet down that God ſaid, *Let there be heaven and earth*, as it is ſet down of the works following; but actually, that God made heaven and earth: the one carrying the ſtile of a manufacture, and the other of a law, decree, or council.

To proceed to that which is next in order, from God to ſpirits. We find, as far as credit is to be given to the celeſtial hierarchy of that ſuppoſed Dionyſius the ſenator of Athens, the firſt place or degree is given to the angels of love, which are termed Seraphim; the ſecond, to the angels of light, which are termed Cherubim; and the third, and ſo following places, to thrones, principalities, and the reſt, which are all angels of power and miniſtry; ſo as the angels of knowledge and illumination are placed before the angels of office and domination.

To deſcend from ſpirits and intellectual forms to ſenſible and material forms; we read the firſt form that was created was light, which hath a relation and correſpondence in nature and corporal things to knowledge in ſpirits and incorporal things.

So in the diſtribution of days, we ſee, the day wherein God did reſt, and contemplate his own works, was bleſſed above all the days wherein he did effect and accompliſh them.

After the creation was finiſhed, it is ſet down unto us, that man was placed in the garden to work therein; which work, ſo appointed to him, could be no other than work of contemplation; that is, when the end of work is but for exerciſe and experiment, not for neceſſity; for there being then no reluctation of the creature, nor ſweat of the brow, man's employment muſt of conſequence have been matter of delight in the experiment, and not matter of labour for the uſe. Again, the firſt acts which man performed in paradiſe, conſiſted of the two ſummary parts of knowledge; the view of creatures, and the impoſition of names. As for the knowledge which induced the fall, it was, as was touched before, not the natural knowledge of creatures, but the moral knowledge of good and evil; wherein the ſuppoſition was, that God's commandments or prohibitions were not the originals of good and evil, but

but that they had other beginnings, which man aſpired to know, to the end to make a total defection from God, and to depend wholly upon himſelf.

To paſs on: in the firſt event or occurrence after the fall of man, we ſee, as the Scriptures have infinite myſteries, not violating at all the truth of the ſtory or letter, an image of the two eſtates, the contemplative ſtate, and the active ſtate, figured in the two perſons of Abel and Cain, and in the two ſimpleſt and moſt primitive trades of life, that of the ſhepherd, who, by reaſon of his leiſure, reſt in a place, and living in view of heaven, is a lively image of a contemplative life; and that of the huſbandman: where we ſee again, the favour and election of God went to the ſhepherd, and not to the tiller of the ground.

So in the age before the flood, the holy records within thoſe few memorials, which are there enter'd and regiſter'd, have vouchſafed to mention, and honour the name of the inventors and authors of muſic, and works in metal. In the age after the flood, the firſt great judgment of God upon the ambition of man was the confuſion of tongues: whereby the open trade and intercourſe of learning and knowledge was chiefly imbarred.

To deſcend to Moſes the lawgiver, and God's firſt pen: he is adorned by the Scriptures with this addition and commendation, that he was *ſeen in all the learning of the Ægyptians*; which nation, we know, was one of the moſt ancient ſchools of the world: for ſo Plato brings in the Ægyptian prieſt ſaying unto Solon; "You "Grecians are ever children, you have no knowledge of antiquity, nor antiquity "of knowledge." Take a view of the ceremonial law of Moſes; you ſhall find, beſides the prefiguration of Chriſt, the badge or difference of the people of God, the exerciſe and impreſſion of obedience, and other divine uſes and fruits thereof, that ſome of the moſt learned Rabbins have travelled profitably, and profoundly to obſerve, ſome of them a natural, ſome of them a moral ſenſe, or reduction of many of the ceremonies and ordinances. As in the law of the leproſy, where it is ſaid, *If the whiteneſs have overſpread the fleſh, the patient may paſs abroad for clean; but if there be any whole fleſh remaining, he is to be ſhut up for unclean:* one of them noteth a principle of nature, that putrefaction is more contagious before maturity, than after: and another noteth a poſition of moral philoſophy, that men, abandoned to vice do not ſo much corrupt manners, as thoſe that are half-good and half-evil. So in this, and very many other places in that law, there is to be found, beſides the theological ſenſe, much aſperſion of philoſophy.

So likewiſe in that excellent book of Job, if it be revolved with diligence, it will be found pregnant, and ſwelling with natural philoſophy; as for example, coſmography, and the roundneſs of the world: *Qui extendit aquilonem ſuper vacuum, et appendit terram ſuper nihilum*; wherein the penſileneſs of the earth, the pole of the north, and the finiteneſs or convexity of heaven are manifeſtly touched. So again, matter of aſtronomy; *Spiritus ejus ornavit coelos, et obſtetricante manu ejus eductus eſt Coluber tortuoſus.* And in another place; *Nunquid conjungere valebis micantes ſtellas Pleiadas, aut gyrum Arcturi poteris diſſipare?* Where the fixing of the ſtars, ever ſtanding at equal diſtance, is with great elegancy noted. And in another place, *Qui facit Arcturum, et Oriona, et Hyadas, et interiora Auſtri*; where again he takes knowledge of the depreſſion of the ſouthern pole, calling it the ſecrets of the ſouth, becauſe the ſouthern ſtars were in that climate unſeen. Matter of generation, *Annon ſicut lac mulſiſti me, et ſicut caſeum coagulaſti me, etc.* Matter of minerals, *Habet*

argentum

argentum venarum ſuarum principia: et auro locus eſt in quo conflatur, ferrum de terra tollitur, et lapis ſolutus calore in aes vertitur: and ſo forwards in that chapter.

So likewiſe in the perſon of Solomon the king, we ſee the gift or endowment of wiſdom and learning, both in Solomon's petition, and in God's aſſent thereunto, preferred before all other terrene and temporal felicity. By virtue of which grant or donative of God, Solomon became enabled, not only to write thoſe excellent parables, or aphoriſms, concerning divine and moral philoſophy; but alſo to compile a natural hiſtory of all verdure, from the cedar upon the mountain to the moſs upon the wall, which is but a rudiment between putrefaction and an herb, and alſo of all things that breathe or move. Nay, the ſame Solomon the king, although he excelled in the glory of treaſure and magnificent buildings, of ſhipping and navigation, of ſervice and attendance, of fame and renown, and the like, yet he maketh no claim to any of thoſe glories, but only to the glory of inquiſition of truth; for ſo he ſaith expreſly, *The glory of God is to conceal a thing, but the glory of the king is to find it out*; as if, according to the innocent play of children, the Divine Majeſty took delight to hide his works, to the end to have them found out; and as if kings could not obtain a greater honour than to be God's playfellows in that game, conſidering the great commandment of wits and means, whereby nothing needeth to be hidden from them.

Neither did the diſpenſation of God vary in the times after our Saviour came into the world; for our Saviour himſelf did firſt ſhew his power to ſubdue ignorance, by his conference with the prieſts and doctors of the law, before he ſhewed his power to ſubdue nature by his miracles. And the coming of the Holy Spirit was chiefly figured and expreſſed in the ſimilitude and gift of tongues, which are but *vehicula ſcientiae*.

So in the election of thoſe inſtruments, which it pleaſed God to uſe for the plantation of the faith, notwithſtanding that at the firſt he did employ perſons altogether unlearned, otherwiſe than by inſpiration, more evidently to declare his immediate working, and to abaſe all human wiſdom or knowledge; yet, nevertheleſs, that counſel of his was no ſooner performed, but in the next viciſſitude and ſucceſſion, he did ſend his divine truth into the world, waited on with other learnings, as with ſervants or handmaids: for ſo we ſee St. Paul, who was only learned amongſt the apoſtles, had his pen moſt uſed in the Scriptures of the New Teſtament.

So again, we find that many of the ancient biſhops and fathers of the Church were excellently read, and ſtudied in all the learning of the heathen; inſomuch, that the edict of the emperor Julianus, whereby it was interdicted unto Chriſtians to be admitted into ſchools, lectures, or exerciſes of learning, was eſteemed and accounted a more pernicious engine and machination againſt the Chriſtian faith, than were all the ſanguinary proſecutions of his predeceſſors; neither could the emulation and jealouſy of Gregory the firſt of that name, biſhop of Rome, ever obtain the opinion of piety or devotion; but contrariwiſe received the cenſure of humour, malignity, and puſillanimity, even amongſt holy men; in that he deſigned to obliterate and extinguiſh the memory of heathen antiquity and authors. But contrariwiſe it was the Chriſtian church, which, amidſt the inundations of the Scythians on the one ſide from the north-weſt, and the Saracens from the eaſt, did preſerve, in the ſacred lap and boſom thereof, the precious relicks even of heathen learning, which otherwiſe had been extinguiſhed, as if no ſuch thing had ever been.

And

And we see before our eyes, that in the age of ourselves and our fathers, when it pleased God to call the church of Rome to account for their degenerate manners and ceremonies, and sundry doctrines obnoxious, and framed to uphold the same abuses; at one and the same time it was ordained by the divine providence, that there should attend withal a renovation, and new spring of all other knowledges: and, on the other side, we see the Jesuits, who partly in themselves, and partly by the emulation and provocation of their example, have much quickened and strengthened the state of learning: we see, I say, what notable service and reparation they have done to the Roman see.

Wherefore, to conclude this part, let it be observed, that there be two principal duties and services, besides ornament and illustration, which philosophy and human learning do perform to faith and religion. The one, because they are an effectual inducement to the exaltation of the glory of God. For as the Psalms and other Scriptures do often invite us to consider, and magnify the great and wonderful works of God; so if we should rest only in the contemplation of the exterior of them, as they first offer themselves to our senses, we should do a like injury unto the majesty of God, as if we should judge or construe of the store of some excellent jeweller, by that only which is set out toward the street in his shop. The other, because they minister a singular help and preservative against unbelief and error: for our Saviour saith, *You err, not knowing the Scriptures, nor the power of God*; laying before us two books or volumes to study, if we will be secured from error; first, the Scriptures, revealing the will of God; and then the creatures, expressing his power: whereof the latter is a key unto the former; not only opening our understanding to conceive the true sense of the Scriptures, by the general notions of reason and rules of speech; but chiefly opening our belief, in drawing us into a due meditation of the omnipotency of God, which is chiefly signed and engraven upon his works. Thus much therefore for divine testimony and evidence, concerning the true dignity and value of learning.

As for human proofs, it is so large a field, as, in a discourse of this nature and brevity, it is fit rather to use choice of those things which we shall produce, than to embrace the variety of them. First therefore, in the degrees of human honour amongst the heathen, it was the highest, to obtain to a veneration and adoration as a God. This unto the Christians is as the forbidden fruit. But we speak now separately of human testimony; according to which, that which the Grecians call *apotheosis*, and the Latins, *relatio inter divos*, was the supreme honour which man could attribute unto man; especially when it was given, not by a formal decree or act of state, as it was used among the Roman emperors, but by an inward assent and belief. Which honour being so high, had also a degree of middle term: for there were reckoned above human honours, honours heroical and divine: in the attribution and distribution of which honours, we see, antiquity made this difference: that whereas founders and uniters of states and cities, lawgivers, extirpers of tyrants, fathers of the people, and other eminent persons in civil merit, were honoured but with the titles of worthies or demi-gods; such as were Hercules, Theseus, Minos, Romulus, and the like: on the other side, such as were inventors and authors of new arts, endowments, and commodities towards man's life, were ever consecrated amongst the gods themselves: as were Ceres, Bacchus, Mercurius, Apollo, and others; and justly: for the merit of the former is confined within the circle of an age or a nation; and is like fruitful showers, which though they

be profitable and good, yet ſerve but for that ſeaſon, and for a latitude of ground where they fall: but the other is indeed like the benefits of heaven, which are permanent and univerſal. The former, again, is mixed with ſtrife and perturbation; but the latter hath the true character of divine preſence, coming *in aura leni*, without noiſe or agitation.

Neither is certainly that other merit of learning, in repreſſing the inconveniencies which grow from man to man, much inferior to the former, of relieving the neceſſities which ariſe from nature; which merit was lively ſet forth by the ancients in that feigned relation of Orpheus's theatre, where all beaſts and birds aſſembled, and, forgetting their ſeveral appetites, ſome of prey, ſome of game, ſome of quarrel, ſtood all ſociably together liſtening to the airs and accords of the harp; the ſound whereof no ſooner ceaſed, or was drowned by ſome louder noiſe, but every beaſt returned to his own nature: wherein is aptly deſcribed the nature and condition of men, who are full of ſavage and unreclaimed deſires of profit, of luſt, of revenge; which as long as they give ear to precepts, to laws, to religion, ſweetly touched with eloquence and perſuaſion of books, of ſermons, of harangues, ſo long is ſociety and peace maintained: but if theſe inſtruments be ſilent, or that ſedition and tumult make them not audible, all things diſſolve into anarchy and confuſion.

But this appeareth more manifeſtly, when kings themſelves, or perſons of authority under them, or other governors in commonwealths and popular eſtates, are endued with learning. For although he might be thought partial to his own profeſſion, that ſaid, "Then ſhould people and eſtates be happy, when either kings "were philoſophers, or philoſophers kings;" yet ſo much is verified by experience, that under learned princes and governors there have been ever the beſt times: for howſoever kings may have their imperfections in their paſſions and cuſtoms; yet if they be illuminated by learning, they have thoſe notions of religion, policy, and morality, which do preſerve them; and refrain them from all ruinous and peremptory errors and exceſſes, whiſpering evermore in their ears, when counſellors and ſervants ſtand mute and ſilent. And ſenators, or counſellors likewiſe, which be learned, do proceed upon more ſafe and ſubſtantial principles, than counſellors which are only men of experience; the one ſort keeping dangers afar off, whereas the other diſcover them not till they come near hand, and then truſt to the agility of their wit to ward off or avoid them.

Which felicity of times under learned princes, to keep ſtill the law of brevity, by uſing the moſt eminent and ſelected examples, doth beſt appear in the age which paſſed from the death of Domitian the emperor, until the reign of Commodus; comprehending a ſucceſſion of ſix princes, all learned, or ſingular favourers and advancers of learning; which age, for temporal reſpects, was the moſt happy and flouriſhing that ever the Roman empire, which then was a model of the world, enjoyed; a matter revealed and prefigured unto Domitian in a dream the night before he was ſlain; for he thought there was grown behind upon his ſhoulders a neck and a head of gold: which came accordingly to paſs in thoſe golden times which ſucceeded; of which princes we will make ſome commemoration; wherein although the matter will be vulgar, and may be thought fitter for a declamation, than agreeable to a treatiſe enfolded as this is; yet becauſe it is pertinent to the point in hand, *neque ſemper arcum tendit Apollo*, and to name them only were too naked and curſory, I will not omit it altogether.

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The first was Nerva, the excellent temper of whose government is by a glance in Cornelius Tacitus touched to the life: *Postquam divus Nerva res olim insociabiles miscuisset, imperium et libertatem.* And in token of his learning, the last act of his short reign, left to memory, was a missive to his adopted son Trajan, proceeding upon some inward discontent at the ingratitude of the times, comprehended in a verse of Homer's;

Telis, Phoebe, tuis lacrymas ulciscere nostras.

Trajan, who succeeded, was for his person not learned: but if we will hearken to the speech of our Saviour, that saith, *He that receiveth a prophet in the name of a prophet, shall have a prophet's reward*, he deserveth to be placed amongst the most learned princes; for there was not a greater admirer of learning, or benefactor of learning; a founder of famous libraries, a perpetual advancer of learned men to office, and a familiar converser with learned professors and preceptors, who were noted to have then most credit in court. On the other side, how much Trajan's virtue and government was admired and renowned, surely no testimony of grave and faithful history doth more lively set forth, than that legend tale of Gregorius Magnus, bishop of Rome, who was noted for the extreme envy he bore towards all heathen excellency; and yet he is reported, out of the love and estimation of Trajan's moral virtues, to have made unto God passionate and fervent prayers for the delivery of his soul out of hell; and to have obtained it, with a caveat, that he should make no more such petitions. In this prince's time also, the persecutions against the Christians received intermission, upon the certificate of Plinius Secundus, a man of excellent learning, and by Trajan advanced.

Adrian, his successor, was the most curious man that lived, and the most universal inquirer; insomuch as it was noted for an error in his mind, that he desired to comprehend all things, and not to reserve himself for the worthiest things; falling into the like humour that was long before noted in Philip of Macedon, who when he would needs over-rule and put down an excellent musician, in an argument touching music, was well answered by him again, "God forbid, Sir, saith he, "that your fortune should be so bad, as to know these things better than I." It pleased God likewise to use the curiosity of this emperor, as an inducement to the peace of his church in those days. For having Christ in veneration, not as a God or Saviour, but as a wonder or novelty; and having his picture in his gallery, matched it with Apollonius, with whom, in his vain imagination he thought he had some conformity; yet it served the turn to allay the bitter hatred of those times against the christian name, so as the church had peace during his time. And for his government civil, although he did not attain to that of Trajan's, in the glory of arms, or perfection of justice; yet in deserving of the weal of the subject he did exceed him. For Trajan erected many famous monuments and buildings, insomuch as Constantine the Great in emulation was wont to call him *Parietaria*, wall-flower, because his name was upon so many walls: but his buildings and works were more of glory and triumph than use and necessity. But Adrian spent his whole reign, which was peaceable, in a perambulation, or survey of the Roman empire; giving order, and making assignation where he went, for re-edifying of cities, towns, and forts decayed, and for cutting of rivers and streams, and for making bridges and passages, and for policying of cities and commonalties with new ordinances and constitutions, and granting new franchises and incorporations; so that his whole time was a very restoration of all the lapses and decays of former times.

Antoninus Pius, who ſucceeded him, was a prince excellently learned; and had the patient and ſubtle wit of a ſchoolman; inſomuch as in common ſpeech, which leaves no virtue untaxed, he was called *cymini ſector*, a carver, or a divider of cumin-ſeed, which is one of the leaſt ſeeds; ſuch a patience he had and ſettled ſpirit, to enter into the leaſt and moſt exact differences of cauſes; a fruit no doubt of the exceeding tranquillity and ſerenity of his mind; which being no ways charged or incumbered, either with fears, remorſes or ſcruples, but having been noted for a man of the pureſt goodneſs, without all fiction or affectation, that hath reigned or lived, made his mind continually preſent and intire. He likewiſe approached a degree nearer unto chriſtianity, and became, as Agrippa ſaid unto St. Paul, *half a Chriſtian*; holding their religion and law in good opinion, and not only ceaſing perſecution, but giving way to the advancement of Chriſtians.

There ſucceeded him the firſt *divi fratres*, the two adoptive brethren, Lucius Commodus Verus, ſon to Ælius Verus, who delighted much in the ſofter kind of learning, and was wont to call the poet Martial his Virgil: and Marcus Aurelius Antoninus, whereof the latter, who obſcured his collegue, and ſurvived him long, was named the philoſopher; who as he excelled all the reſt in learning, ſo he excelled them likewiſe in perfection of all royal virtues; inſomuch as Julianus the emperor, in his book, intitled *Cæſares*, being as a paſquil or ſatire to deride all his predeceſſors, feigned, that they were all invited to a banquet of the gods, and Silenus the Jeſter ſat at the nether end of the table, and beſtowed a ſcoff on every one as they came in; but when Marcus Philoſophus came in, Silenus was gravelled, and out of countenance, not knowing where to carp at him, ſave at the laſt he gave a glance at his patience towards his wife. And the virtue of this prince, continued with that of his predeceſſor, made the name of Antoninus ſo ſacred in the world, that though it were extremely diſhonoured in Commodus, Caracalla, and Heliogabalus, who all bore the name; yet when Alexander Severus refuſed the name, becauſe he was a ſtranger to the family, the ſenate with one acclamation ſaid, *Quo modo Auguſtus, ſic et Antoninus.* In ſuch renown and veneration was the name of theſe two princes in thoſe days, that they would have had it as a perpetual addition in all the emperors ſtiles. In this emperor's time alſo, the church for the moſt part was in peace; ſo as in this ſequence of ſix princes, we do ſee the bleſſed effects of learning in ſovereignty, painted forth in the greateſt table of the world.

But for a tablet, or picture of ſmaller volume, not preſuming to ſpeak of your majeſty that liveth, in my judgment the moſt excellent is that of queen Elizabeth your immediate predeceſſor in this part of Britain; a princeſs that, if Plutarch were now alive to write lives by parallels, would trouble him, I think, to find for her a parallel amongſt women. This lady was endued with learning in her ſex ſingular, and great even amongſt maſculine princes; whether we ſpeak of learning, of language, or of ſcience, modern or ancient, divinity or humanity: and unto the very laſt year of her life, ſhe accuſtomed to appoint ſet hours for reading; ſcarcely any young ſtudent in an univerſity, more daily, or more duly. As for her government, I aſſure myſelf, I ſhall not exceed, if I do affirm, that this part of the iſland never had forty-five years of better times; and yet not through the calmneſs of the ſeaſon, but through the wiſdom of her regimen.

For if there be conſidered of the one ſide, the truth of religion eſtabliſhed; the conſtant peace and ſecurity; the good adminiſtration of juſtice; the temperate uſe of the prerogative, not ſlackened, nor much ſtrained; the flouriſhing ſtate of learning,

learning, ſortable to ſo excellent a patroneſs; the convenient eſtate of wealth and means, both of crown and ſubject; the habit of obedience, and the moderation of diſcontents: and there be conſidered, on the other ſide, the differences of religion, the troubles of neighbour countries, the ambition of Spain, and oppoſition of Rome; and then, that ſhe was ſolitary, and of herſelf: theſe things, I ſay, conſidered, as I could not have choſen an inſtance ſo recent and ſo proper, ſo, I ſuppoſe, I could not have choſen one more remarkable or eminent to the purpoſe now in hand, which is concerning the conjunction of learning in the prince, with felicity in the people.

Neither hath learning an influence and operation only upon civil merit and moral virtue, and the arts or temperature of peace and peaceable government; but likewiſe it hath no leſs power and efficacy in enablement towards martial and military virtue and proweſs; as may be notably repreſented in the examples of Alexander the great, and Cæſar the dictator, mentioned before, but now in fit place to be reſumed; of whoſe virtues and acts in war there needs no note or recital, having been the wonders of time in that kind: but of their affections towards learning, and perfections in learning, it is pertinent to ſay ſomewhat.

Alexander was bred and taught under Ariſtotle the great philoſopher, who dedicated divers of his books of philoſophy unto him: he was attended with Calliſthenes, and divers other learned perſons, that followed him in camp, throughout his journeys and conqueſts. What price and eſtimation he had learning in, doth notably appear in theſe three particulars: firſt, in the envy he uſed to expreſs that he bore towards Achilles, in this, that he had ſo good a trumpet of his praiſes as Homer's verſes: ſecondly, in the judgment or ſolution he gave touching that precious cabinet of Darius, which was found amongſt his jewels, whereof queſtion was made what thing was worthy to be put into it, and he gave his opinion for Homer's works: thirdly in his letter to Ariſtotle, after he had ſet forth his books of nature, wherein he expoſtulateth with him for publiſhing the ſecrets or myſteries of philoſophy; and gave him to underſtand that himſelf eſteemed it more to excel other men in learning and knowledge, than in power and empire. And what uſe he had of learning doth appear, or rather ſhine in all his ſpeeches and anſwers, being full of ſcience and uſe of ſcience, and that in all variety.

And here again it may ſeem a thing ſcholaſtical, and ſomewhat idle, to recite things that every man knoweth; but yet, ſince the argument I handle leadeth me thereunto, I am glad that men ſhall perceive I am as willing to flatter, if they will ſo call it, an Alexander, or a Cæſar, or an Antoninus, that are dead many hundred years ſince, as any that now liveth: for it is the diſplaying the glory of learning in ſovereignty that I propound to myſelf, and not an humour of declaiming in any man's praiſes. Obſerve then the ſpeech he uſed of Diogenes, and ſee if it tend not to the true ſtate of one of the greateſt queſtions of moral philoſophy; whether the enjoying of outward things, or the contemning of them, be the greateſt happineſs: for when he ſaw Diogenes ſo perfectly contented with ſo little, he ſaid to thoſe that mocked at his condition; "Were I not Alexander, I would wiſh to be Diogenes." But Seneca inverteth it, and ſaith; *Plus erat, quod hic nollet accipere, quàm quod ille poſſet dare.* "There were more things which Diogenes would have refuſed, than "thoſe were, which Alexander could have given or enjoyed."

Obſerve again that ſpeech which was uſual with him, "That he felt his mortality "chiefly in two things, ſleep and luſt;" and ſee if it were not a ſpeech extracted out

out of the depth of natural philoſophy, and liker to have come out of the mouth of Ariſtotle, or Democritus, than from Alexander.

See again that ſpeech of humanity and poeſy; when upon the bleeding of his wounds, he called unto him one of his flatterers, that was wont to aſcribe to him divine honour, and ſaid, "Look, this is very blood; this is not ſuch liquor as "Homer ſpeaketh of, which ran from Venus's hand, when it was pierced by "Diomedes."

See likewiſe his readineſs in reprehenſion of logic, in the ſpeech he uſed to Caſſander, upon a complaint that was made againſt his father Antipater: for when Alexander happened to ſay, "Do you think theſe men would have come from ſo "far to complain, except they had juſt cauſe of grief?" And Caſſander anſwered, "Yea, that was the matter, becauſe they thought they ſhould not be diſproved." Said Alexander laughing: "See the ſubtilties of Ariſtotle, to take a matter both ways, *pro et contra*," etc.

But note again how well he could uſe the ſame art, which he reprehended, to ſerve his own humour, when bearing a ſecret grudge to Calliſthenes, becauſe he was againſt the new ceremony of his adoration, feaſting one night, where the ſame Calliſthenes was at the table, it was moved by ſome after ſupper, for entertainment ſake, that Calliſthenes, who was an eloquent man, might ſpeak of ſome theme or purpoſe, at his own choice: which Calliſthenes did; chooſing the praiſe of the Macedonian nation for his diſcourſe, and performing the ſame with ſo good manner, as the hearers were much raviſhed: whereupon Alexander, nothing pleaſed, ſaid, "It was eaſy to be eloquent upon ſo good a ſubject. But," ſaith he, "turn "your ſtile, and let us hear what you can ſay againſt us:" which Calliſthenes preſently undertook, and did with that ſting and life, that Alexander interrupted him, and ſaid, "The goodneſs of the cauſe made him eloquent before, and deſpite "made him eloquent then again."

Conſider farther, for tropes of rhetoric, that excellent uſe of a metaphor or tranſlation, wherewith he taxed Antipater, who was an imperious and tyrannous governor: for when one of Antipater's friends commended him to Alexander for his moderation, that he did not degenerate, as his other lieutenants did, into the Perſian pride in uſe of purple, but kept the ancient habit of Macedon, of black: "True, ſaith Alexander, but Antipater is all purple within." Or that other, when Parmenio came to him in the plain of Arbela, and ſhewed him the innumerable multitude of his enemies, eſpecially as they appeared by the infinite number of lights, as it had been a new firmament of ſtars, and thereupon adviſed him to aſſail them by night: whereupon he anſwered, "That he would not ſteal "the victory."

For matter of policy weigh that ſignificant diſtinction, ſo much in all ages embraced, that he made between his two friends, Hephæſtion and Craterus, when he ſaid, "That the one loved Alexander, and the other loved the king:" deſcribing the principal difference of princes beſt ſervants, that ſome in affection love their perſon, and others in duty love their crown.

Weigh alſo that excellent taxation of an error, ordinary with counſellors of princes, that they counſel their maſters according to the model of their own mind and fortune, and not of their maſters; when, upon Darius's great offers, Parmenio had ſaid, "Surely I would accept theſe offers, were I as Alexander;" ſaith Alexander, So "would I, were I as Parmenio."

Laſtly, weigh that quick and acute reply, which he made when he gave ſo large gifts to his friends and ſervants, and was aſked what he did reſerve for himſelf, and he anſwered, "Hope:" weigh, I ſay, whether he had not caſt up his account right, becauſe hope muſt be the portion of all that reſolve upon great enterpriſes. For this was Cæſar's portion when he went firſt into Gaul, his eſtate being then utterly overthrown with largeſſes. And this was likewiſe the portion of that noble prince, howſoever tranſported with ambition, Henry duke of Guiſe, of whom it was uſually ſaid, that he was the greateſt uſurer in France, becauſe he had turned all his eſtate into obligations.

To conclude therefore: as certain critics are uſed to ſay hyperbolically, "That "if all ſciences were loſt, they might be found in Virgil;" ſo certainly this may be ſaid truly, there are the prints and footſteps of all learning in thoſe few ſpeeches, which are reported of this prince: the admiration of whom, when I conſider him not as Alexander the great, but as Ariſtotle's ſcholar, hath carried me too far.

As for Julius Caeſar, the excellency of his learning needeth not to be argued from his education, or his company, or his ſpeeches; but in a farther degree doth declare itſelf in his writings and works; whereof ſome are extant and permanent, and ſome unfortunately periſhed. For, firſt, we ſee, there is left unto us that excellent hiſtory of his own wars, which he intitled only a commentary, wherein all ſucceeding times have admired the ſolid weight of matter, and the real paſſages, and lively images of actions and perſons, expreſſed in the greateſt propriety of words and perſpicuity of narration that ever was; which that it was not the effect of a natural gift, but of learning and precept, is well witneſſed by that work of his, intitled, *De analogia*, being a grammatical philoſophy, wherein he did labour to make this ſame *vox ad placitum* to become *vox ad licitum*, and to reduce cuſtom of ſpeech to congruity of ſpeech; and took, as it were, the picture of words from the life of reaſon.

So we receive from him, as a monument both of his power and learning, the then reformed computation of the year; well expreſſing, that he took it to be as great a glory to himſelf to obſerve and know the law of the heavens, as to give law to men upon the earth.

So likewiſe in that book of his, *Anti-Cato*, it may eaſily appear that he did aſpire as well to victory of wit as victory of war; undertaking therein a conflict againſt the greateſt champion with the pen that then lived, Cicero the orator.

So again in his book of *Apophthegms*, which he collected, we ſee that he eſteemed it more honour to make himſelf but a pair of tables, to take the wiſe and pithy words of others, than to have every word of his own to be made an apophthegm, or an oracle; as vain princes, by cuſtom of flattery, pretend to do. And yet if I ſhould enumerate divers of his ſpeeches, as I did thoſe of Alexander, they are truly ſuch as Solomon noteth, when he ſaith, *Verba ſapientum tanquam aculei, et tanquam clavi in altum defixi:* whereof I will only recite three, not ſo delectable for elegancy, but admirable for vigour and efficacy.

As firſt, it is reaſon he be thought a maſter of words, that could with one word appeaſe a mutiny in his army, which was thus: The Romans, when their generals did ſpeak to their army, did uſe the word *Milites*, but when the magiſtrates ſpake to the people, they did uſe the word *Quirites*. The ſoldiers were in tumult, and ſeditiouſly prayed to be caſhiered; not that they ſo meant, but by expoſtulation thereof to draw Cæſar to other conditions; wherein he being reſolute not to give way,

after

after ſome ſilence, he began his ſpeech, *Ego, Quirites:* which did admit them already caſhiered; wherewith they were ſo ſurpriſed, croſſed, and confuſed, as they would not ſuffer him to go on in his ſpeech, but relinquiſhed their demands, and made it their ſuit, to be again called by the name of *Milites*.

The ſecond ſpeech was thus: Cæſar did extremely affect the name of king; and ſome were ſet on, as he paſſed by, in popular acclamation to ſalute him king: whereupon, finding the cry weak and poor, he put it off thus, in a kind of jeſt, as if they had miſtaken his ſurname; *Non rex ſum, ſed Cæſar*; a ſpeech, that if it be ſearched, the life and fulneſs of it can ſcarce be expreſſed: for, firſt, it was a refuſal of the name, but yet not ſerious: again, it did ſignify an infinite confidence and magnanimity, as if he preſumed Cæſar was the greater title, as by his worthineſs it is come to paſs till this day; but chiefly, it was a ſpeech of great allurement toward his own purpoſe; as if the ſtate did ſtrive with him but for a name, whereof mean families were veſted; for Rex was a ſurname with the Romans, as well as King is with us.

The laſt ſpeech which I will mention, was uſed to Metellus; when Cæſar, after war declared, did poſſeſs himſelf of the city of Rome, at which time entering into the inner treaſury to take the money there accumulated, Metellus, being tribune, forbad him: whereto Cæſar ſaid, "That if he did not deſiſt, he would lay him dead "in the place." And preſently taking himſelf up, he added, "Young man, it is harder for me to ſpeak it, than to do it:" *Adoleſcens, durius eſt mihi hoc dicere, quàm facere.* A ſpeech compounded of the greateſt terror and greateſt clemency that could proceed out of the mouth of man.

But to return, and conclude with him: it is evident, himſelf knew well his own perfection in learning, and took it upon him; as appeared when, upon occaſion that ſome ſpake what a ſtrange reſolution it was in Lucius Sylla to reſign his dictature; he ſcoffing at him, to his own advantage, anſwered, "That Sylla could not ſkill of "letters, and therefore knew not how to dictate."

And here it were fit to leave this point, touching the concurrence of military virtue and learning, for what example would come with any grace, after thoſe two of Alexander and Cæſar? were it not in regard of the rareneſs of circumſtance, that I find in one other particular, as that which did ſo ſuddenly paſs from extreme ſcorn to extreme wonder; and it is of Xenophon the philoſopher, who went from Socrates's ſchool into Aſia, in the expedition of Cyrus the younger, againſt king Artaxerxes. This Xenophon at that time was very young, and never had ſeen the wars before; neither had any command in the army, but only followed the war as a voluntary, for the love and converſation of Proxenus his friend. He was preſent when Falinus came in meſſage from the great king to the Grecians, after that Cyrus was ſlain in the field, and they a handful of men left to themſelves in the midſt of the king's territories, cut off from their country by many navigable rivers, and many hundred miles. The meſſage imported, that they ſhould deliver up their arms, and ſubmit themſelves to the king's mercy. To which meſſage before anſwer was made, divers of the army conferred familiarly with Falinus: and amongſt the reſt Xenophon happen'd to ſay, "Why, Falinus, we have now but theſe two things "left, our arms and our virtue; and if we yield up our arms, how ſhall we make "uſe of our virtue?" Whereto Falinus, ſmiling on him, ſaid, "If I be not de-"ceived, young gentleman, you are an Athenian, and, I believe, you ſtudy philo-"ſophy, and it is pretty that you ſay; but you are much abuſed, if you think your

"virtue

" virtue can withſtand the king's power." Here was the ſcorn: the wonder followed; which was, that this young ſcholar, or philoſopher, after all the captains were murdered in parley by treaſon, conducted thoſe ten thouſand foot, through the heart of all the king's high countries, from Babylon to Græcia in ſafety, in deſpite of all the king's forces, to the aſtoniſhment of the world, and the encouragement of the Grecians in times ſucceeding to make invaſion upon the kings of Perſia; as was after purpoſed by Jaſon the Theſſalian, attempted by Ageſilaus the Spartan, and atchieved by Alexander the Macedonian, all upon the ground of the act of that young ſcholar.

To proceed now from imperial and military virtue to moral and private virtue: firſt, it is an aſſured truth, which is contained in the verſes;

Scilicet ingenuas didiciſſe fideliter artes,
Emollit mores, nec ſinit eſſe feros.

It taketh away the wildneſs and barbariſm, and fierceneſs of mens minds: but indeed the accent had need be upon *fideliter:* for a little ſuperficial learning doth rather work a contrary effect. It taketh away all levity, temerity, and inſolency, by copious ſuggeſtion of all doubts and difficulties, and acquainting the mind to balance reaſons on both ſides, and to turn back the firſt offers and conceits of the mind, and to accept of nothing but examined and tried. It taketh away vain admiration of any thing, which is the root of all weakneſs: for all things are admired, either becauſe they are new or becauſe they are great. For novelty, no man that wadeth in learning or contemplation throughly, but will find that printed in his heart, *Nil novi ſuper terram.* Neither can any man marvel at the play of puppets, that goeth behind the curtain, and adviſeth well of the motion. And for magnitude, as Alexander the great, after that he was uſed to great armies, and the great conqueſts of the ſpacious provinces in Aſia, when he received letters out of Greece, of ſome fights and ſervices there, which were commonly for a paſſage, or a fort, or ſome walled town at the moſt, he ſaid, " It ſeemed to him, that he was advertiſed " of the battle of the frogs and the mice, that the old tales went of." So certainly, if a man meditate upon the univerſal frame of nature, the earth with men upon it, the divineneſs of ſouls excepted, will not ſeem much other than an ant-hill, where ſome ants carry corn, and ſome carry their young, and ſome go empty, and all to and fro a little heap of duſt. It taketh away or mitigateth fear of death, or adverſe fortune; which is one of the greateſt impediments of virtue and imperfections of manners. For if a man's mind be deeply ſeaſoned with the conſideration of the mortality and corruptible nature of things, he will eaſily concur with Epictetus, who went forth one day, and ſaw a woman weeping for her pitcher of earth that was broken; and went forth the next day, and ſaw a woman weeping for her ſon that was dead; and thereupon ſaid, *Heri vidi fragilem frangi, hodie vidi mortalem mori.* And therefore Virgil did excellently and profoundly couple the knowledge of cauſes, and the conqueſt of all fears together, as *concomitantia:*

Felix, qui potuit rerum cognoſcere cauſas,
Quique metus omnes, et inexorabile fatum
Subjecit pedibus, ſtrepitumque Acherontis avari.

It were too long to go over the particular remedies which learning doth miniſter to all the diſeaſes of the mind, ſometimes purging the ill humours, ſometimes opening the obſtructions, ſometimes helping digeſtion, ſometimes increaſing appetite, ſometimes healing the wounds and exulcerations thereof, and the like; and therefore

I will conclude with that which hath *rationem totius*, which is, that it diſpoſeth the conſtitution of the mind not to be fixed or ſettled in the defects thereof, but ſtill to be capable and ſuſceptible of growth and reformation. For the unlearned man knows not what it is to deſcend into himſelf, or to call himſelf to account; nor the pleaſure of that *ſuaviſſima vita, indies ſentire ſe fieri meliorem*. The good parts he hath, he will learn to ſhew to the full, and uſe them dexterouſly, but not much to increaſe them: the faults he hath, he will learn how to hide and colour them, but not much to amend them: like an ill mower, that mows on ſtill, and never whets his ſcythe. Whereas with the learned man it fares otherwiſe, that he doth ever intermix the correction and amendment of his mind, with the uſe and employment thereof. Nay, farther, in general and in ſum certain it is, that *veritas* and *bonitas* differ but as the ſeal and the print: for truth prints goodneſs; and they be the clouds of error, which deſcend in the ſtorms of paſſions and perturbations.

From moral virtue let us paſs on to matter of power and commandment, and conſider whether in right reaſon there be any comparable with that, wherewith knowledge inveſteth and crowneth man's nature. We ſee the dignity of the commandment is according to the dignity of the commanded: to have commandment over beaſts, as herdmen have, is a thing contemptible; to have commandment over children, as ſchoolmaſters have, is a matter of ſmall honour; to have commandment over galley-ſlaves, is a diſparagement, rather than an honour. Neither is the commandment of tyrants much better, over people which have put off the generoſity of their minds: and therefore it was ever holden, that honours in free monarchies and commonwealths had a ſweetneſs more than in tyrannies, becauſe the commandment extendeth more over the wills of men, and not only over their deeds and ſervices. And therefore, when Virgil putteth himſelf forth to attribute to Auguſtus Cæſar, the beſt of human honours, he doth it in theſe words:

victorque volentes
Per populos dat jura, viamque affectat Olympo.

But yet the commandment of knowledge is higher than the commandment over the will; for it is a commandment over the reaſon, belief and underſtanding of man, which is the higheſt part of the mind, and giveth law to the will itſelf: for there is no power on earth, which ſetteth up a throne, or chair of ſtate, in the ſpirits and ſouls of men, and in their cogitations, imaginations, opinions, and beliefs, but knowledge and learning. And therefore we ſee the deteſtable and extreme pleaſure that arch-heretics, and falſe prophets, and impoſtors are tranſported with, when they once find in themſelves that they have a ſuperiority in the faith and conſcience of men; ſo great, as, if they have once taſted of it, it is ſeldom ſeen that any torture or perſecution can make them relinquiſh or abandon it. But as this is what the author of the *Revelation* calleth *the depth*, or profoundneſs, *of Satan*; ſo, by argument of contraries, the juſt and lawful ſovereignty over mens underſtanding, by force of truth rightly interpreted, is that which approacheth neareſt to the ſimilitude of the divine rule.

As for fortune and advancement, the beneficence of learning is not ſo confined to give fortune only to ſtates and commonwealths, as it doth not likewiſe give fortune to particular perſons. For it was well noted long ago, that Homer hath given more men their livings, than either Sylla, or Cæſar, or Auguſtus ever did, notwithſtanding their great largeſſes and donatives, and diſtributions of lands to ſo many legions; and no doubt it is hard to ſay, whether arms, or learning have advanced

vanced greater numbers. And in caſe of ſovereignty we ſee, that if arms or deſcent have carried away the kingdom, yet learning hath carried the prieſthood, which ever hath been in ſome competition with empire.

Again, for the pleaſure and delight of knowledge and learning, it far ſurpaſſeth all other in nature: for, ſhall the pleaſures of the affections ſo exceed the pleaſures of the ſenſes, as much as the obtaining of deſire or victory exceedeth a ſong or a dinner; and muſt not, of conſequence, the pleaſures of the intellect, or underſtanding, exceed the pleaſures of the affections? We ſee in all other pleaſures there is ſatiety, and after they be uſed, their verdure departeth; which ſheweth well they be but deceits of pleaſure, and not pleaſures; and that it was the novelty which pleaſed, and not the quality: and therefore we ſee that voluptuous men turn friers, and ambitious princes turn melancholy. But of knowledge there is no ſatiety, but ſatisfaction and appetite are perpetually interchangeable; and therefore appeareth to be good in itſelf ſimply, without fallacy or accident. Neither is that pleaſure of ſmall efficacy and contentment to the mind of man, which the poet Lucretius deſcribeth elegantly,

Suave mari magno, turbantibus aequora ventis, etc.

"It is a view of delight, ſaith he, to ſtand or walk upon the ſhore ſide, and to ſee a "ſhip toſſed with tempeſt upon the ſea; or to be in a fortified tower, and to ſee two "battles join upon a plain: but it is a pleaſure incomparable, for the mind of man "to be ſettled, landed, and fortified in the certainty of truth, and from thence to "deſcry and behold the errors, perturbations, labours, and wanderings up and down "of other men."

Laſtly, leaving the vulgar arguments, that by learning man excelleth man in that wherein man excelleth beaſts; that by learning man aſcendeth to the heavens and their motions, where in body he cannot come, and the like: let us conclude with the dignity and excellency of knowledge and learning in that whereunto man's nature doth moſt aſpire, which is, immortality or continuance: for to this tendeth generation, and raiſing of houſes and families; to this tend buildings, foundations, and monuments; to this tendeth the deſire of memory, fame, and celebration, and in effect the ſtrength of all other human deſires. We ſee then how far the monuments of wit and learning are more durable than the monuments of power, or of the hands. For have not the verſes of Homer continued twenty-five hundred years, or more, without the loſs of a ſyllable or letter; during which time, infinite palaces, temples, caſtles, cities, have been decayed and demoliſhed? It is not poſſible to have the true pictures or ſtatues of Cyrus, Alexander, and Cæſar; no, nor of the kings or great perſonages of much later years; for the originals cannot laſt, and the copies cannot but loſe of the life and truth. But the images of mens wits and knowledges remain in books, exempted from the wrong of time, and capable of perpetual renovation. Neither are they fitly to be called images, becauſe they generate ſtill, and caſt their ſeeds in the minds of others, provoking and cauſing infinite actions and opinions in ſucceeding ages: ſo that, if the invention of the ſhip was thought ſo noble, which carrieth riches and commodities from place to place, and conſociateth the moſt remote regions in participation of their fruits; how much more are letters to be magnified, which, as ſhips paſs through the vaſt ſeas of time, and make ages ſo diſtant to participate of the wiſdom, illuminations, and inventions, the one of the other? Nay farther, we ſee, ſome of the philoſophers which were leaſt divine, and moſt immerſed in the ſenſes, and denied generally the immortality of the ſoul;

yet came to this point, that whatſoever motions the ſpirit of man could act and perform without the organs of the body, they thought, might remain after death, which were only thoſe of the underſtanding, and not of the affections, ſo immortal and incorruptible a thing did knowledge ſeem unto them to be. But we, that know by divine revelation, that not only the underſtanding, but the affections purified; not only the ſpirit but the body changed, ſhall be advanced to immortality, do diſclaim theſe rudiments of the ſenſes. But it muſt be remembered both in this laſt point, and ſo it may likewiſe be needful in other places, that in probation of the dignity of knowledge or learning, I did in the beginning ſeparate divine teſtimony from human, which method I have purſued, and ſo handled them both apart.

Nevertheleſs I do not pretend, and I know it will be impoſſible for me, by any pleading of mine to reverſe the judgment, either of Æſop's cock, that preferred the barley-corn before the gem; or of Midas, that being choſen judge between Apollo, preſident of the Muſes, and Pan, god of the flocks, judged for plenty; or of Paris, that judged for beauty and love, againſt wiſdom and power; or of Agrippina, *occidat matrem, modo imperet*, that preferred empire with any condition never ſo deteſtable; or of Ulyſſes, *qui vetulam praetulit immortalitati*, being a figure of thoſe which prefer cuſtom and habit before all excellency; or of a number of the like popular judgments. For theſe things muſt continue as they have been: but ſo will that alſo continue whereupon learning hath ever relied, and which faileth not: *juſtificata eſt Sapientia à filiis ſuis.*

THE

THE SECOND BOOK OF *FRANCIS BACON:* OF THE PROFICIENCE and ADVANCEMENT OF LEARNING, DIVINE and HUMAN.

TO THE KING.

IT might ſeem to have more convenience, though it come often otherwiſe to paſs, excellent king, that thoſe, which are fruitful in their generations, and have in themſelves the foreſight of immortality in their deſcendents, ſhould likewiſe be more careful of the good eſtate of future times, unto which they know they muſt tranſmit and commend over their deareſt pledges. Queen Elizabeth was a ſojourner in the world, in reſpect of her unmarried life, and was a bleſſing to her own times; and yet ſo as the impreſſion of her good government, beſides her happy memory, is not without ſome effect which doth ſurvive her. But to your majeſty, whom God hath already bleſſed with ſo much royal iſſue, worthy to continue and repreſent you for ever; and whoſe youthful and fruitful bed doth yet promiſe many the like renovations; it is proper and agreeable to be converſant, not only in the tranſitory parts of good government, but in thoſe acts alſo which are in their nature permanent and perpetual: among the which, if affection do not tranſport me, there is not any more worthy, than the farther endowment of the world with ſound and fruitful knowledge. For why ſhould a few received authors ſtand up like Hercules's columns; beyond which there ſhould be no ſailing or diſcovering, ſince we have ſo bright and benign a ſtar as your majeſty, to conduct and proſper us? To return therefore where we left, it remaineth to conſider of what kind thoſe acts are, which have been undertaken and performed by kings and others for the increaſe and advancement of learning, wherein I purpoſe to ſpeak actively, without digreſſing or dilating.

Let

Let this ground therefore be laid, that all works are overcome by amplitude of reward, by ſoundneſs of direction, and by the conjunction of labours. The firſt multiplieth endeavour, the ſecond preventeth error, and the third ſupplieth the frailty of man; but the principal of theſe is direction: for *claudus in via antevertit curſorem extra viam*; and Solomon excellently ſetteth it down, *If the iron be not ſharp, it requireth more ſtrength; but wiſdom is that which prevaileth:* ſignifying, that the invention or election of the mean is more effectual than any inforcement or accumulation of endeavours. This I am induced to ſpeak, for that, not derogating from the noble intention of any that have been deſervers towards the ſtate of learning, I do obſerve, nevertheleſs, that their works and acts are rather matters of magnificence and memory, than of progreſſion and proficience, and tend rather to augment the maſs of learning, in the multitude of learned men, than to rectify or raiſe the ſciences themſelves.

The works or acts of merit towards learning are converſant about three objects: the places of learning, the books of learning, and the perſons of the learned. For as water, whether it be the dew of heaven, or the ſprings of the earth, doth ſcatter and loſe itſelf in the ground, except it be collected into ſome receptacle, where it may by union comfort and ſuſtain itſelf, and for that cauſe the induſtry of man hath made and framed ſpring-heads, conduits, ciſterns, and pools, which men have accuſtomed likewiſe to beautify and adorn with accompliſhments of magnificence and ſtate, as well as of uſe and neceſſity; ſo this excellent liquor of knowledge, whether it deſcend from divine inſpiration, or ſpring from human ſenſe, would ſoon periſh and vaniſh to oblivion, if it were not preſerved in books, traditions, conferences, and places appointed; as univerſities, colleges, and ſchools, for the receipt and comforting of the ſame.

The works, which concern the ſeats and places of learning, are four; foundations and buildings, endowments with revenues, endowments with franchiſes and privileges, inſtitutions and ordinances for government; all tending to quietneſs and privateneſs of life, and diſcharge of cares and troubles; much like the ſtations which Virgil preſcribeth for the hiving of bees:

Principio ſedes apibus ſtatioque petenda,
Quo neque ſit ventis aditus, etc.

The works touching books are two; firſt libraries, which are as the ſhrines where all the relicks of the ancient ſaints, full of true virtue, and that without deluſion or impoſture, are preſerved and repoſed: ſecondly, new editions of authors, with more correct impreſſions, more faithful tranſlations, more profitable gloſſes, more diligent annotations, and the like.

The works pertaining to the perſons of learned men, beſides the advancement and countenancing of them in general, are two: the reward and deſignation of readers in ſciences already extant and invented; and the reward and deſignation of writers and inquirers concerning any parts of learning not ſufficiently laboured and proſecuted.

Theſe are ſummarily the works and acts, wherein the merits of many excellent princes and other worthy perſonages have been converſant. As for any particular commemorations, I call to mind what Cicero ſaid, when he gave general thanks; *Difficile non aliquem, ingratum quenquam praeterire.* Let us rather, according to the Scriptures, look unto that part of the race which is before us, than look back to that which is already attained.

Firſt

First therefore, amongſt ſo many great foundations of colleges in Europe, I find ſtrange that they are all dedicated to profeſſions, and none left free to arts and ſciences at large. For if men judge that learning ſhould be referred to action, they judge well; but in this they fall into the error deſcribed in the ancient fable, in which the other parts of the body did ſuppoſe the ſtomach had been idle, becauſe it neither performed the office of motion, as the limbs do, nor of ſenſe, as the head doth; but yet, notwithſtanding, it is the ſtomach that digeſteth and diſtributeth to all the reſt: ſo if any man think philoſophy and univerſality to be idle ſtudies, he doth not conſider that all profeſſions are from thence ſerved and ſupplied. And this I take to be a great cauſe, that hath hinder'd the progreſſion of learning, becauſe theſe fundamental knowledges have been ſtudied but in paſſage. For if you will have a tree bear more fruit than it hath uſed to do, it is not any thing you can do to the boughs, but it is the ſtirring of the earth, and putting new mould about the roots, that muſt work it. Neither is it to be forgotten, that this dedicating of foundations and donations to profeſſory learning, hath not only had a malign aſpect and influence upon the growth of ſciences, but hath alſo been prejudicial to ſtates and governments. For hence it proceedeth that princes find a ſolitude in regard of able men to ſerve them in cauſes of ſtate, becauſe there is no education collegiate which is free, where ſuch as were ſo diſpoſed might give themſelves to hiſtories, modern languages, books of policy and civil diſcourſe, and other the like enablements unto ſervice of ſtate.

And becauſe founders of colleges do plant, and founders of lectures do water, it followeth well in order, to ſpeak of the defect which is in public lectures; namely, in the ſmallneſs and meanneſs of the ſalary or reward which in moſt places is aſſigned unto them; whether they be lectures of arts, or of profeſſions. For it is neceſſary to the progreſſion of ſciences, that readers be of the moſt able and ſufficient men, as thoſe which are ordained for generating and propagating of ſciences, and not for tranſitory uſe. This cannot be, except their condition and endowment be ſuch as may content the ableſt man to appropriate his whole labour, and continue his whole age in that function and attendance, and therefore muſt have a proportion anſwerable to that mediocrity or competency of advancement, which may be expected from a profeſſion, or the practice of a profeſſion. So as, if you will have ſciences flouriſh, you muſt obſerve David's military law, which was, "That "thoſe which ſtaid with the carriage, ſhould have equal part with thoſe which were "in the action;" elſe will the carriages be ill attended. So readers in ſciences are indeed the guardians of the ſtores and proviſions of ſciences, whence men in active courſes are furniſhed, and therefore ought to have equal entertainment with them; otherwiſe if the fathers in ſciences be of the weakeſt ſort, or be ill-maintained,

Et patrum invalidi referent jejunia nata.

Another defect I note, wherein I ſhall need ſome alchemiſt to help me, who call upon men to ſell their books, and to build furnaces, quitting and forſaking Minerva and the Muſes as barren virgins, and relying upon Vulcan. But certain it is, that unto the deep, fruitful, and operative ſtudy of many ſciences, eſpecially natural philoſophy and phyſic, books be not only the inſtrumentals wherein alſo the beneficence of men hath not been altogether wanting: for, we ſee, ſpheres, globes, aſtrolabes, maps, and the like, have been provided as appurtenances to aſtronomy and coſmography, as well as books; we ſee likewiſe, that ſome places inſtituted for phyſic have annexed the commodity of gardens for ſimples of all ſorts,

and

and do likewiſe command the uſe of dead bodies for anatomies. But theſe do reſpect but a few things. In general, there will hardly be any main proficience in the diſcloſing of nature, except there be ſome allowance for expences about experiments; whether they be experiments appertaining to Vulcanus or Dædalus, furnace or engine, or any other kind: and therefore as ſecretaries and ſpies of princes and ſtates bring in bills for intelligence, ſo you muſt allow the ſpies and intelligencers of nature to bring in their bills, or elſe you ſhall be ill advertiſed.

And if Alexander made ſuch a liberal aſſignation to Ariſtotle of treaſure for the allowance of hunters, fowlers, fiſhers, and the like, that he might compile an hiſtory of nature, much better do they deſerve it that travel in arts of nature.

Another defect which I note, is an intermiſſion or neglect, in thoſe which are governors in univerſities, of conſultation; and in princes, or ſuperior perſons, of viſitation: to enter into account and conſideration, whether the readings, exerciſes, and other cuſtoms appertaining unto learning, anciently begun, and ſince continued, be well inſtituted or no, and thereupon to ground an amendment or reformation in that which ſhall be found inconvenient. For it is one of your majeſty's own moſt wiſe and princely maxims, "That in all uſages and precedents, the times "be conſider'd wherein they firſt began, which if they were weak or ignorant, it "derogateth from the authority of the uſage, and leaveth it for ſuſpect." And therefore in as much as moſt of the uſages and orders of the univerſities were derived from more obſcure times, it is the more requiſite they be re-examined. In this kind I will give an inſtance or two, for example ſake, of things that are the moſt obvious and familiar: the one is a matter, which though it be ancient and general, yet I hold it to be an error, which is, that ſcholars in univerſities come too ſoon and too unripe to logic and rhetoric, arts fitter for graduates than children and novices; for theſe two, rightly taken, are the graveſt of ſciences, being the arts of arts, the one for judgment, the other for ornament. And they be the rules and directions how to ſet forth and diſpoſe matter; and therefore for minds empty and unfraught with matter, and which have not gathered that which Cicero calleth *ſylva* and *ſupellex*, ſtuff and variety, to begin with thoſe arts, as if one ſhould learn to weigh, or to meaſure, or to paint the wind, doth work but this effect, that the wiſdom of thoſe arts, which is great and univerſal, is almoſt made contemptible, and is degenerate into childiſh ſophiſtry and ridiculous affectation. And farther, the untimely learning of them hath drawn on, by conſequence, the ſuperficial and unprofitable teaching and writing of them, as fitteſt indeed to the capacity of children. Another, is a lack I find in the exerciſes uſed in the univerſities, which do make too great a divorce between invention and memory; for their ſpeeches are either premeditate *in verbis conceptis*, where nothing is left to invention; or merely extemporal, where little is left to memory; whereas in life and action there is leaſt uſe of either of theſe, but rather of intermixtures of premeditation and invention, notes and memory; ſo as the exerciſe fitteth not the practice, nor the image the life; and it is ever a true rule in exerciſes, that they be framed as near as may be to the life of practice, for otherwiſe they do pervert the motions and faculties of the mind, and not prepare them. The truth whereof is not obſcure, when ſcholars come to the practices of profeſſions, or other actions of civil life, which when they ſet into, this want is ſoon found by themſelves, and ſooner by others. But this part, touching the amendment of the inſtitutions and orders of univerſities, I will conclude with the clauſe of Cæſar's letter to Appius and Balbus, *Hoc quemadmodum*

admodum fieri poſſit, nonnulla mihi in mentem veniunt, et multa reperiri poſſunt: de iis rebus rogo vos, ut cogitationem ſuſcipiatis.

Another defect, which I note, aſcendeth a little higher than the precedent: for as the proficience of learning conſiſteth much in the orders and inſtitutions of univerſities in the ſame ſtates and kingdoms, ſo it would be yet more advanced, if there were more intelligence mutual between the univerſities of Europe than now there is. We ſee there be many orders and foundations, which though they be divided under ſeveral ſovereignties and territories, yet they take themſelves to have a kind of contract, fraternity, and correſpondence one with another, inſomuch as they have provincials and generals. And ſurely as nature createth brotherhood in families, and arts mechanical contract brotherhoods in commonalties, and the anointment of God ſuperinduceth a brotherhood in kings and biſhops: ſo in like manner there cannot but be a fraternity in learning and illumination, relating to that paternity which is attributed to God, who is called the father of illuminations or lights.

The laſt defect which I will note is, that there hath not been, or very rarely been, any public deſignation of writers or inquirers concerning ſuch parts of knowledge, as may appear not to have been already ſufficiently laboured or undertaken: unto which point it is an inducement to enter into a view and examination what parts of learning have been proſecuted, and what omitted; for the opinion of plenty is amongſt the cauſes of want, and the great quantity of books maketh a ſhew rather of ſuperfluity than lack; which ſurcharge, nevertheleſs, is not to be remedied by making no more books, but by making more good books, which, as the ſerpent of Moſes, might devour the ſerpents of the enchanters.

The removing of all the defects formerly enumerated, except the laſt, and of the active part alſo of the laſt, which is the deſignation of writers, are *opera baſilica*; towards which the endeavours of a private man may be but as an image in a croſs way, that may point at the way, but cannot go it. But the inducing part of the latter, which is the ſurvey of learning, may be ſet forward by private travel: wherefore I will now attempt to make a general and faithful perambulation of learning, with an inquiry what parts thereof lie freſh and waſte, and not improved and converted by the induſtry of man; to the end that ſuch a plot, made and recorded to memory, may both miniſter light to any public deſignation, and alſo ſerve to excite voluntary endeavours: wherein nevertheleſs, my purpoſe is at this time to note only omiſſions and deficiencies, and not to make any redargution of errors, or incomplete proſecutions: for it is one thing to ſet forth what ground lieth unmanured, and another thing to correct ill huſbandry in that which is manured.

In the handling and undertaking of which work I am not ignorant what it is that I do now move and attempt, nor inſenſible of mine own weakneſs to ſuſtain my purpoſe: but my hope is, that if my extreme love to learning carry me too far, I may obtain the excuſe of affection; for that "it is not granted to man to love "and to be wiſe." But, I know well, I can uſe no other liberty of judgment than I muſt leave to others; and I, for my part, ſhall be indifferently glad either to perform myſelf, or accept from another, that duty of humanity; *Nam qui erranti comiter monſtrat viam, etc.* I do foreſee likewiſe, that of thoſe things which I ſhall enter and regiſter, as deficiencies and omiſſions, many will conceive and cenſure,

that ſome of them are already done and extant; others to be but curioſities, and things of no great uſe; and others to be of too great difficulty, and almoſt impoſſibility to be compaſſed and effected: but for the two firſt, I refer myſelf to the particulars; for the laſt, touching impoſſibility, I take it, thoſe things are to be held poſſible which may be done by ſome perſon, though not by every one; and which may be done by many, though not by any one; and which may be done in ſucceſſion of ages, though not within the hour-glaſs of one man's life; and which may be done by public deſignation, though not by private endeavour.

But, notwithſtanding, if any man will take to himſelf rather that of Solomon, *Dicit piger, Leo eſt in via*, than that of Virgil, *Poſſunt quia poſſe videntur*: I ſhall be content that my labours be eſteemed but as the better ſort of wiſhes; for as it aſketh ſome knowledge to demand a queſtion not impertinent, ſo it requireth ſome ſenſe to make a wiſh not abſurd.

THE parts of human learning have reference to the three parts of man's Underſtanding, which is the ſeat of learning; Hiſtory to his Memory, Poeſy to his Imagination, and Philoſophy to his Reaſon. Divine learning receiveth the ſame diſtribution, for the ſpirit of man is the ſame, though the revelation of oracle and ſenſe be diverſe: ſo as theology conſiſteth alſo of hiſtory of the church; of parables, which is divine poeſy; and of holy doctrine or precept: for as for that part which ſeemeth ſupernumerary, which is prophecy, it is but divine hiſtory; which hath that prerogative over human, as the narration may be before the fact, as well as after.

Hiſtoria literarum.

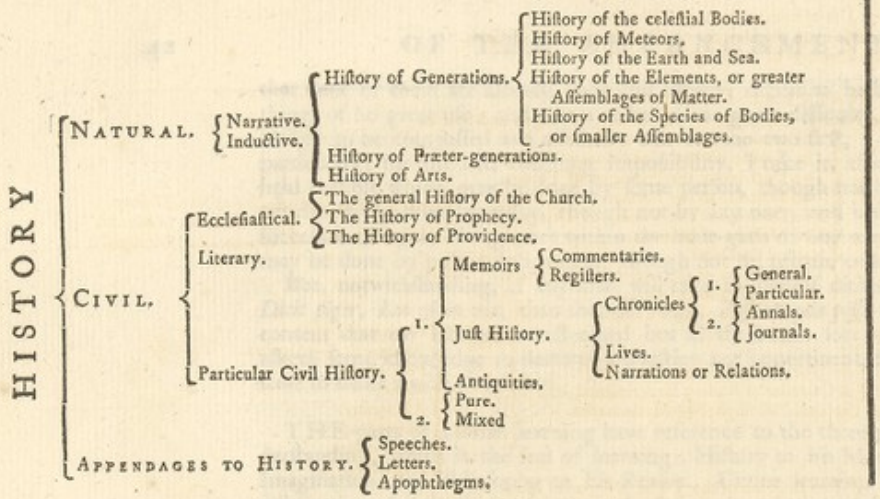
History is *Natural*, *Civil*, *Eccleſiaſtical*, and *Literary*; whereof the three firſt I allow as extant, the fourth I note as deficient. For no man hath propounded to himſelf the general ſtate of learning to be deſcribed and repreſented from age to age, as many have done the works of nature, and the ſtate civil and eccleſiaſtical; without which the hiſtory of the world ſeemeth to me to be as the ſtatue of Polyphemus with his eye out, that part being wanting which doth moſt ſhew the ſpirit and life of the perſon: And yet I am not ignorant, that in divers particular ſciences, as of the juriſconſults, the mathematicians, the rhetoricians, the philoſophers, there are ſet down ſome ſmall memorials of the ſchools, authors and books; and ſo likewiſe ſome barren relations touching the invention of arts or uſages.

But a juſt ſtory of learning, containing the antiquities and originals of knowledges and their ſects, their inventions, their traditions, their diverſe adminiſtrations and managings, their flouriſhings, their oppoſitions, decays, depreſſions, oblivions, removes, with the cauſes and occaſions of them, and all other events concerning learning, throughout the ages of the world, I may truly affirm to be wanting.

The uſe and end of which work, I do not ſo much deſign for curioſity, or ſatisfaction of thoſe that are the lovers of learning, but chiefly for a more ſerious and grave purpoſe, which is this in few words, that it will make learned men wiſe in the uſe and adminiſtration of learning. For it is not St. Auguſtine's nor St. Ambroſe's works that will make ſo wiſe a divine, as eccleſiaſtical hiſtory thoroughly read and obſerved; and the ſame reaſon is of learning.

THE GENERAL DISTRIBUTIO

MEMORY.



IMAGINATION.

POETRY
- NARRATIVE.
- DRAMATIC.
- ALLEGORICAL.

REASON.

INSPIRED THEOLOGY, or DIVINITY. Its Diviſion left to Divines.

Three Appendages to Inſpired Theology.
- The true Uſe of human Reaſon in Theology.
- A Diſcourſe upon the Degrees of Unity in the City of God.
- The firſt Flowings of the Scriptures.

PHILOSOPHY.

DIVINE PHILOSOPHY, or NATURAL THEOLOGY.

Appendage both to Inſpired and Natural Theology. — The Science of Angels and Spirits.

NATURAL PHILOSOPHY.

PRIMARY PHILOSOPHY.
- The common Axioms of all Sciences.
- The Tranſcendental Conditions of Things.

SPECULATIVE.

Particular Phyſics
- The Doctrine of the Principles of Things.
- The Doctrine of the Formation of Things.
- The Doctrine of the Variety of Things
  - Concrete Phyſics; *divided as* Nat. Hiſtory.
  - Abſtract Phyſics.
    - The Schemes of Matter.
    - Appetites and Motions.

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- Natural Problems.
- The Opinions of the ancient Philoſophers.

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- The Inveſtigation of Forms.
- The Doctrine of final Cauſes.

PRACT.
- Mechanics
- Natural Magic
- Appendages to Practical Philoſophy.
  - An Inventory of Human Knowledge.
  - A Calendar of leading Experiments.
- Appendage to Speculative and Practical Philoſophy. — Mathematics.
  - Pure
    - Geometry.
    - Arithmetic. — Algebra.
  - Mixed
    - Perſpective.
    - Muſic.
    - Aſtronomy.
    - Coſmography.
    - Architecture.
    - Enginery.

THE GENERAL SCIENCE OF THE NATURE AND STATE OF MAN.

The Doctrine of the human Perſon.
- The Miſeries of Mankind.
- The Prerogatives of Mankind.

The Doctrine of Union.
- Notices or Indication.
  - Phyſiognomy.
  - Interpretation of Dreams.
- Impreſſion.

THE DOCTRINE OF THE HUMAN BODY.

Medicine.
- Preſervation of Health.
- Cure of Diſeaſes.
- Prolongation of Life.

Coſmetics.
- Civil.
- Effeminate.

Athletics.
- Arts of Activity.
- Arts of Endurance.

Arts of Elegance.
- Painting.
- Muſic, etc.

The Doctrine of the inſpired Subſtance.

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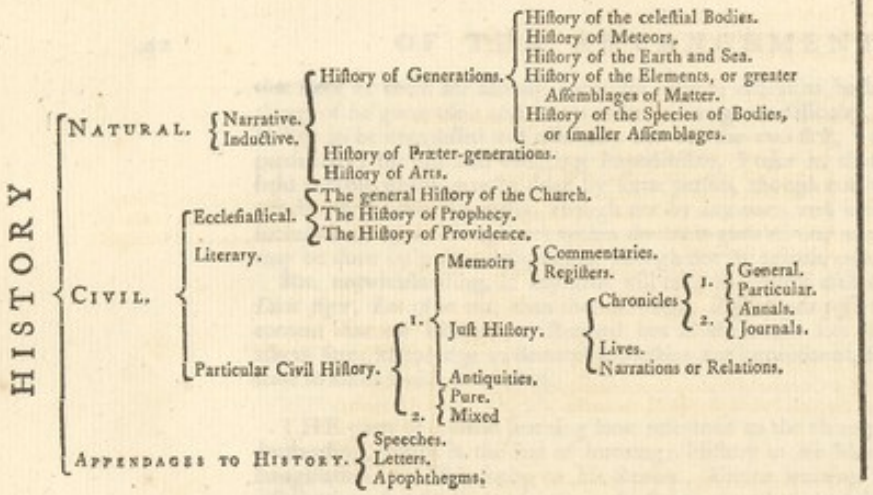
MEMORY.



IMAGINATIO

POETRY
Narrat
Dramat
Allego

INSPI

PHILOSOPHY.
Div
Natural Philosophy.
Human Philosophy.

OF HUMAN KNOWLEDGE.

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    - Phyſiognomy.
    - Interpretation of Dreams.
  - Impreſſion.

HUMAN DOCTRINE.

THE DOCTRINE OF THE HUMAN BODY.
- Medicine.
  - Preſervation of Health.
  - Cure of Diſeaſes.
  - Prolongation of Life.
- Coſmetics.
  - Civil.
  - Effeminate.
- Athletics.
  - Arts of Activity.
  - Arts of Endurance.
- Arts of Elegance.
  - Painting.
  - Muſic, etc.

THE DOCTRINE OF THE HUMAN SOUL.
- The Doctrine of the inſpired Subſtance.
- The Doctrine of the ſenſitive Soul.
  - The Doctrine of voluntary Motion.
  - The Doctrine of Senſe and Senſibility.
- The Doctrine of the Subſtance and Faculties of the Soul.
- Two Appendages to this Doctrine.
  - Divination.
  - Faſcination.

THE DOCTRINE OF THE USE AND OBJECTS OF THE FACULTIES.

LOGICS.

Art of Invention.
- The Invention of Arts
  - The Proceſs from Experiment to Experiment, or Learned Experience.
  - The Proceſs from Experiments to Axioms, or the Art of Induction.
- The Invention of Arguments.
  - Promptuary.
  - Topical
    - Genera.
    - Particular.

Art of Judging.
- Judgment by Induction.
- Judgment by Syllogiſm.
  1. Reduction direct.
     Reduction inverſe.
  2. Analytics.
     Doctrine of Confutations.
     - Confutat. of Sophiſms.
     - Confutat. of Interpretation.
     - Conf. of Idols or falſe Notions.

Appendix to the Art of Judging.—The Aſſignation of Demonſtrations according to the Nature of the Subject.

Art of Cuſtody.
- The Doctrine of Helps for the Memory.
- The Doctrine of the Memory itſelf.
  - Prenotion.
  - Emblem.

Doctrine of Tradition.
- The Doctrine of the Organ of Speech, or Literary Grammar.
  - The Doctrine of the Marks of Things.
    - Hieroglyphics and Geſtures.
    - Real Characters.
  - Art of Speaking. — Sound. Meaſure. Accent.
  - Art of Writing.
    - Alphabet.
    - Cypher. Decyphering.
- Philoſophical Grammar.
- Method of Speech, or Doctrine of traditive Prudence.
  - Doctrinal and initiative.
  - Open and concealed.
  - Aphoriſtical and regular.
  - Queſtion and Anſwer.
  - Method of conquering Prejudice.
- Method has two Parts.
  - The Diſpoſition of a whole Work.
  - The Limitation of Propoſitions.
- The Doctrine of the Illuſtration of Speech, or Rhetoric.
- Three Appendages to this Doctrine.
  - A Collection of Sophiſms.
  - A Collection of ſtudied Antithets.
  - A Collection of leſſer Forms of Speech.

Two Appendages to the Doctrine of Tradition.
- The Art of Criticiſm.
- School learning.

ETHICS.

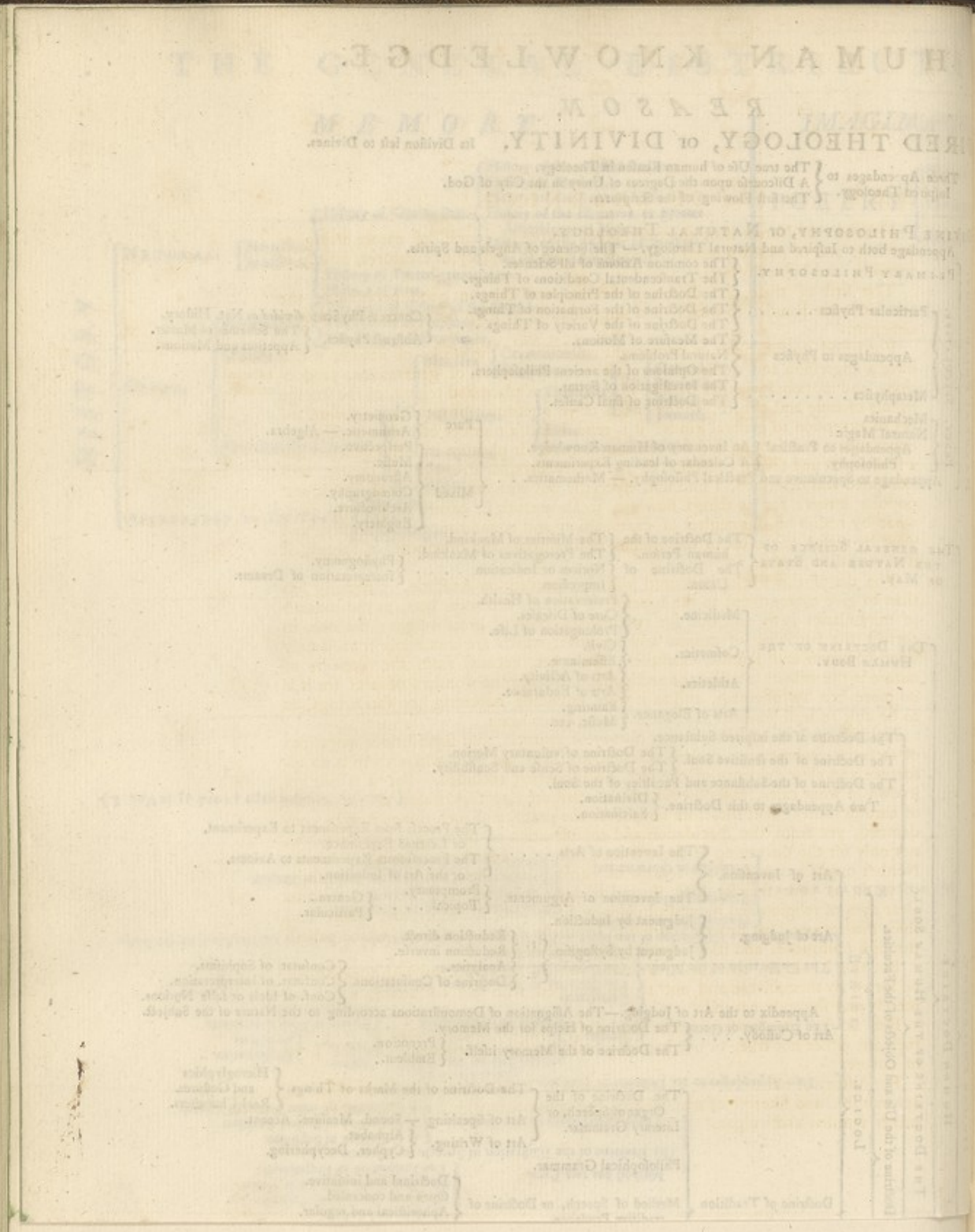
The Exemplar of Good.
- Simple.
  - Individual or Self Good.
    - Active.
    - Paſſive.
      - Conſervative.
      - Perfective.
  - Good of Communion.
    - Duties of Man in common.
    - Reſpective Duties.
- Compound.

The Cultivation of the Mind.
- The Doctrine of Mens Natures and Diſpoſitions.
- The Inquiry into the Affections.
- The Doctrine of Remedies.

Appendix to the Cultivation of the Mind.—The Relation between the Good of the Mind and the Good of the Body.

CIVIL KNOWLEDGE.
- Prudence in Converſation.
- Prudence in Buſineſs
  - The Doctrine of various Occaſions.
  - The Doctrine of riſing in Life.
- Prudence in Government.
  - The Doctrine of enlarging the Bounds of Empire.
  - The Doctrine of univerſal Juſtice.

[Place this between page 42 and 43 in VOL. I.]



History of *Nature* is of three ſorts; of nature in courſe, of nature erring or varying, and of nature altered or wrought; that is, hiſtory of creatures, hiſtory of marvels, and hiſtory of arts.

The firſt of theſe, no doubt, is extant, and that in good perfection; the two latter are handled ſo weakly and unprofitably, as I am moved to note them as deficient.

For I find no ſufficient or competent collection of the works of nature, which have a digreſſion and deflexion from the ordinary courſe of generations, productions, and motions, whether they be ſingularities of place and region, or the ſtrange events of time and chance, or the effects of yet unknown properties, or the inſtances of exception to general kinds: it is true, I find a number of books of fabulous experiments and ſecrets, and frivolous impoſtures for pleaſure and ſtrangeneſs: but a ſubſtantial and ſevere collection of the heteroclites, or irregulars of nature, well examined and deſcribed, I find not, eſpecially not with due rejection of fables, and popular errors: for as things now are, if an untruth in nature be once on foot, what by reaſon of the neglect of examination and countenance of antiquity, and what by reaſon of the uſe of the opinion in ſimilitudes and ornaments of ſpeech, it is never called down. Hiſtoria naturae errantis.

The uſe of this work, honoured with a precedent in Ariſtotle, is nothing leſs than to give contentment to the appetite of curious and vain wits, as the manner of mirabilaries is to do: but for two reaſons, both of great weight: the one, to correct the partiality of axioms and opinions, which are commonly framed only upon common and familiar examples; the other, becauſe from the wonders of nature is the neareſt intelligence and paſſage towards the wonders of art: for it is no more, but by following, and as it were hounding nature in her wanderings, to to be able to lead her afterwards to the ſame place again.

Neither am I of opinion, in this hiſtory of marvels, that ſuperſtitious narrations of ſorceries, witchcrafts, dreams, divinations, and the like, where there is an aſſurance and clear evidence of the fact, be altogether excluded. For it is not yet known in what caſes, and how far effects attributed to ſuperſtition do participate of natural cauſes: and therefore howſoever the practice of ſuch things is to be condemned, yet from the ſpeculation and conſideration of them light may be taken, not only for the diſcerning of the offences, but for the farther diſcloſing of nature. Neither ought a man to make ſcruple of entring into theſe things for inquiſition of truth, as your majeſty hath ſhewed in your own example; who with the two clear eyes of religion and natural philoſophy have looked deeply and wiſely into theſe ſhadows, and yet proved yourſelf to be of the nature of the ſun, which paſſeth through pollutions, and itſelf remains as pure as before.

But this I hold fit, that theſe narrations, which have mixture with ſuperſtition, be ſorted by themſelves, and not to be mingled with the narrations, which are merely and ſincerely natural.

But as for the narrations touching the prodigies and miracles of religions, they are either not true, or not natural; and therefore impertinent for the ſtory of nature.

For hiſtory of nature wrought, or mechanical, I find ſome collections made of agriculture, and likewiſe of manual arts, but commonly with a rejection of experiments familiar and vulgar. Hiſtoria mechanica.

For it is eſteemed a kind of diſhonour unto learning, to deſcend to inquiry or meditation upon matters mechanical, except they be ſuch as may be thought ſecrets, rarities, and ſpecial ſubtilties; which humour of vain and ſupercilious arrogancy is juſtly derided in Plato; where he brings in Hippias, a vaunting ſophiſt, diſputing with Socrates, a true and unfeigned inquiſitor of truth; where the ſubject being touching beauty, Socrates, after his wandering manner of inductions, put firſt an example of a fair virgin, and then of a fair horſe, and then of a fair pot well glazed, whereat Hippias was offended; and ſaid, "More than for "courteſy's ſake, he did think much to diſpute with any that did alledge ſuch "baſe and ſordid inſtances:" whereunto Socrates anſwered, "You have reaſon, "and it becomes you well, being a man ſo trim in your veſtments," *etc.* And ſo goeth on in irony.

But the truth is, they be not the higheſt inſtances that give the ſecureſt information; as may be well expreſſed in the tale ſo common of the philoſopher, that while he gazed upwards to the ſtars fell into the water; for if he had looked down he might have ſeen the ſtars in the water, but looking aloft, he could not ſee the water in the ſtars. So it cometh often to paſs, that mean and ſmall things diſcover great, better than great can diſcover the ſmall: and therefore Ariſtotle noteth well, "that the nature of every thing is beſt ſeen in his ſmalleſt portions." And for that cauſe he inquireth the nature of a commonwealth, firſt in a family, and the ſimple conjugations of man and wife, parent and child, maſter and ſervant, which are in every cottage. Even ſo likewiſe the nature of this great city of the world, and the policy thereof, muſt be firſt ſought in mean concordances and ſmall portions. So we ſee how that ſecret of nature, of the turning of iron touched with the loadſtone towards the north, was found out in needles of iron, not in bars of iron.

But if my judgment be of any weight, the uſe of Hiſtory Mechanical is of all others the moſt radical and fundamental towards natural philoſophy; ſuch natural philoſophy as ſhall not vaniſh in the fume of ſubtile, ſublime, or delectable ſpeculation, but ſuch as ſhall be operative to the endowment and benefit of man's life: for it will not only miniſter and ſuggeſt for the preſent many ingenious practices in all trades, by a connection and transferring of the obſervations of one art to the uſe of another, when the experiences of ſeveral myſteries ſhall fall under the conſideration of one man's mind; but farther, it will give a more true and real illumination concerning cauſes and axioms than is hitherto attained.

For like as a man's diſpoſition is never well known till he be croſſed, nor Proteus ever changed ſhapes till he was ſtraitened and held faſt; ſo the paſſages and variations of nature cannot appear ſo fully in the liberty of nature, as in the trials and vexations of art.

For *Civil Hiſtory*, it is of three kinds, not unfitly to be compared with the three kinds of pictures or images: for of pictures or images, we ſee, ſome are unfiniſhed, ſome are perfect, and ſome are defaced. So of hiſtories we may find three kinds, Memorials, Perfect Hiſtories, and Antiquities; for memorials are hiſtory unfiniſhed, or the firſt or rough draughts of hiſtory; and antiquities are hiſtory defaced, or ſome remnants of hiſtory which have caſually eſcaped the ſhipwreck of time.

Memorials,

Memorials, or preparatory history, are of two sorts, whereof the one may be termed Commentaries, and the other Registers. Commentaries are they which set down a continuance of the naked events and actions, without the motives or designs, the counsels, the speeches, the pretexts, the occasions, and other passages of action: for this is the true nature of a Commentary, though Cæsar, in modesty mixed with greatness, did for his pleasure apply the name of a Commentary to the best history of the world. Registers are collections of public acts, as decrees of council, judicial proceedings, declarations and letters of state, orations and the like, without a perfect continuance or contexture of the thread of the narration.

Antiquities, or remnants of history, are, as was said, *tanquam tabula naufragii*, when industrious persons, by an exact and scrupulous diligence and observation, out of monuments, names, words, proverbs, traditions, private records and evidences, fragments of stories, passages of books that concern not story, and the like, do save and recover somewhat from the deluge of time.

In these kinds of imperfect histories I do assign no deficience, for they are *tanquam imperfecte mista*, and therefore any deficience in them is but their nature.

As for the corruptions and moths of history, which are Epitomes, the use of them deserveth to be banished, as all men of sound judgment have confessed, as those that have fretted and corroded the sound bodies of many excellent histories, and wrought them into base and unprofitable dregs.

History, which may be called *Just* and *Perfect History*, is of three kinds, according to the object which it propoundeth, or pretendeth to represent: for it either representeth a time, or a person, or an action. The first we call Chronicles, the second Lives, and the third Narrations, or Relations.

Of these, although the first be the most complete and absolute kind of history, and hath most estimation and glory, yet the second excelleth it in profit and use, and the third in verity and sincerity. For history of times representeth the magnitude of actions, and the public faces and deportments of persons, and passeth over in silence the smaller passages and motions of men and matters.

But such being the workmanship of God, as he doth hang the greatest weight upon the smallest wires, *maxima è minimis suspendens*, it comes therefore to pass, that such histories do rather set forth the pomp of business than the true and inward resorts thereof. But Lives if they be well written, propounding to themselves a person to represent, in whom actions both greater and smaller, public and private, have a commixture, must of a necessity contain a more true, native, and lively representation. So again narrations and relations of actions, as the War of Peloponnesus, the Expedition of Cyrus Minor, the Conspiracy of Catiline, cannot but be more purely and exactly true, than histories of times, because they may choose an argument comprehensible within the notice and instructions of the writer: whereas he that undertaketh the story of a time, especially of any length, cannot but meet with many blanks and spaces, which he must be forced to fill up out of his own wit and conjecture.

For the *History of Times*, I mean of civil history, the providence of God hath made the distribution: for it hath pleased God to ordain and illustrate two exemplar states of the world of arms, learning, moral virtue, policy, and laws. The state of Græcia, and the state of Rome; the histories whereof occupying the middle part of time, have, more ancient to them, histories which may by one common name be

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termed the Antiquities of the world; and after them, hiſtories which may be likewiſe called by the name of Modern Hiſtory.

Now to ſpeak of the deficiencies. As to the heathen antiquities of the world, it is in vain to note them for deficient: deficient they are no doubt, conſiſting moſtly of fables and fragments, but the deficience cannot be holpen; for antiquity is like fame, *caput inter nubila condit*, her head is muffled from our ſight. For the hiſtory of the exemplar ſtates, it is extant in good perfection. Not but I could wiſh there were a perfect courſe of hiſtory for Græcia from Theſeus to Philopœmen, what time the affairs of Græcia were drowned and extinguiſhed in the affairs of Rome; and for Rome from Romulus to Juſtinianus, who may be truly ſaid to be *ultimus Romanorum*. In which ſequences of ſtory the text of Thucydides and Xenophon in the one, and the text of Livius, Polybius, Saluſtius, Cæſar, Appianus, Tacitus, Herodianus, in the other, to be kept intire without any diminution at all, and only to be ſupplied and continued. But this is matter of magnificence, rather to be commended than required: and we ſpeak now of parts of learning ſupplemental, and not of ſupererogation.

But for Modern Hiſtories, whereof there are ſome few very worthy, but the greater part beneath mediocrity, leaving the care of foreign ſtories to foreign ſtates, becauſe I will not be *curioſus in aliena republica*, I cannot fail to repreſent to your majeſty the unworthineſs of the hiſtory of England in the main continuance thereof, and the partiality and obliquity of that of Scotland, in the lateſt and largeſt author that I have ſeen; ſuppoſing that it would be honour for your majeſty, and a work very memorable, if this iſland of Great Britain, as it is now joined in monarchy for the ages to come, ſo were joined in one hiſtory for the times paſſed, after the manner of the ſacred hiſtory, which draweth down the ſtory of the ten tribes, and of the two tribes, as twins, together. And if it ſhall ſeem that the greatneſs of this work may make it leſs exactly performed, there is an excellent period of a ſmaller compaſs of time, as to the ſtory of England; that is to ſay, from the uniting of the roſes to the uniting of the kingdoms: a portion of time, wherein, to my underſtanding, there hath been the rareſt varieties, that, in like number of ſucceſſions of any hereditary monarchy hath been known: for it beginneth with the mixed adeption of a crown by arms and title; an entry by battle, an eſtabliſhment by marriage; and therefore times anſwerable, like waters after a tempeſt, full of working and ſwelling, though without extremity of ſtorm; but well paſſed through by the wiſdom of the pilot, being one of the moſt ſufficient kings of all the number. Then followeth the reign of a king, whoſe actions, howſoever conducted, had much intermixture with the affairs of Europe, balancing and inclining them variably; in whoſe time alſo began that great alteration in the ſtate eccleſiaſtical, an action which ſeldom cometh upon the ſtage. Then the reign of a minor: then an offer of an uſurpation, though it was but as *febris ephemera*: then the reign of a queen matched with a foreigner: then of a queen that lived ſolitary and unmarried, and yet her government ſo maſculine, as it had greater impreſſion and operation upon the ſtates abroad than it any ways received from thence. And now laſt, this moſt happy and glorious event, that this iſland of Britain, divided from all the world, ſhould be united in itſelf: and that oracle of reſt, given to Æneas, *Antiquam exquirite matrem*, ſhould now be performed and fulfilled upon the nations of England and Scotland, being now reunited in the ancient mother name of Britain, as a full period of all inſtability

bility and peregrinations: ſo that as it cometh to paſs in maſſive bodies, that they have certain trepidations and waverings before they fix and ſettle; ſo it ſeemeth that by the providence of God this monarchy, before it was to ſettle in your majeſty and your generations, in which, I hope, it is now eſtabliſhed for ever, it had theſe preluſive changes and varieties.

For *Lives*; I do find ſtrange that theſe times have ſo little eſteemed the virtues of the times, as that the writing of lives ſhould be no more frequent. For although there be not many ſovereign princes or abſolute commanders, and that ſtates are moſt collected into monarchies, yet there are many worthy perſonages that deſerve better than diſperſed report or barren elogies. For herein the invention of one of the late poets is proper, and doth well inrich the ancient fiction; for he feigneth, that at the end of the thread or web of every man's life there was a little medal containing the perſon's name, and that Time waited upon the ſhears; and as ſoon as the thread was cut, caught the medals, and carried them to the river of Lethe; and about the bank there were many birds flying up and down, that would get the medals, and carry them in their beak a little while, and then let them fall into the river: only there were a few ſwans, which if they got a name, would carry it to a temple, where it was conſecrated.

And though many men, more mortal in their affections than in their bodies, do eſteem deſire of name and memory but as a vanity and ventoſity,

Animi nil magnae laudis egentes;

which opinion cometh from the root, *non prius laudes contempſimus, quam laudanda facere deſivimus:* yet that will not alter Solomon's judgment, *Memoria juſti cum laudibus, at impiorum nomen putreſcet:* the one flouriſheth, the other either conſumeth to preſent oblivion, or turneth to an ill odour.

And therefore in that ſtile or addition, which is and hath been long well received and brought in uſe, *felicis memoriae, piae memoriae, bonae memoriae*, we do acknowledge that which Cicero ſaith, borrowing it from Demoſthenes, that *bona fama propria poſſeſſio defunctorum*; which poſſeſſion I cannot but note, that in our times it lieth much waſte, and that therein there is a deficience.

For *Narrations* and *Relations* of particular actions, there were alſo to be wiſhed a greater diligence therein; for there is no great action but hath ſome good pen which attends it.

And becauſe it is an ability not common to write a good hiſtory, as may well appear by the ſmall number of them; yet if particularity of actions memorable were but tolerably reported as they paſs, the compiling of a complete hiſtory of times might be the better expected, when a writer ſhould ariſe that were fit for it; for the collection of ſuch relations might be as a nurſery garden, whereby to plant a fair and ſtately garden, when time ſhould ſerve.

There is yet another partition of hiſtory which Cornelius Tacitus maketh, which is not to be forgotten, eſpecially with that application which he accoupleth it withal, *Annals* and *Journals*; appropriating to the former, matters of ſtate; and to the latter, acts and accidents of a meaner nature. For giving but a touch of certain magnificent buildings, he addeth, *Cum ex dignitate populi Romani repertum ſit, res illuſtres annalibus, talia diurnis urbis actis mandare.* So as there is a kind of contemplative heraldry, as well as civil. And as nothing doth derogate from the dignity of a ſtate more than confuſion of degrees: ſo it doth not a little embaſe the authority of an hiſtory, to intermingle matters of triumph, or matters of ceremony, or matters

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of novelty, with matters of ſtate. But the uſe of a journal hath not only been in the hiſtory of time, but likewiſe in the hiſtory of perſons, and chiefly of actions; for princes in ancient time had, upon point of honour and policy both, journals kept of what paſſed day by day: for we ſee the Chronicle which was read before Ahaſuerus, when he could not take reſt, contained matter of affairs indeed, but ſuch as had paſſed in his own time, and very lately before: but the journal of Alexander's houſe expreſſed every ſmall particularity, even concerning his perſon and court; and it is yet an uſe well received in enterpriſes memorable, as expeditions of war, navigations, and the like, to keep diaries of that which paſſeth continually.

I cannot likewiſe be ignorant of a form of writing, which ſome grave and wiſe men have uſed, containing a ſcattered hiſtory of thoſe actions which they have thought worthy of memory, with politic diſcourſe and obſervation thereupon; not incorporated into the hiſtory, but ſeparately, and as the more principal in their intention; which kind of ruminated hiſtory I think more fit to place amongſt books of policy, whereof we ſhall hereafter ſpeak, than amongſt books of hiſtory: for it is the true office of hiſtory to repreſent the events themſelves together with the counſels, and to leave the obſervations and concluſions thereupon to the liberty and faculty of every man's judgment: but mixtures are things irregular, whereof no man can define.

So alſo is there another kind of hiſtory manifoldly mixed, and that is Hiſtory of Coſmography, being compounded of natural hiſtory, in reſpect of the regions themſelves; of hiſtory civil, in reſpect of the habitations, regimens, and manners of the people; and the mathematics, in reſpect of the climates and configurations towards the heavens: which part of learning of all others, in this latter time, hath obtained moſt proficience. For it may be truly affirmed to the honour of theſe times, and in a virtuous emulation with antiquity, that this great building of the world had never thorough lights made in it, till the age of us and our fathers: for although they had knowledge of the antipodes,

Noſque ubi primus equis oriens afflavit anhelis,
Illic ſera rubens accendit lumina Veſper:

yet that might be by demonſtration, and not in fact; and if by travel, it requireth the voyage but of half the globe. But to circle the earth, as the heavenly bodies do, was not done or enterpriſed till theſe latter times: and therefore theſe times may juſtly bear in their word, not only *plus ultra* in precedence of the ancient *non ultra*, and *imitabile fulmen*, in precedence of the ancient *non imitabile fulmen*,

Demens qui nimbos et non imitabile fulmen, etc.

but likewiſe *imitabile coelum:* in reſpect of the many memorable voyages, after the manner of heaven, about the globe of the earth.

And this proficience in navigation and diſcoveries may plant alſo an expectation of the farther proficience and augmentation of all ſciences; becauſe, it may ſeem, they are ordained by God to be coevals, that is, to meet in one age. For ſo the prophet Daniel, ſpeaking of the latter times, foretelleth; *Plurimi pertranſibunt, et multiplex erit ſcientia*; as if the openneſs and thorough paſſage of the world, and the increaſe of knowledge, were appointed to be in the ſame ages, as we ſee it is already performed in great part; the learning of theſe latter times not much giving place to the former two periods or returns of learning, the one of the Grecians, the other of the Romans.

History

History eccleſiaſtical receiveth the ſame diviſions with hiſtory civil; but farther, in the propriety thereof, may be divided into the hiſtory of the church, by a general name; Hiſtory of prophecy; and Hiſtory of providence.

The firſt deſcribeth the times of the militant church, whether it be fluctuant, as the ark of Noah; or moveable as the ark in the wilderneſs; or at reſt, as the ark in the temple; that is, the ſtate of the church in perſecution, in remove, and in peace. This part I ought in no ſort to note as deficient, only I would that the virtue and ſincerity of it were according to the maſs and quantity. But I am not now in hand with cenſures, but with omiſſions.

The ſecond, which is hiſtory of prophecy, conſiſteth of two relatives, the prophecy, and the accompliſhment; and therefore the nature of ſuch a work ought to be, that every prophecy of the ſcripture be ſorted with the event fulfilling the ſame, throughout the ages of the world; both for the better confirmation of faith, and for the better illumination of the church touching thoſe parts of prophecies which are yet unfulfilled: allowing nevertheleſs that latitude which is agreeable and familiar unto divine prophecies, being of the nature of their author, with whom a thouſand years are but as one day, and therefore are not fulfilled punctually at once, but have ſpringing and germinant accompliſhment throughout many ages; though the height or fulneſs of them may refer to ſome one age. Hiſtoria Prophetica.

This is a work which I find deficient, but is to be done with wiſdom, ſobriety, and reverence, or not at all.

The third, which is Hiſtory of providence, containeth that excellent correſpondence which is between God's revealed will and his ſecret will: which though it be ſo obſcure, as for the moſt part it is not legible to the natural man; no, nor many times to thoſe who behold it from the tabernacle: yet at ſome times it pleaſeth God, for our better eſtabliſhment, and the confuting of thoſe which are as without God in the world, to write it in ſuch text and capital letters, that, as the prophet ſaith, *he that runneth by may read it*; that is, mere ſenſual perſons, which haſten by God's judgments, and never bend or fix their cogitations upon them, are nevertheleſs in their paſſage and race urged to diſcern it. Such are the notable events and examples of God's judgments, chaſtiſements, deliverances, and bleſſings: and this is a work which hath paſſed through the labours of many, and therefore I cannot preſent as omitted.

There are alſo other parts of learning which are Appendices to hiſtory: for all the exterior proceedings of man conſiſt of words and deeds; whereof hiſtory doth properly receive and retain in memory the deeds; and if words, yet but as inducements and paſſages to deeds: ſo are there other books and writings, which are appropriated to the cuſtody and receipt of words only, which likewiſe are of three ſorts; Orations, Letters, and brief Speeches or Sayings.

Orations are pleadings, ſpeeches of counſel, laudatives, invectives, apologies, reprehenſions; orations of formality or ceremony, and the like.

Letters are according to all the variety of occaſions, advertiſements, advices, directions, propoſitions, petitions, commendatory, expoſtulatory, ſatisfactory; of compliment, of pleaſure, of diſcourſe, and all other paſſages of action. And ſuch as are written from wiſe men, are of all the words of man, in my judgment, the beſt; for they are more natural than orations and public ſpeeches, and more adviſed than conferences or preſent ſpeeches. So again letters of affairs from ſuch as manage them,

or are privy to them, are of all others the beſt inſtructions for hiſtory, and to a diligent reader the beſt hiſtories in themſelves.

For Apophthegms, it is a great loſs of that book of Cæſar's; for as his hiſtory, and thoſe few letters of his which we have, and thoſe apophthegms which were of his own, excel all mens elſe, ſo I ſuppoſe would his collection of apophthegms have done; for as for thoſe which are collected by others, either I have no taſte in ſuch matters, or elſe their choice hath not been happy. But upon theſe three kinds of writings I do not inſiſt, becauſe I have no deficiences to propound concerning them.

Thus much therefore concerning hiſtory, which is that part of learning which anſwereth to one of the cells, domiciles, or offices of the mind of man, which is that of the memory.

POESY is a part of learning in meaſure of words for the moſt part reſtrained, but in all other points extremely licenſed, and doth truly refer to the imagination; which, being not tied to the laws of matter, may at pleaſure join that which nature hath ſevered, and ſever that which nature hath joined, and ſo make unlawful matches and divorces of things; *Pictoribus atque poetis, etc.* It is taken in two ſenſes, in reſpect of words, or matter; in the firſt ſenſe it is but a character of ſtile, and belongeth to arts of ſpeech, and is not pertinent for the preſent: in the latter, it is, as hath been ſaid, one of the principal portions of learning, and is nothing elſe but feigned hiſtory, which may be ſtiled as well in proſe as in verſe.

The uſe of this feigned hiſtory hath been to give ſome ſhadow of ſatisfaction to the mind of man in thoſe points wherein the nature of things doth deny it, the world being in proportion inferior to the ſoul; by reaſon whereof there is, agreeable to the ſpirit of man, a more ample greatneſs, a more exact goodneſs, and a more abſolute variety, than can be found in the nature of things. Therefore, becauſe the acts or events of true hiſtory have not that magnitude which ſatisfieth the mind of man, poeſy feigneth acts and events greater and more heroical: becauſe true hiſtory propoundeth the ſucceſſes and iſſues of actions not ſo agreeable to the merits of virtue and vice, therefore poeſy feigns them more juſt in retribution, and more according to revealed providence: becauſe true hiſtory repreſenteth actions and events more ordinary, and leſs interchanged; therefore poeſy endueth them with more rareneſs, and more unexpected and alternative variations: ſo as it appeareth that poeſy ſerveth and conferreth to magnanimity, morality, and to delectation. And therefore it was ever thought to have ſome participation of divineneſs, becauſe it doth raiſe and erect the mind, by ſubmitting the ſhews of things to the deſires of the mind; whereas reaſon doth buckle and bow the mind unto the nature of things.

And we ſee, that by theſe inſinuations and congruities with man's nature and pleaſure, joined alſo with the agreement and conſort it hath with muſic, it hath had acceſs and eſtimation in rude times and barbarous regions, where other learning ſtood excluded.

The diviſion of poeſy, which is apteſt in the propriety thereof, beſides thoſe diviſions which are common unto it with hiſtory; as feigned chronicles, feigned lives, and the appendices of hiſtory, as feigned epiſtles, feigned orations, and the reſt, is into Poeſy Narrative, Repreſentative, and Alluſive.

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The Narrative is a mere imitation of hiſtory, with the exceſſes before remembered, chooſing for ſubject commonly wars and love; rarely ſtate, and ſometimes pleaſure or mirth.

Repreſentative is as a viſible hiſtory, and is an image of actions as if they were preſent, as hiſtory is of actions in nature as they are, that is paſt.

Alluſive or parabolical, is a narration applied only to expreſs ſome ſpecial purpoſe or conceit: which latter kind of parabolical wiſdom was much more in uſe in the ancient times, as by the fables of Æſop, and the brief ſentences of the Seven, and the uſe of hieroglyphics, may appear. And the cauſe was, for that it was then of neceſſity to expreſs any point of reaſon, which was more ſharp or ſubtile than the vulgar, in that manner, becauſe men in thoſe times wanted both variety of examples and ſubtilty of conceit: and as hieroglyphics were before letters, ſo parables were before arguments. And nevertheleſs now, and at all times, they do retain much life and vigour, becauſe reaſon cannot be ſo ſenſible, nor examples ſo fit.

But there remaineth yet another uſe of poeſy parabolical, oppoſite to that which we laſt mentioned: for that tendeth to demonſtrate and illuſtrate that which is taught or delivered, and this other to retire and obſcure it: that is, when the ſecrets and myſteries of religion, policy, or philoſophy, are involved in fables and parables.

Of this in divine poeſy, we ſee, the uſe is authoriſed. In heathen poeſy, we ſee, the expoſition of fables doth fall out ſometimes with great felicity, as in the fable that the giants being overthrown in their war againſt the gods, the Earth their mother, in revenge thereof, brought forth Fame:

Illam terra parens ira irritata deorum,
Extremam, ut perhibent, Coeo Enceladoque ſororem
Progenuit.

Expounded, that when princes and monarchies have ſuppreſſed actual and open rebels, then the malignity of people, which is the mother of rebellion, doth bring forth libels and ſlanders, and taxations of the ſtates, which is of the ſame kind with rebellion, but more feminine. So in the fable, that the reſt of the gods having conſpired to bind Jupiter, Pallas called Briareus with his hundred hands to his aid: expounded, that monarchies need not fear any curbing of their abſoluteneſs by mighty ſubjects, as long as by wiſdom they keep the hearts of the people, who will be ſure to come in on their ſide. So in the fable, that Achilles was brought up under Chiron the Centaur, who was part a man and part a beaſt, expounded ingeniouſly, but corruptly by Machiavel, that it belongeth to the education and diſcipline of princes, to know as well how to play the part of the lion in violence, and the fox in guile, as of the man in virtue and juſtice.

Nevertheleſs in many the like encounters, I do rather think that the fable was firſt, and the expoſition deviſed, than that the moral was firſt, and thereupon the fable framed. For I find it was an ancient vanity in Chryſippus that troubled himſelf with great contention to faſten the aſſertions of the Stoics upon fictions of the ancient poets: but yet that all the fables and fictions of the poets were but pleaſure and not figure, I interpoſe no opinion.

Surely of thoſe poets which are now extant, even Homer himſelf, notwithſtanding he was made a kind of Scripture by the latter ſchools of the Grecians, yet I ſhould without any difficulty pronounce, that his fables had no ſuch inwardneſs in

his own meaning; but what they might have upon a more original tradition, is not eaſy to affirm, for he was not the inventor of many of them.

In this third part of learning, which is poeſy, I can report no deficience. For being as a plant that cometh of the luſt of the earth, without a formal ſeed, it hath ſprung up, and ſpread abroad more than any other kind: but to aſcribe unto it that which is due, for the expreſſion of affections, paſſions, corruptions, and cuſtoms, we are beholden to poets more than to the philoſophers works; and for wit and eloquence, not much leſs than to orators harangues. But it is not good to ſtay too long in the theatre. Let us now paſs to the judicial place or palace of the mind, which we are to approach and view with more reverence and attention.

THE knowledge of man is as the waters, ſome deſcending from above, and ſome ſpringing from beneath; the one informed by the light of nature, the other inſpired by divine revelation.

The light of nature conſiſteth in the notions of the mind, and the reports of the ſenſes; for as for knowledge which man receiveth by teaching, it is cumulative and not original, as in a water, that, beſides his own ſpring-head, is fed with other ſprings and ſtreams. So then, according to theſe two differing illuminations or originals, knowledge is firſt of all divided into Divinity and Philoſophy.

In Philoſophy, the contemplations of man do neither penetrate unto God, or are circumferred to nature, or are reflected or reverted upon himſelf. Out of which ſeveral inquiries there do ariſe three knowledges, Divine philoſophy, Natural philoſophy, and Human philoſophy or humanity. For all things are marked and ſtamped with this triple character, of the power of God, the difference of nature, and the uſe of man. But becauſe the diſtributions and partitions of knowledge are not like ſeveral lines that meet in one angle, and ſo touch but in a point; but are like branches of a tree, that meet in a ſtem, which hath a dimenſion and quantity of intireneſs and continuance, before it come to diſcontinue and break itſelf into arms and boughs; therefore it is good, before we enter into the former diſtribution, to erect and conſtitute one univerſal ſcience, by the name of *Philoſophia prima*, primitive or ſummary philoſophy, as the main and common way, before we come where the ways part and divide themſelves; which ſcience, whether I ſhould report as deficient or no, I ſtand doubtful.

For I find a certain rhapſody of natural theology, and of divers parts of logic; and of that other part of natural philoſophy, which concerneth the principles; and of that other part of natural philoſophy, which concerneth the ſoul or ſpirit; all theſe ſtrangely commixed and confuſed; but being examined, it ſeemeth to me rather a depredation of other ſciences, advanced and exalted unto ſome height of terms, than any thing ſolid or ſubſtantial of itſelf.

Nevertheleſs I cannot be ignorant of the diſtinction which is current, that the ſame things are handled but in ſeveral reſpects. As for example, that logic conſidereth of many things as they are in notion; and this philoſophy, as they are in nature; the one in appearance, the other in exiſtence: but I find this difference better made than purſued. For if they had conſidered quantity, ſimilitude, diverſity, and the reſt of thoſe external characters of things, as philoſophers, and in nature; their inquiries muſt of force have been of a far other kind than they are.

For doth any of them, in handling quantity, ſpeak of the force of union, how, and

and how far it multiplieth virtue? Doth any give the reaſon, why ſome things in nature are ſo common and in ſo great maſs, and others ſo rare, and in ſo ſmall quantity? Doth any, in handling ſimilitude and diverſity, aſſign the cauſe why iron ſhould not move to iron, which is more like, but move to the loadſtone which is leſs like? Why, in all diverſities of things, there ſhould be certain participles in nature, which are almoſt ambiguous, to which kind they ſhould be referred? But there is a mere and deep ſilence touching the nature and operation of thoſe common adjuncts of things, as in nature; and only a reſuming and repeating of the force and uſe of them in ſpeech or argument.

Therefore becauſe in a writing of this nature I avoid all ſubtilty, my meaning touching this original or univerſal philoſophy is thus, in a plain and groſs deſcription by negative; "That it be a receptacle for all ſuch profitable obſervations and "axioms, as fall not within the compaſs of any of the ſpecial parts of philoſophy "or ſciences, but are more common and of a higher ſtage.".

Now that there are many of that kind, need not to be doubted. For example; is not the rule *Si inaequalibus aequalia addas, omnia erunt inaequalia*, an axiom as well of juſtice as of the mathematics? And is there not a true coincidence between commutative and diſtributive juſtice, and arithmetical and geometrical proportion? Is not that other rule, *Quae in eodem tertio conveniunt, et inter ſe conveniunt*, a rule taken from the mathematics, but ſo potent in logic, as all ſyllogiſms are built upon it? Is not the obſervation, *Omnia mutantur, nil interit*, a contemplation in philoſophy thus, that the *quantum* of nature is eternal? in natural theology thus; that it requireth the ſame omnipotence to make ſomething nothing, which at the firſt made nothing ſomething; according to the ſcripture, *Didici quod omnia opera, quae fecit Deus, perſeverent in perpetuum; non poſſumus eis quicquam addere, nec auferre.*

Is not the ground, which Machiavel wiſely and largely diſcourſeth concerning governments, that the way to eſtabliſh and preſerve them, is to reduce them *ad principia*; a rule in religion and nature, as well as in civil adminiſtration? Was not the Perſian magic a reduction or correſpondence of the principles and architectures of nature, to the rules and policy of governments? Is not the precept of a muſician, to fall from a diſcord or harſh accord upon a concord or ſweet accord, alike true in affection? Is not the trope of muſic, to avoid or ſlide from the cloſe or cadence, common with the trope of rhetoric, of deceiving expectation? Is not the delight of the quavering upon a ſtop in muſic, the ſame with the playing of light upon the water?

Splendet tremulo ſub lumine pontus.

Are not the organs of the ſenſes of one kind with the organs of reflection, the eye with a glaſs, the ear with a cave or ſtrait determined and bounded? Neither are theſe only ſimilitudes, as men of narrow obſervation may conceive them to be, but the ſame footſteps of nature, treading or printing upon ſeveral ſubjects or matters.

This ſcience therefore, as I underſtand it, I may juſtly report as deficient; for I ſee ſometimes the profounder ſort of wits, in handling ſome particular argument, will now and then draw a bucket of water out of this well for their preſent uſe; but the ſpring-head thereof ſeemeth to me not to have been viſited; being of ſo excellent uſe, both for the diſcloſing of nature, and the abridgment of art. Philoſophia prima, ſive de fontibus ſcientiarum.

This

This ſcience being therefore firſt placed as a common parent, like unto Berecynthia, which had ſo much heavenly iſſue, *Omnes coelicolas, omnes ſupera alta tenentes*, we may return to the former diſtribution of the three philoſophies, divine, natural, and human.

And as concerning divine philoſophy, or Natural Theology, it is that knowledge or rudiment of knowledge concerning God, which may be obtained by the contemplation of his creatures; which knowledge may be truly termed divine, in reſpect of the object, and natural in reſpect of the light.

The bounds of this knowledge are, that it ſufficeth to convince atheiſm, but not to inform religion: and therefore there was never miracle wrought by God to convert an atheiſt, becauſe the light of nature might have led him to confeſs a God: but miracles have been wrought to convert idolaters and the ſuperſtitious, becauſe no light of nature extendeth to declare the will and true worſhip of God.

For as all works do ſhew forth the power and ſkill of the workman, and not his image, ſo it is of the works of God, which do ſhew the omnipotency and wiſdom of the maker, but not his image: and therefore therein the heathen opinion differeth from the ſacred truth; for they ſuppoſed the world to be the image of God, and man to be an extract or compendious image of the world: but the Scriptures never vouchſafe to attribute to the world that honour, as to be the image of God, but only the work of his hands; neither do they ſpeak of any other image of God, but man: wherefore by the contemplation of nature, to induce and inforce the acknowledgement of God, and to demonſtrate his power, providence and goodneſs, is an excellent argument, and hath been excellently handled by divers.

But on the other ſide, out of the contemplation of nature or ground of human knowledges, to induce any verity or perſuaſion concerning the points of faith, is in my judgment not ſafe: *Da fidei, quae fidei ſunt.* For the heathens themſelves conclude as much in that excellent and divine fable of the golden chain; "That men "and gods were not able to draw Jupiter down to the earth; but contrariwiſe, Ju"piter was able to draw them up to heaven."

So as we ought not to attempt to draw down or ſubmit the myſteries of God to our reaſon; but contrariwiſe, to raiſe and advance our reaſon to the divine truth. So as in this part of knowledge, touching divine philoſophy, I am ſo far from noting any deficience, as I rather note an exceſs; whereunto I have digreſſed, becauſe of the extreme prejudice which both religion and philoſophy have received, and may receive, by being commixed together; as that which undoubtedly will make an heretical religion, and an imaginary and fabulous philoſophy.

Otherwiſe it is of the nature of angels and ſpirits, which is an appendix of theology, both divine and natural, and is neither inſcrutable nor interdicted: for although the Scripure ſaith, *Let no man deceive you in ſublime diſcourſe touching the worſhip of angels, preſſing into that he knoweth not*, etc. yet, notwithſtanding, if you obſerve well that precept, it may appear thereby that there be two things only forbidden, adoration of them, and opinion fantaſtical of them, either to extol them farther than appertaineth to the degree of a creature, or to extol a man's knowledge of them farther than he hath ground. But the ſober and grounded inquiry, which may ariſe out of the paſſages of holy Scriptures, or out of the gradations of nature, is not reſtrained. So of degenerate and revolted ſpirits, the converſing with them, or the employment of them, is prohibited, much more any veneration towards them. But the contemplation or ſcience of their nature,

nature, their power, their illuſions, either by Scripture or reaſon, is a part of ſpiritual wiſdom. For ſo the apoſtle ſaith, *We are not ignorant of his ſtratagems.* And it is no more unlawful to inquire the nature of evil ſpirits, than to inquire the force of poiſons in nature, or the nature of ſin and vice in morality. But this part, touching angels and ſpirits, I cannot note as deficient, for many have occupied themſelves in it: I may rather challenge it, in many of the writers thereof, as fabulous and fantaſtical.

Leaving therefore divine philoſophy or natural theology, not divinity, or inſpired theology, which we reſerve for the laſt of all, as the haven and ſabbath of all man's contemplations, we will now proceed to Natural Philoſophy.

If then it be true that Democritus ſaid, "That the truth of nature lieth hid in "certain deep mines and caves:" and if it be true likewiſe that the alchemiſts do ſo much inculcate, that Vulcan is a ſecond nature, and imitateth that dexterouſly and compendiouſly, which nature worketh by ambages and length of time; it were good to divide natural philoſophy into the mine and the furnace, and to make two profeſſions or occupations of natural philoſophers, ſome to be pioneers, and ſome ſmiths; ſome to dig, and ſome to refine and hammer: and ſurely I do beſt allow of a diviſion of that kind, though in more familiar and ſcholaſtical terms: namely, that theſe be the two parts of natural philoſophy, the inquiſition of cauſes, and the production of effects; ſpeculative, and operative; natural ſcience, and natural prudence.

For as in civil matters there is a wiſdom of diſcourſe, and a wiſdom of direction; ſo is it in natural. And here I will make a requeſt, that for the latter, or at leaſt for a part thereof, I may revive and redintegrate the miſapplied and abuſed name of natural magic, which, in the true ſenſe, is but natural wiſdom, or natural prudence; taken according to the ancient acceptation, purged from vanity and ſuperſtition.

Now although it be true, and I know it well, that there is an intercourſe between cauſes and effects, ſo as both theſe knowledges, ſpeculative and operative, have a great connection between themſelves; yet becauſe all true and fruitful natural philoſophy hath a double ſcale or ladder, aſcendent and deſcendent; aſcending from experiments, to the invention of cauſes; and deſcending from cauſes, to the invention of new experiments; therefore I judge it moſt requiſite that theſe two parts be ſeverally conſidered and handled.

Natural ſcience, or theory, is divided into Phyſic and Metaphyſic; wherein I deſire it may be conceived, that I uſe the word metaphyſic in a differing ſenſe from that that is received: and, in like manner, I doubt not but it will eaſily appear to men of judgment, that in this and other particulars, whereſoever my conception and notion may differ from the ancient, yet I am ſtudious to keep the ancient terms.

For hoping well to deliver myſelf from miſtaking, by the order and perſpicuous expreſſing of that I do propound; I am otherwiſe zealous and affectionate to recede as little from antiquity, either in terms or opinions, as may ſtand with truth, and the proficience of knowledge.

And herein I cannot a little marvel at the philoſopher Ariſtotle, that did proceed in ſuch a ſpirit of difference and contradiction towards all antiquity, undertaking not only to frame new words of ſcience at pleaſure, but to confound and extinguiſh all ancient wiſdom: inſomuch as he never nameth or mentioneth an ancient author or

opinion, but to confute and reprove; wherein for glory, and drawing followers and disciples, he took the right course.

For certainly there cometh to pass, and hath place in human truth, that which was noted and pronounced in the highest truth; *Veni in nomine Patris, nec recipitis me; si quis venerit in nomine suo, eum recipietis.* But in this divine aphorism, considering to whom it was applied, namely to Antichrist, the highest deceiver, we may discern well, that the coming in a man's own name, without regard of antiquity or paternity, is no good sign of truth, although it be joined with the fortune and success of an *Eum recipietis.*

But for this excellent person, Aristotle, I will think of him, that he learned that humour of his scholar, with whom, it seemeth, he did emulate, the one to conquer all opinions, as the other to conquer all nations: wherein nevertheless, it may be, he may at some mens hands, that are of a bitter disposition, get a like title as his scholar did.

Felix terrarum praedo, non utile mundo
Editus exemplum, etc.

So

Felix doctrinae praedo.

But to me, on the other side, that do desire as much as lieth in my pen to ground a sociable intercourse between antiquity and proficience, it seemeth best to keep way with antiquity *usque ad aras*; and therefore to retain the ancient terms, though I sometimes alter the uses and definitions; according to the moderate proceeding in civil government, where, although there be some alteration, yet that holdeth which Tacitus wisely noteth, *eadem magistratuum vocabula.*

To return therefore to the use and acceptation of the word metaphysic, as I do now understand the word; it appeareth, by that which hath been already said, that I intend *philosophia prima*, summary philosophy, and metaphysic, which heretofore have been confounded as one, to be two distinct things. For, the one I have made as a parent, or common ancestor, to all knowledge; and the other I have now brought in, as a branch, or descendent of natural science. It appeareth likewise that I have assigned to summary philosophy the common principles and axioms which are promiscuous and indifferent to several sciences: I have assigned unto it likewise the inquiry touching the operation of the relative and adventitious characters of essences, as quantity, similitude, diversity, possibility, and the rest; with this distinction and provision; that they be handled as they have efficacy in nature, and not logically. It appeareth likewise, that natural theology, which heretofore hath been handled confusedly with metaphysic, I have inclosed and bounded by itself.

It is therefore now a question, what is left remaining for metaphysic; wherein I may without prejudice preserve thus much of the conceit of antiquity, that physic should contemplate that which is inherent in matter, and therefore transitory; and metaphysic, that which is abstracted and fixed.

And again, that physic should handle that which supposeth in nature only a being and moving; and metaphysic should handle that which supposeth farther in nature, a reason, understanding, and platform. But the difference perspicuously expressed, is most familiar and sensible.

For as we divided natural philosophy in general into the inquiry of causes, and productions of effects; so that part which concerneth the inquiry of causes, we do subdivide according to the received and sound division of causes; the one part, which

which is phyſic, inquireth and handleth the material and efficient cauſes; and the other, which is metaphyſic, handleth the formal and final cauſes.

Phyſic, taking it according to the derivation, and not according to our idiom for medicine, is ſituate in a middle term, or diſtance, between natural hiſtory and metaphyſic. For natural hiſtory deſcribeth the variety of things, phyſic the cauſes, but variable or reſpective cauſes; and metaphyſic, the fixed and conſtant cauſes.

Limus ut hic dureſcit, et haec ut cera liqueſcit,
Uno eodemque igne.

Fire is the cauſe of induration but reſpective to clay: fire is the cauſe of colliquation but reſpective to wax. But fire is no conſtant cauſe either of induration or colliquation: ſo then the phyſical cauſes are but the efficient and the matter.

Phyſic hath three parts, whereof two reſpect nature united or collected, the third contemplateth nature diffuſed or diſtributed.

Nature is collected either into one intire total, or elſe into the ſame principles or ſeeds. So as the firſt doctrine is touching the contexture or configuration of things, as *de mundo*, *de univerſitate rerum*.

The ſecond is the doctrine concerning the principles or originals of things.

The third is the doctrine concerning all variety and particularity of things; whether it be of the differing ſubſtances, or their differing qualities and natures: whereof there needeth no enumeration, this part being but as a gloſs, or paraphraſe, that attendeth upon the text of natural hiſtory.

Of theſe three I cannot report any as deficient. In what truth or perfection they are handled, I make not now any judgment: but they are parts of knowledge not deſerted by the labour of man.

For Metaphyſic, we have aſſigned unto it the inquiry of formal and final cauſes; which aſſignation, as to the former of them, may ſeem to be nugatory and void, becauſe of the received and inveterate opinion, that the inquiſition of man is not competent to find out eſſential forms or true differences: of which opinion we will take this hold, that the invention of forms is of all other parts of knowledge the worthieſt to be ſought, if it be poſſible to be found.

As for the poſſibility, they are ill diſcoverers that think there is no land, when they can ſee nothing but ſea.

But it is manifeſt, that Plato, in his opinion of ideas, as one that had a wit of elevation ſituate as upon a cliff, did deſcry, "That forms were the true object of "knowledge;" but loſt the real fruit of his opinion, by conſidering of forms as abſolutely abſtracted from matter, and not confined and determined by matter; and ſo turning his opinion upon theology, wherewith all his natural philoſophy is infected.

But if any man ſhall keep a continual watchful and ſevere eye upon action, operation, and the uſe of knowledge, he may adviſe and take notice what are the forms, the diſcloſures whereof are fruitful and important to the ſtate of man. For as to the forms of ſubſtances, man only except, of whom it is ſaid, *Formavit hominem de limo terrae, et ſpiravit in faciem ejus ſpiraculum vitae*, and not as of all other creatures, *Producant aquae, producat terra*, the forms of ſubſtances: I ſay, as they are now by compounding and tranſplanting multiplied, are ſo perplexed, as they are not to be inquired; no more than it were either poſſible or to purpoſe, to ſeek in groſs the

forms of thoſe ſounds which make words, which by compoſition and tranſpoſition of letters are infinite.

But, on the other ſide, to inquire the form of thoſe ſounds or voices which make ſimple letters, is eaſily comprehenſible; and being known, induceth and manifeſteth the forms of all words, which conſiſt and are compounded of them. In the ſame manner to inquire the form of a lion, of an oak, of gold; nay, of water, of air, is a vain purſuit: but to inquire the forms of ſenſe, of voluntary motion, of vegetation, of colours, of gravity and levity, of denſity, of tenuity, of heat, of cold, and all other natures and qualities, which, like an alphabet, are not many, and of which the eſſences, upheld by matter, of all creatures do conſiſt: to inquire, I ſay, the true forms of theſe, is that part of metaphyſic which we now define of.

Not but that phyſic doth make inquiry, and take conſideration of the ſame natures: but how? Only as to the material and efficient cauſes of them, and not as to the forms. For example; if the cauſe of whiteneſs in ſnow or froth be enquired, and it be rendered thus; that the ſubtile intermixture of air and water is the cauſe, it is well rendered; but nevertheleſs, is this the form of whiteneſs? No; but it is the efficient, which is ever but *vehiculum formae*.

Metaphyſica, ſive de formis et finibus rerum.

This part of metaphyſic I do not find laboured and performed, whereat I marvel not: becauſe I hold it not poſſible to be invented by that courſe of invention which hath been uſed, in regard that men, which is the root of all error, have made too untimely a departure, and too remote a receſs from particulars.

But the uſe of this part of metaphyſic which I report as deficient, is of the reſt the moſt excellent in two reſpects: the one, becauſe it is the duty and virtue of all knowledge to abridge the infinity of individual experience, as much as the conception of truth will permit, and to remedy the complaint of *vita brevis, ars longa*; which is performed by uniting the notions and conceptions of ſciences: for knowledges are as pyramids, whereof hiſtory is the baſis. So of natural philoſophy, the baſis is natural hiſtory; the ſtage next the baſis is phyſic; the ſtage next the vertical point is metaphyſic. As for the vertical point, *Opus, quod operatur Deus à principio uſque ad finem*, the ſummary law of nature, we know not whether man's inquiry can attain unto it. But theſe three be the true ſtages of knowledge, and are to them that are depraved no better than the giants hills.

Ter ſunt conati imponere Pelio Oſſam
Scilicet, atque Oſſae frondoſum involvere Olympum.

But to thoſe which refer all things to the glory of God, they are as the three acclamations, *Sancte, ſancte, ſancte*; holy in the deſcription, or dilatation of his works; holy in the connection or concatenation of them; and holy in the union of them in a perpetual and uniform law.

And therefore the ſpeculation was excellent in Parmenides and Plato, although but a ſpeculation in them, that all things by ſcale did aſcend to unity. So then always that knowledge is worthieſt, which is charged with leaſt multiplicity; which appeareth to be metaphyſic, as that which conſidereth the ſimple forms or differences of things, which are few in number, and the degrees and co-ordinations whereof make all this variety.

The ſecond reſpect which valueth and commendeth this part of metaphyſic, is, that it doth enfranchiſe the power of man unto the greateſt liberty and poſſibility of works

works and effects. For physic carrieth men in narrow and restrained ways, subject to many accidents of impediments, imitating the ordinary flexuous courses of nature; but *latae undique sunt sapientibus viae:* to sapience, which was anciently defined to be *rerum divinarum et humanarum scientia*, there is ever choice of means: for physical causes give light to new invention *in simili materia*. But whosoever knoweth any form, knoweth the utmost possibility of super-inducing that nature upon any variety of matter, and so is less restrained in operation, either to the basis of the matter, or the condition of the efficient: which kind of knowledge Solomon likewise, though in a more divine sense, elegantly describeth; *Non arctabunter gressus tui, et currens non habebis offendiculum.* They of sapience are not much liable either to particularity or chance.

The second part of metaphysic is the inquiry of final causes, which I am moved to report, not as omitted, but as misplaced; and yet if it were but a fault in order, I would not speak of it: for order is matter of illustration, but pertaineth not to the substance of sciences. But this misplacing hath caused a deficience, or at least a great improficience in the sciences themselves. For the handling of final causes, mixed with the rest in physical inquiries, hath intercepted the severe and diligent inquiry of all real and physical causes, and given men the occasion to stay upon these satisfactory and specious causes, to the great arrest and prejudice of farther discovery.

For this I find done not only by Plato, who ever anchoreth upon that shore, but by Aristotle, Galen, and others, which do usually likewise fall upon these flats of discoursing causes. For to say that the hairs of the eyelids are for a quickset and fence about the sight; or, that the firmness of the skins and hides of living creatures is to defend them from the extremities of heat or cold; or that the bones are for the columns or beams, whereupon the frame of the bodies of living creatures is built; or, that the leaves of the trees are for protecting of the fruit; or, that the clouds are for watering of the earth; or, that the solidness of the earth is for the station and mansion of living creatures, and the like, is well inquired and collected in metaphysic; but in physic they are impertinent. Nay, they are indeed but remoras and hinderances to stay and slug the ship from farther sailing, and have brought this to pass, that the search of the physical causes hath been neglected, and passed in silence.

And therefore the natural philosophy of Democritus, and some others, who did not suppose a mind or reason in the frame of things, but attributed the form thereof, able to maintain itself, to infinite essays or proofs of nature, which they term fortune; seemeth to me, as far as I can judge by the recital and fragments which remain unto us, in particularities of physical causes, more real and better inquired than that of Aristotle and Plato; whereof both intermingled final causes, the one as a part of theology, and the other as a part of logic, which were the favourite studies respectively of both those persons. Not because those final causes are not true, and worthy to be inquired, being kept within their own province; but because their excursions into the limits of physical causes hath bred a vastness and solitude in that track. For, otherwise, keeping their precincts and borders, men are extremely deceived if they think there is an enmity or repugnancy at all between them. For, the cause rendered, that the hairs about the eye-lids are for the safe-guard of the sight, doth not impugn the cause rendered, that pilosity is incident to orifices of moisture; *Muscosi fontes, etc.* Nor the cause rendered, that the firmness of hides

is for the armour of the body againſt extremities of heat and cold, doth not impugn the cauſe rendered, that contraction of pores is incident to the outwardeſt parts, in regard of their adjacence to foreign or unlike bodies; and ſo of the reſt: both cauſes being true and compatible, the one declaring an intention, the other a conſequence only.

Neither doth this call in queſtion, or derogate from divine providence, but highly confirms and exalts it. For as in civil actions he is the greater and deeper politician, that can make other men the inſtruments of his will and ends, and yet never acquaint them with his purpoſe, ſo as they ſhall do it, and yet not know what they do; than he that imparteth his meaning to thoſe he employeth: ſo is the wiſdom of God more admirable, when nature intendeth one thing, and providence draweth forth another; than if he had communicated to particular creatures, and motions, the characters and impreſſions of his providence. And thus much for metaphyſic; the latter part whereof I allow as extant, but wiſh it confined to its proper place.

Nevertheleſs there remaineth yet another part of natural philoſophy, which is commonly made a principal part, and holdeth rank with phyſic ſpecial, and metaphyſic, which is mathematic; but I think it more agreeable to the nature of things, and to the light of order, to place it as a branch of metaphyſic: for the ſubject of it being quantity, not quantity indefinite, which is but a relative, and belongeth to *philoſophia prima*, as hath been ſaid, but quantity determined, or proportionable; it appeareth to be one of the eſſential forms of things; as that that is cauſative in nature of a number of effects; inſomuch as we ſee, in the ſchools both of Democritus and of Pythagoras, that the one did aſcribe Figure to the firſt ſeeds of things, and the other did ſuppoſe Numbers to be the principles and originals of things: and it is true alſo, that of all other forms, as we underſtand forms, it is the moſt abſtracted and ſeparable from matter, and therefore moſt proper to metaphyſic; which hath likewiſe been the cauſe why it hath been better laboured and inquired, than any of the other forms, which are more immerſed into matter.

For it being the nature of the mind of man, to the extreme prejudice of knowledge, to delight in the ſpacious liberty of generalities, as in a champain region, and not in the incloſures of particularity; the mathematics of all other knowledge were the goodlieſt fields to ſatisfy that appetite.

But for the placing of theſe ſciences, it is not much material; only we have endeavoured, in theſe our partitions, to obſerve a kind of perſpective, that one part may caſt light upon another.

The Mathematics are either pure or mixed. To the pure mathematics are thoſe ſciences belonging which handle quantity determinate, merely ſevered from any axioms of natural philoſophy; and theſe are two, Geometry, and Arithmetic; the one handling quantity continued, and the other diſſevered.

Mixed hath for ſubject ſome axioms or parts of natural philoſophy, and conſidereth quantity determined, as it is auxiliary and incident unto them.

For many parts of nature can neither be invented with ſufficient ſubtilty, nor demonſtrated with ſufficient perſpicuity, nor accommodated unto uſe with ſufficient dexterity, without the aid and intervening of the mathematics: of which ſort are perſpective, muſic, aſtronomy, coſmography, architecture, enginery, and divers others.

In the mathematics I can report no deficience, except it be that men do not ſufficiently

ficiently underſtand the excellent uſe of the pure mathematics, in that they do remedy and cure many defects in the wit and faculties intellectual. For, if the wit be too dull, they ſharpen it; if too wandering, they fix it; if too inherent in the ſenſe, they abſtract it. So that as tennis is a game of no uſe in itſelf, but of great uſe in reſpect it maketh a quick eye, and a body ready to put itſelf into all poſtures; ſo in the mathematics, that uſe which is collateral and intervenient, is no leſs worthy than that which is principal and intended.

And as for the mixed mathematics, I may only make this prediction, that there cannot fail to be more kinds of them, as nature grows further diſcloſed.

Thus much of natural ſcience, or the part of nature ſpeculative.

For Natural Prudence, or the part operative of natural philoſophy, we will divide it into three parts, experimental, philoſophical and magical; which three parts active have a correſpondence and analogy with the three parts ſpeculative, natural hiſtory, phyſic, and metaphyſic: for many operations have been invented, ſometimes by a caſual incidence and occurrence, ſometimes by a purpoſed experiment: and of thoſe which have been found by an intentional experiment, ſome have been found out by varying, or extending the ſame experiment, ſome by transferring and compounding divers experiments the one into the other, which kind of invention an empiric may manage.

Again, by the knowledge of phyſical cauſes, there cannot fail to follow many indications and deſignations of new particulars, if men in their ſpeculation will keep an eye upon uſe and practice. But theſe are but coaſtings along the ſhore, *premendo littus iniquum*: for, it ſeemeth to me, there can hardly be diſcovered any radical or fundamental alterations and innovations in nature, either by the fortune and eſſays of experiments, or by the light and direction of phyſical cauſes.

Naturalis magia ſive phyſica operativa major.

If therefore we have reported metaphyſic deficient, it muſt follow, that we do the like of natural magic, which hath relation thereunto. For as for the natural magic whereof now there is mention in books, containing certain credulous and ſuperſtitious conceits and obſervations of ſympathies, and antipathies, and hidden properties, and ſome frivolous experiments, ſtrange rather by diſguiſement, than in themſelves: it is as far differing in truth of nature from ſuch a knowledge as we require, as the ſtory of king Arthur of Britain, or Hugh of Bourdeaux, differs from Cæſar's commentaries in truth of ſtory. For it is manifeſt that Cæſar did greater things *de vero*, than thoſe imaginary heroes were feigned to do; but he did them not in that fabulous manner. Of this kind of learning the fable of Ixion was a figure, who deſigned to enjoy Juno, the goddeſs of power; and inſtead of her had copulation with a cloud, of which mixture were begotten centaurs and chimeras.

So whoſoever ſhall entertain high and vaporous imaginations, inſtead of a laborious and ſober inquiry of truth, ſhall beget hopes and beliefs of ſtrange and impoſſible ſhapes. And therefore we may note in theſe ſciences, which hold ſo much of imagination and belief, as this degenerate natural magic, alchemy, aſtrology, and the like, that, in their propoſitions, the deſcription of the means is ever more monſtrous, than the pretence or end.

For it is a thing more probable, that he that knoweth well the natures of weight, of colour, of pliant and fragile in reſpect of the hammer, of volatile and fixed in reſpect of the fire, and the reſt, may ſuperinduce upon ſome metal the nature and form of gold by ſuch mechanic as belongeth to the production of the natures afore rehearſed, than that ſome grains of the medicine projected, ſhould in a few moments

ments of time turn a ſea of quickſilver, or other material, into gold: ſo it is more probable, that he, that knoweth the nature of arefaction, the nature of aſſimilation, of nouriſhment to the thing nouriſhed, the manner of increaſe and clearing of ſpirits, the manner of the depredations which ſpirits make upon the humours and ſolid parts; ſhall, by ambages of diets, bathings, anointings, medicines, motions, and the like, prolong life, or reſtore ſome degree of youth or vivacity, than that it can be done with the uſe of a few drops, or ſcruples of a liquor or receipt. To conclude therefore, the true natural magic, which is that great liberty and latitude of operation, which dependeth upon the knowledge of forms, I may report deficient, as the relative thereof is; to which part, if we be ſerious, and incline not to vanities and plauſible diſcourſe, beſides the deriving and deducing the operations themſelves from metaphyſic, there are pertinent two points of much purpoſe, the one by way of preparation, the other by way of caution: the firſt is, that there be made a kalendar reſembling an inventory of the eſtate of man, containing all the inventions, being the works or fruits of nature or art, which are now extant, and whereof man is already poſſeſſed, out of which doth naturally reſult a note, what things are yet held impoſſible or not invented: which kalendar will be the more artificial and ſerviceable, if to every reputed impoſſibility you add what thing is extant, which cometh the neareſt in degree to that impoſſibility; to the end, that by theſe optatives and potentials man's inquiry may be the more awake in deducing direction of works from the ſpeculation of cauſes: and ſecondly, that thoſe experiments be not only eſteemed which have an immediate and preſent uſe, but thoſe principally which are of moſt univerſal conſequence for invention of other experiments, and thoſe which give moſt light to the invention of cauſes; for the invention of the mariners needle, which giveth the direction, is of no leſs benefit for navigation, than the invention of the ſails, which give the motion.

Inventarium opum humanarum.

Thus have I paſſed through natural philoſophy, and the deficiencies thereof, wherein if I have differed from the ancient and received doctrines, and thereby ſhall move contradiction; for my part, as I affect not to diſſent, ſo I purpoſe not to contend. If it be truth,

Non canimus ſurdis, reſpondent omnia ſylvae:

The voice of nature will conſent, whether the voice of man do or no. And as Alexander Borgia was wont to ſay of the expedition of the French for Naples, that they came with chalk in their hands to mark up their lodgings, and not with weapons to fight: ſo I like better that entry of truth, which cometh peaceably with chalk to mark up thoſe minds which are capable to lodge and harbour it, than that which cometh with pugnacity and contention.

But there remaineth a diviſion of natural philoſophy according to the report of the inquiry, and nothing concerning the matter or ſubject; and that is poſitive and conſiderative; when the inquiry reporteth either an aſſertion, or a doubt. Theſe doubts, or *non liquets*, are of two ſorts, particular and total. For the firſt, we ſee a good example thereof in Ariſtotle's *Problems*, which deſerved to have had a better continuance; but ſo, nevertheleſs, as there is one point whereof warning is to be given and taken. The regiſtring of doubts hath two excellent uſes: The one, that it ſaveth philoſophy from errors and falſhoods, when that which is not fully appearing, is not collected into aſſertion, whereby error might draw error, but reſerved in doubt. The other, that the entry of doubts are as ſo many ſuckers or ſpunges to draw uſe of knowledge; inſomuch, as that which, if doubts had not preceded, a man

man ſhould never have adviſed, but paſſed it over without note, by the ſuggeſtion and ſolicitation of doubts is made to be attended and applied. But both theſe commodities do ſcarcely countervail an inconvenience which will intrude itſelf, if it be not debarred; which is, that, when a doubt is once received, men labour rather how to keep it a doubt ſtill, than how to ſolve it, and accordingly bend their wits. Of this we ſee the familiar example in lawyers and ſcholars, both which, if they have once admitted a doubt, it goeth ever after authoriſed for a doubt. But that uſe of wit and knowledge is to be allowed, which laboureth to make doubtful things certain, and not thoſe which labour to make certain things doubtful. Therefore theſe kalendars of doubts I commend as excellent things, ſo that there be this caution uſed, that when they be thoroughly ſifted and brought to reſolution, they be from thenceforth omitted, diſcarded, and not continued to cheriſh and encourage men in doubting. To which kalendar of doubts or problems, I adviſe to be annexed another kalendar, as much or more material, which is a kalendar of popular errors; I mean chiefly in natural hiſtory, ſuch as paſs in ſpeech and conceit, and are nevertheleſs apparently detected and convicted of untruth, that man's knowledge be not weakened nor imbaſed by ſuch droſs and vanity.

Continuatio problematum in natura.

Catalogus falſitatum graſſantium in hiſtoria naturae.

As for the doubts or *non liquets* general or in total, I underſtand thoſe differences of opinions touching the principles of nature, and the fundamental points of the ſame, which have cauſed the diverſity of ſects, ſchools, and philoſophies, as that of Empedocles, Pythagoras, Democritus, Parmenides, and the reſt. For although Ariſtotle, as though he had been of the race of the Ottomans, thought he could not reign, except the firſt thing he did he killed all his brethren; yet to thoſe that ſeek truth and not magiſtrality, it cannot but ſeem a matter of great profit, to ſee before them the ſeveral opinions touching the foundations of nature: not for any exact truth that can be expected in thoſe theories; for as the ſame phaenomena in aſtronomy are ſatisfied by the received aſtronomy of the diurnal motion, and the proper motions of the planets, with their eccentrics, and epicyles; and likewiſe by the theory of Copernicus, who ſuppoſed the earth to move, and the calculations are indifferently agreeable to both: ſo the ordinary face and view of experience is many times ſatisfied by ſeveral theories and philoſophies; whereas to find the real truth requireth another manner of ſeverity and attention. For, as Ariſtotle ſaith, that children at the firſt will call every woman mother, but afterward they come to diſtinguiſh according to truth: ſo experience, if it be in childhood, will call every philoſophy mother, but when it cometh to ripeneſs, it will diſcern the true mother; ſo as in the mean time it is good to ſee the ſeveral gloſſes and opinions upon nature, whereof it may be every one in ſome one point hath ſeen clearer than his fellows; therefore I wiſh ſome collection to be made painfully and underſtandingly *de antiquis philoſophiis*, out of all the poſſible light which remaineth to us of them: which kind of work I find deficient. But here I muſt give warning, that it be done diſtinctly and ſeverally, the philoſophies of every one throughout by themſelves, and not by titles packed and fagotted up together, as hath been done by Plutarch. For it is the harmony of a philoſophy in itſelf which giveth it light and credence; whereas if it be ſingled and broken, it will ſeem more foreign and diſſonant. For as when I read in Tacitus the actions of Nero or Claudius, with circumſtances of times, inducements and occaſions, I find them not ſo ſtrange; but when I read them in Suetonius Tranquillus, gathered into titles and bundles, and not in order of time, they ſeem more monſtrous and incredible; ſo is it of any philoſophy reported intire, and

De antiquis philoſophiis.

and diſmembered by articles. Neither do I exclude opinions of latter times to be likewiſe repreſented in this kalendar of ſects of philoſophy, as that of Theophraſtus Paracelſus, eloquently reduced into an harmony by the pen of Severinus the Dane, and that of Tileſius, and his ſcholar Donius, being as a paſtoral philoſophy, full of ſenſe, but of no great depth: and that of Fracaſtorius, who though he pretended not to make any new philoſophy, yet did uſe the abſoluteneſs of his own ſenſe upon the old: and that of Gilbertus, our countryman, who revived, with ſome alterations and demonſtrations, the opinions of Xenophanes: and any other worthy to be admitted.

Thus have we now dealt with two of the three beams of man's knowledge, that is, *Radius directus*, which is referred to nature; *Radius refractus*, which is referred to God, and cannot report truly becauſe of the inequality of the medium; there reſteth *Radius reflexus*, whereby man beholdeth and contemplateth himſelf.

We come therefore now to that knowledge whereunto the ancient oracle directeth us, which is the knowledge of ourſelves; which deſerveth the more accurate handling, by how much it toucheth us more nearly. This knowledge, as it is the end and term of natural philoſophy in the intention of man, ſo, notwithſtanding, it is but a portion of natural philoſophy in the continent of nature; and generally let this be a rule, that all partitions of knowledges be accepted rather for lines and veins, than for ſections and ſeparations; and that the continuance and intireneſs of knowledge be preſerved. For the contrary hereof hath made particular ſciences to become barren, ſhallow, and erroneous, while they have not been nouriſhed and maintained from the common fountain. So we ſee Cicero the orator complained of Socrates and his ſchool, that he was the firſt that ſeparated philoſophy and rhetoric, whereupon rhetoric became an empty and verbal art. So we may ſee, that the opinion of Copernicus touching the rotation of the earth, which aſtronomy itſelf cannot correct, becauſe it is not repugnant to any of the phaenomena, yet natural philoſophy may correct. So we ſee alſo that the ſcience of medicine, if it be deſtitute and forſaken by natural philoſophy, it is not much better than an empirical practice.

With this reſervation therefore we proceed to Human Philoſophy, or humanity, which hath two parts: The one conſidereth man ſegregate or diſtributively: the other congregate or in ſociety. So as human philoſophy is either ſimple and particular, or conjugate and civil. Humanity particularly conſiſteth of the ſame parts whereof man conſiſteth, that is of knowledges which reſpect the body, and of knowledges that reſpect the mind; but before we diſtribute ſo far, it is good to conſtitute. For I do take the conſideration in general, and at large, of human nature to be fit to be emancipated and made a knowledge by itſelf; not ſo much in regard of thoſe delightful and elegant diſcourſes which have been made of the dignity of man, of his miſeries, of his ſtate and life, and the like adjuncts of his common and undivided nature; but chiefly in regard of the knowledge concerning the ſympathies and concordances between the mind and body, which being mixed, cannot be properly aſſigned to the ſciences of either.

This knowledge hath two branches: for as all leagues and amities conſiſt of mutual intelligence and mutual offices, ſo this league of mind and body hath theſe two

parts

parts, how the one diſcloſeth the other, and how the one worketh upon the other; Diſcovery, and Impreſſion.

The former of theſe hath begotten two arts, both of prediction or prenotion, whereof the one is honoured with the inquiry of Ariſtotle, and the other of Hippocrates. And although they have of later time been uſed to be coupled with ſuperſtitious and fantaſtical arts, yet being purged and reſtored to their true ſtate, they have both of them a ſolid ground in nature, and a profitable uſe in life. The firſt is phyſiognomy, which diſcovereth the diſpoſition of the mind by the lineaments of the body. The ſecond is the expoſition of natural dreams, which diſcovereth the ſtate of the body by the imaginations of the mind. In the former of theſe I note a deficience, for Ariſtotle hath very ingeniouſly and diligently handled the factures of the body, but not the geſtures of the body, which are no leſs comprehenſible by art, and of greater uſe and advantage. For the lineaments of the body do diſcloſe the diſpoſition and inclination of the mind in general; but the motions of the countenance and parts do not only ſo, but do farther diſcloſe the preſent humour and ſtate of the mind and will. For, as your majeſty ſaith moſt aptly and elegantly, "As the tongue ſpeaketh to the ear, ſo the geſture ſpeaketh to the eye." And therefore a number of ſubtle perſons, whoſe eyes do dwell upon the faces and faſhions of men, do well know the advantage of this obſervation, as being moſt part of their ability; neither can it be denied, but that it is a great diſcovery of diſſimulations, and a great direction in buſineſs.

Pars phyſiognomiae, de geſtu ſive motu corporis.

The latter branch touching impreſſion, hath not been collected into art, but hath been handled diſperſedly; and it hath the ſame relation or antiſtrophe that the former hath. For the conſideration is double; "Either how, and how far the humours and effects of the body do alter or work upon the mind; or again, How, and how far the paſſions or apprehenſions of the mind do alter or work upon the body." The former of theſe hath been inquired and conſidered, as a part and appendix of medicine, but much more as a part of religion or ſuperſtition: for the phyſician preſcribeth cures of the mind in frenſies and melancholy paſſions, and pretendeth alſo to exhibit medicines to exhilarate the mind, to confirm the courage, to clarify the wits, to corroborate the memory, and the like: but the ſcruples and ſuperſtitions of diet, and other regimen of the body, in the ſect of the Pythagoreans, in the hereſy of the Manicheans, and in the law of Mahomet, do exceed: So likewiſe the ordinances in the ceremonial law, interdicting the eating of the blood and fat, diſtinguiſhing between beaſts clean and unclean for meat, are many and ſtrict. Nay the faith itſelf, being clear and ſerene from all clouds of ceremony, yet retaineth the uſe of faſtings, abſtinences, and other macerations and humiliations of the body, as things real and not figurative. The root and life of all which preſcripts is, beſides the ceremony, the conſideration of that dependency, which the affections of the mind are ſubmitted unto upon the ſtate and diſpoſition of the body. And if any man of weak judgment do conceive, that this ſuffering of the mind from the body, doth either queſtion the immortality, or derogate from the ſovereignty of the ſoul, he may be taught in eaſy inſtances, that the infant in the mother's womb is compatible with the mother, and yet ſeparable: and the moſt abſolute monarch is ſometimes led by his ſervants, and yet without ſubjection. As for the reciprocal knowledge, which is the operation of the conceits and paſſions of the mind upon the body; we ſee all wiſe phyſicians, in the preſcriptions of their regimens to their patients, do ever conſider *accidentia animi*, as of great force to further or hinder reme-

dies or recoveries; and more eſpecially it is an inquiry of great depth and worth concerning imagination, how, and how far it altereth the body proper of the imaginant. For although it hath a manifeſt power to hurt, it followeth not it hath the ſame degree of power to help; no more than a man can conclude, that becauſe there be peſtilent airs, able ſuddenly to kill a man in health, therefore there ſhould be ſovereign airs, able ſuddenly to cure a man in ſickneſs. But the inquiſition of this part is of great uſe, though it needeth, as Socrates ſaid, "a Delian diver," being difficult and profound. But unto all this knowledge *de communi vinculo*, of the concordances between the mind and the body, that part of inquiry is moſt neceſſary, which conſidereth of the ſeats and domiciles, which the ſeveral faculties of the mind do take and occupate in the organs of the body; which knowledge hath been attempted, and is controverted, and deſerveth to be much better inquired. For the opinion of Plato, who placed the underſtanding in the brain, animoſity (which he did unfitly call anger, having a greater mixture with pride) in the heart, and concupiſcence or ſenſuality in the liver, deſerveth not to be deſpiſed, but much leſs to be allowed. So then we have conſtituted, as in our own wiſh and advice, the inquiry touching human nature intire, as a juſt portion of knowledge to be handled apart.

The knowledge that concerneth man's Body, is divided as the good of man's body is divided, unto which it referreth. The good of man's body is of four kinds, health, beauty, ſtrength, and pleaſure: So the knowledges are medicine, or art of cure; art of decoration, which is called coſmetic; art of activity, which is called athletic; and art voluptuary, which Tacitus truly calleth *eruditus luxus*. This ſubject of man's body is of all other things in nature moſt ſuſceptible of remedy; but then that remedy is moſt ſuſceptible of error. For the ſame ſubtility of the ſubject doth cauſe large poſſibility, and eaſy failing; and therefore the inquiry ought to be the more exact.

To ſpeak therefore of medicine, and to reſume that we have ſaid, aſcending a little higher; the ancient opinion that man was *microcoſmus*, an abſtract or model of the world, hath been fantaſtically ſtrained by Paracelſus and the alchemiſts, as if there were to be found in man's body certain correſpondences and parallels, which ſhould have reſpect to all varieties of things, as ſtars, planets, minerals, which are extant in the great world. But thus much is evidently true, that of all ſubſtances which nature hath produced, man's body is the moſt extremely compounded: For we ſee herbs and plants are nouriſhed by earth and water; beaſts for the moſt part by herbs and fruits; man by the fleſh of beaſts, birds, fiſhes, herbs, grains, fruits, water, and the manifold alterations, dreſſings, and preparations of theſe ſeveral bodies, before they come to be his food and aliment. Add hereunto, that beaſts have a more ſimple order of life, and leſs change of affections to work upon their bodies; whereas man in his manſion, ſleep, exerciſe, paſſions, hath infinite variations; and it cannot be denied, but that the body of man of all other things is of the moſt compounded maſs. The ſoul on the other ſide is the ſimpleſt of ſubſtances, as is well expreſſed:

Purumque reliquit
Aethereum ſenſum, atque auraï ſimplicis ignem.

So that it is no marvel though the ſoul ſo placed enjoy no reſt, if that principle be true, that *Motus rerum eſt rapidus extra locum, placidus in loco.* But to the purpoſe: this variable compoſition of man's body hath made it as an inſtrument eaſy to diſtemper,

diſtemper, and therefore the poets did well to conjoin muſic and medicine in Apollo, becauſe the office of medicine is but to tune this curious harp of man's body, and to reduce it to harmony. So then the ſubject being ſo variable, hath made the art by conſequence more conjectural; and the art being conjectural, hath made ſo much the more place to be left for impoſture. For almoſt all other arts and ſciences are judged by acts or maſter-pieces, as I may term them, and not by the ſucceſſes and events. The lawyer is judged by the virtue of his pleading, and not by the iſſue of the cauſe. The maſter of the ſhip is judged by the directing his courſe aright, and not by the fortune of the voyage. But the phyſician, and perhaps the politician, hath no particular acts demonſtrative of his ability, but is judged moſt by the event; which is ever but as it is taken: for who can tell, if a patient die or recover, or if a ſtate be preſerved or ruined, whether it be art or accident? And therefore many times the impoſtor is prized, and the man of virtue taxed. Nay, we ſee the weakneſs and credulity of men is ſuch, as they will often prefer a mountebank or witch before a learned phyſician. And therefore the poets were clear-ſighted in diſcerning this extreme folly, when they made Æſculapius and Circe brother and ſiſter, both children of the ſun, as in the verſes; Æn. vii. 772.

Ipſe repertorem medicinae talis et artis
Fulmine Phoebigenam Stygias detruſit ad undas:

And again,

Dives inacceſſos ubi Solis filia lucos, etc. Æn. vii. 11.

For in all times, in the opinion of the multitude, witches, and old women, and impoſtors, have had a competition with phyſicians. And what followeth? Even this; that phyſicians ſay to themſelves, as Solomon expreſſeth it upon an higher occaſion; *If it befal to me, as befalleth to the fools, why ſhould I labour to be more wiſe?* And therefore I cannot much blame phyſicians, that they uſe commonly to intend ſome other art or practice, which they fancy more than their profeſſion. For you ſhall have of them, antiquaries, poets, humaniſts, ſtateſmen, merchants, divines, and in every of theſe better ſeen than in their profeſſion; and no doubt, upon this ground, that they find that mediocrity and excellency in their art maketh no difference in profit or reputation towards their fortune; for the weakneſs of patients, and ſweetneſs of life, and nature of hope, maketh men depend upon phyſicians with all their defects. But, nevertheleſs, theſe things, which we have ſpoken of, are courſes begotten between a little occaſion, and a great deal of ſloth and default; for if we will excite and awake our obſervation, we ſhall ſee, in familiar inſtances, what a predominant faculty the ſubtilty of ſpirit hath over the variety of matter or form: nothing more variable than faces and countenances, yet men can bear in memory the infinite diſtinctions of them; nay, a painter with a few ſhells of colours, and the benefit of his eye, and habit of his imagination, can imitate them all that ever have been, are, or may be, if they were brought before him. Nothing more variable than voices, yet men can likewiſe diſcern them perſonally; nay, you ſhall have a buffoon, or *pantomimus*, will expreſs as many as he pleaſeth. Nothing more variable than the differing ſounds of words, yet men have found the way to reduce them to a few ſimple letters. So that it is not the inſufficiency or incapacity of man's mind, but it is the remote ſtanding or placing thereof, that breedeth theſe mazes and incomprehenſions: for as the ſenſe afar off is full of miſtaking, but is exact at hand, ſo it is of the underſtanding; the remedy whereof is not to quicken or ſtrengthen the organ, but to go nearer to the object; and therefore there is no

doubt, but if the phyſicians will learn and uſe the true approaches and avenues of nature, they may aſſume as much as the poet ſaith:

Et quoniam variant morbi, variabimus artes;
Mille mali ſpecies, mille ſalutis erunt.

Which that they ſhould do, the nobleneſs of their art doth deſerve, well ſhadowed by the poets, in that they made Æſculapius to be the ſon of the Sun, the one being the fountain of life, the other as the ſecond ſtream; but infinitely more honoured by the example of our Saviour, who made the body of man the object of his miracles, as the ſoul was the object of his doctrine. For we read not that ever he vouchſafed to do any miracle about honour or money, except that one for giving tribute to Cæſar, but only about the preſerving, ſuſtaining, and healing the body of man.

Medicine is a ſcience which hath been, as we have ſaid, more profeſſed than laboured, and yet more laboured than advanced; the labour having been, in my judgment, rather in circle than in progreſſion. For I find much iteration, but ſmall addition. It conſidereth the cauſes of diſeaſes, with the occaſions or impulſions; the diſeaſes themſelves, with the accidents; and the cures, with the preſervations. The deficiences which I think good to note, being a few of many, and thoſe ſuch as are of a more open and manifeſt nature, I will enumerate and not place.

Narrationes medicinales. The firſt is the diſcontinuance of the ancient and ſerious diligence of Hippocrates, who uſed to ſet down a narrative of the ſpecial caſes of his patients, and how they proceeded, and how they were judged by recovery or death. Therefore having an example proper in the father of the art, I ſhall not need to alledge an example foreign, of the wiſdom of the lawyers, who are careful to report new caſes and deciſions for the direction of future judgments. This continuance of Medicinal Hiſtory I find deficient, which I underſtand neither to be ſo infinite as to extend to every common caſe, nor ſo reſerved, as to admit none but wonders; for many things are new in the manner, which are not new in the kind; and if men will intend to obſerve, they ſhall find much worthy to obſerve.

Anatomia comparata. In the inquiry which is made by anatomy, I find much deficience: for they inquire of the parts, and their ſubſtances, figures, and collocations; but they inquire not of the diverſities of the parts, the ſecrecies of the paſſages, and the ſeats or neſtling of the humours, nor much of the footſteps and impreſſions of diſeaſes; the reaſon of which omiſſion I ſuppoſe to be, becauſe the firſt inquiry may be ſatisfied in the view of one or a few anatomies; but the latter being comparative and caſual, muſt ariſe from the view of many. And as to the diverſity of parts, there is no doubt but the facture or framing of the inward parts is as full of difference as the outward, and in that is the cauſe continent of many diſeaſes, which not being obſerved, they quarrel many times with the humours, which are not in fault, the fault being in the very frame and mechanic of the part, which cannot be moved by medicine alterative, but muſt be accommodated and palliated by diets and medicines familiar. And for the paſſages and pores, it is true, which was anciently noted, that the more ſubtile of them appear not in anatomies, becauſe they are ſhut and latent in dead bodies, though they be open and manifeſt in live: which being ſuppoſed, though the inhumanity of *anatomia vivorum* was by Celſus juſtly reproved; yet in regard of the great uſe of this obſervation, the inquiry needed not by him ſo ſlightly to have been relinquiſhed altogether, or referred to the caſual practices of ſurgery, but might have been well diverted upon the diſſection of beaſts alive, which,

which, notwithstanding the dissimilitude of their parts, may sufficiently satisfy this inquiry. And for the humours, they are commonly passed over in anatomies as purgaments, whereas it is most necessary to observe, what cavities, nests, and receptacles the humours do find in the parts, with the differing kind of the humour so lodged and received. And as for the footsteps of diseases, and their devastations of the inward parts, impostumations, exulcerations, discontinuations, putrefactions, consumptions, contractions, extensions, convulsions, dislocations, obstructions, repletions, together with all preternatural substances, as stones, carnosities, excrescences, worms, and the like; they ought to have been exactly observed by multitude of anatomies, and the contribution of mens several experiences, and carefully set down, both historically, according to the appearances, and artificially, with a reference to the diseases and symptoms which resulted from them, in case where the anatomy is of a defunct patient; whereas now upon opening of bodies, they are passed over slightly and in silence.

Inquisitio ulterior de morbis insanabilibus.

In the inquiry of diseases they do abandon the cures of many, some as in their nature incurable and others as past the period of cure; so that Sylla and the triumvirs never proscribed so many men to die, as they do by their ignorant edicts, whereof numbers do escape with less difficulty, than they did in the Roman proscriptions. Therefore I will not doubt to note as a deficience, that they inquire not the perfect cures of many diseases, or extremities of diseases, but pronouncing them incurable, do enact a law of neglect, and exempt ignorance from discredit.

De euthanasia exteriore.

Nay farther, I esteem it the office of a physician not only to restore health, but to mitigate pain and dolors, and not only when such mitigation may conduce to recovery, but when it may serve to make a fair and easy passage: for it is no small felicity which Augustus Cæsar was wont to wish to himself, that same *euthanasia*, and which was specially noted in the death of Antoninus Pius, whose death was after the fashion and semblance of a kindly and pleasant sleep. So it is written of Epicurus, that after his disease was judged desperate, he drowned his stomach and senses with a large draught and ingurgitation of wine; whereupon the epigram was made, *Hinc Stygias ebrius hausit aquas:* he was not sober enough to taste any bitterness of the Stygian water. But the physicians, contrariwise, do make a kind of scruple and religion to stay with the patient after the disease is deplored; whereas, in my judgment, they ought both to inquire the skill, and to give the attendances for the facilitating and assuaging of the pains and agonies of death.

Medicinae experimentales.

In the consideration of the cures of diseases, I find a deficience in the receipts of propriety, respecting the particular cures of diseases: for the physicians have frustrated the fruit of tradition and experience by their magistralities, in adding, and taking out, and changing *quid pro quo*, in their receipts, at their pleasures, commanding so over the medicine, as the medicine cannot command over the disease; for except it be treacle and Mithridatum, and of late diascordium, and a few more, they tie themselves to no receipts severely and religiously: for as to the confections of sale which are in the shops, they are for readiness and not for propriety; for they are upon general intentions of purging, opening, comforting, altering, and not much appropriated to particular diseases; and this is the cause why empirics and old women are more happy many times in their cures than learned physicians, because they are more religious in holding their medicines. Therefore here is the deficience which I find, that physicians have not, partly out of their own practice, partly out of their constant probations reported in books, and partly out of the traditions of empirics, set down and

and delivered over certain experimental medicines for the cure of particular diſeaſes, beſides their own conjectural and magiſterial deſcriptions. For as they were the men of the beſt compoſition in the ſtate of Rome, which either being conſuls inclined to the people, or being tribunes inclined to the ſenate; ſo in the matter we now handle, they be the beſt phyſicians, which being learned, incline to the traditions of experience, or being empirics, incline to the methods of learning.

Imitatio naturae in balneis, et aquis medicinalibus.

In preparation of medicines, I do find ſtrange, eſpecially conſidering how mineral medicines have been extolled, and that they are ſafer for the outward than inward parts, that no man hath ſought to make an imitation by art of natural baths, and medicinable fountains; which nevertheleſs are confeſſed to receive their virtues from minerals; and not ſo only, but diſcerned and diſtinguiſhed from what particular mineral they receive tincture, as ſulphur, vitriol, ſteel, or the like; which nature, if it may be reduced to compoſitions of art, both the variety of them will be increaſed, and the temper of them will be more commanded.

Filum medicinale, ſive de vicibus medicinarum.

But leſt I grow to be more particular than is agreeable, either to my intention or to proportion; I will conclude this part with the note of one deficience more, which ſeemeth to me of greateſt conſequence; which is, that the preſcripts in uſe are too compendious to attain their end; for to my underſtanding, it is a vain and flattering opinion to think any medicine can be ſo ſovereign, or ſo happy, as that the receipt or uſe of it can work any great effect upon the body of man: it were a ſtrange ſpeech, which ſpoken, or ſpoken oft, ſhould reclaim a man from a vice to which he were by nature ſubject; it is order, purſuit, ſequence, and interchange of application, which is mighty in nature; which although it require more exact knowledge in preſcribing, and more preciſe obedience in obſerving, yet is recompenſed with the magnitude of effects. And although a man would think by the daily viſitations of the phyſicians, that there were a purſuance in the cure; yet let a man look into their preſcripts and miniſtrations, and he ſhall find them but inconſtancies, and every day's devices without any ſettled providence or project; not that every ſcrupulous or ſuperſtitious preſcript is effectual, no more than every ſtrait way is the way to heaven, but the truth of the direction muſt precede ſeverity of obſervance.

For Coſmetic, it hath parts civil, and parts effeminate: for cleanneſs of body was ever eſteemed to proceed from a due reverence to God, to ſociety, and to ourſelves. As for artificial decoration, it is well worthy of the deficiences which it hath; being neither fine enough to deceive, nor handſome to uſe, nor wholeſome to pleaſe.

For Athletic, I take the ſubject of it largely, that is to ſay, for any point of ability, whereunto the body of man may be brought, whether it be of activity, or of patience; whereof activity hath two parts, ſtrength and ſwiftneſs: and patience likewiſe hath two parts, hardneſs againſt wants and extremities, and indurance of pain or torment, whereof we ſee the practices in tumblers, in ſavages, and in thoſe that ſuffer puniſhment: nay, if there be any other faculty which falls not within any of the former diviſions, as in thoſe that dive, that obtain a ſtrange power of containing reſpiration, and the like, I refer it to this part. Of theſe things the practices are known, but the philoſophy that concerneth them is not much inquired; the rather, I think, becauſe they are ſuppoſed to be obtained, either by an aptneſs of nature, which cannot be taught, or only by continual cuſtom, which is ſoon preſcribed; which though it be not true, yet I forbear to note any deficiences, for the Olympian games are down long ſince, and the mediocrity of theſe things is for uſe;

as

as for the excellency of them, it ſerveth for the moſt part but for mercenary oſtentation.

For arts of Pleaſure ſenſual, the chief deficience in them is of laws to repreſs them. For as it hath been well obſerved, that the arts which flouriſh in times while virtue is in growth, are military, and while virtue is in ſtate, are liberal, and while virtue is in declination, are voluptuary; ſo I doubt, that this age of the world is ſomewhat upon the deſcent of the wheel. With arts voluptuary I couple practices joculary; for the deceiving of the ſenſes is one of the pleaſures of the ſenſes. As for games of recreation, I hold them to belong to civil life and education. And thus much of that particular human philoſophy which concerns the body, which is but the tabernacle of the mind.

For Human Knowledge, which concerns the Mind, it hath two parts, the one that inquireth of the ſubſtance or nature of the ſoul or mind, the other that inquireth of the faculties or functions thereof.

Unto the firſt of theſe, the conſiderations of the original of the ſoul, whether it be native or adventive, and how far it is exempted from laws of matter, and of the immortality thereof, and many other points, do appertain; which have been not more laborioufly inquired than variouſly reported; ſo as the travel therein taken, ſeemeth to have been rather in a maze than in a way. But although I am of opinion, that this knowledge may be more really and ſoundly inquired even in nature than it hath been; yet I hold, that in the end it muſt be bounded by religion, or elſe it will be ſubject to deceit and deluſion: for as the ſubſtance of the ſoul in the creation was not extracted out of the maſs of heaven and earth, by the benediction of a *producat*, but was immediately inſpired from God; ſo it is not poſſible that it ſhould be, otherwiſe than by accident, ſubject to the laws of heaven and earth, which are the ſubject of philoſophy; and therefore the true knowledge of the nature, and ſtate of the ſoul, muſt come by the ſame inſpiration that gave the ſubſtance. Unto this part of knowledge touching the ſoul there be two appendixes, which, as they have been handled, have rather vapoured forth fables than kindled truth, divination, and faſcination.

Divination hath been anciently and fitly divided into artificial and natural; whereof artificial is, when the mind maketh a prediction by argument, concluding upon ſigns and tokens: natural is, when the mind hath a preſention by an internal power, without the inducement of a ſign. Artificial is of two ſorts, either when the argument is coupled with a derivation of cauſes, which is rational; or when it is only grounded upon a coincidence of the effect, which is experimental; whereof the latter for the moſt part is ſuperſtitious: ſuch as were the heathen obſervations upon the inſpection of ſacrifices, the flights of birds, the ſwarming of bees, and ſuch as were the Chaldean aſtrology, and the like. For artificial divination, the ſeveral kinds thereof are diſtributed amongſt particular knowledges. The aſtronomer hath his predictions, as of conjunctions, aſpects, eclipſes, and the like. The phyſician hath his predictions, of death, of recovery, of the accidents and iſſues of diſeaſes. The politician hath his predictions; *O urbem venalem, et cito perituram, ſi emptorem invenerit!* which ſtayed not long to be performed in Sylla firſt, and after in Cæſar; ſo as theſe predictions are now impertinent, and to be referred over. But the divination which ſpringeth from the internal nature of the ſoul, is that which we now ſpeak of, which hath been made to be of two ſorts, primitive and by influxon.

Primitive

Primitive is grounded upon the ſuppoſition, that the mind, when it is withdrawn and collected into itſelf, and not diffuſed into the organs of the body, hath ſome extent and latitude of prenotion, which therefore appeareth moſt in ſleep, in extaſies, and near death, and more rarely in waking apprehenſions; and is induced and furthered by thoſe abſtinences and obſervances which make the mind moſt to conſiſt in itſelf. By influxion, is grounded upon the conceit that the mind, as a mirror or glaſs ſhould take illumination from the foreknowledge of God and ſpirits; unto which the ſame regimen doth likewiſe conduce. For the retiring of the mind within itſelf, is the ſtate which is moſt ſuſceptible of divine influxions, ſave that it is accompanied in this caſe with a fervency and elevation, which the ancients noted by fury, and not with a repoſe and quiet, as it is in the other.

Faſcination is the power and act of imagination intenſive upon other bodies than the body of the imaginant; for of that we ſpake in the proper place; wherein the ſchool of Paracelſus, and the diſciples of pretended natural magic, have been ſo intemperate, as that they have exalted the power of the imagination to be much one with the power of miracle-working faith: others, that draw nearer to probability, calling to their view the ſecret paſſages of things, and eſpecially of the contagion that paſſeth from body to body, do conceive it ſhould likewiſe be agreeable to nature, that there ſhould be ſome tranſmiſſions and operations from ſpirit to ſpirit, without the mediation of the ſenſes: whence the conceits have grown, now almoſt made civil, of the maſtering ſpirit, and the force of confidence, and the like. Incident unto this is the inquiry how to raiſe and fortify the imagination; for if the imagination fortified have power, then it is material to know how to fortify and exalt it. And herein comes in crookedly and dangerouſly, a palliation of a great part of ceremonial magic. For it may be pretended, that ceremonies, characters, and charms, do work, not by any tacit or ſacramental contract with evil ſpirits, but ſerve only to ſtrengthen the imagination of him that uſeth it; as images are ſaid by the Roman church, to fix the cogitations, and raiſe the devotions of them that pray before them. But for mine own judgment, if it be admitted that imagination hath power, and that ceremonies fortify imagination, and that they be uſed ſincerely and intentionally for that purpoſe; yet I ſhould hold them unlawful, as oppoſing to that firſt edict which God gave unto man, *In ſudore vultus comedes panem tuum.* For they propound thoſe noble effects, which God hath ſet forth unto man to be bought at the price of labour, to be attained by a few eaſy and ſlothful obſervances. Deficiences in theſe knowledges I will report none, other than the general deficience, that it is not known how much of them is verity, and how much vanity.

The knowledge which reſpecteth the faculties of the mind of man, is of two kinds; the one reſpecting his underſtanding and reaſon, and the other his will, appetite and affection; whereof the former produceth poſition or decree, the latter action or execution. It is true that the imagination is an agent or *nuncius* in both provinces, both the judicial and the miniſterial. For ſenſe ſendeth over to imagination before reaſon have judged, and reaſon ſendeth over to imagination before the decree can be acted: for imagination ever precedeth voluntary motion, ſaving that this Janus of imagination hath differing faces; for the face towards reaſon hath the print of truth, but the face towards action hath the print of good, which nevertheleſs are faces,

Quales decet eſſe ſororum.

Neither is the imagination ſimply and only a meſſenger, but is inveſted with, or at leaſtwiſe

leaſtwiſe uſurpeth no ſmall authority in itſelf, beſides the duty of the meſſage. For it was well ſaid by Ariſtotle, "That the mind hath over the body that command-"ment, which the lord hath over a bondman; but that reaſon hath over the ima-"gination that commandment, which a magiſtrate hath over a free citizen," who may come alſo to rule in his turn. For we ſee, that in matters of faith and religion, we raiſe our imagination above our reaſon, which is the cauſe why religion ſought ever acceſs to the mind by ſimilitudes, types, parables, viſions, dreams. And again, in all perſuaſions that are wrought by eloquence, and other impreſſions of like nature, which do paint and diſguiſe the true appearance of things, the chief recommendation unto reaſon is from the imagination. Nevertheleſs, becauſe I find not any ſcience that doth properly or fitly pertain to the imagination, I ſee no cauſe to alter the former diviſion. For as for poeſy, it is rather a pleaſure, or play of imagination, than a work or duty thereof. And if it be a work, we ſpeak not now of ſuch parts of learning as the imagination produceth, but of ſuch ſciences as handle and conſider of the imagination; no more than we ſhall ſpeak now of ſuch knowledges as reaſon produceth, for that extendeth to all philoſophy, but of ſuch knowledges as do handle and inquire of the faculty of reaſon; ſo as poeſy had its true place. As for the power of the imagination in nature, and the manner of fortifying the ſame, we have mentioned it in the doctrine *De anima*, whereunto moſt fitly it belongeth: and laſtly, for imaginative or inſinuative reaſon, which is the ſubject of rhetoric, we think it beſt to refer it to the arts of reaſon. So therefore we content ourſelves with the former diviſion, that Human Philoſophy, which reſpecteth the faculties of the mind of man, hath two parts, Rational and Moral.

The part of Human Philoſophy which is Rational, is of all knowledges, to the moſt wits, the leaſt delightful, and ſeemeth but a net of ſubtilty and ſpinoſity: for as it was truly ſaid, that knowledge is *pabulum animi*; ſo in the nature of mens appetite to this food, moſt men are of the taſte and ſtomach of the Iſraelites in the deſert, that would fain have returned *ad ollas carnium*, and were weary of manna; which though it were celeſtial, yet ſeemed leſs nutritive and comfortable. So generally men taſte well knowledges that are drenched in fleſh and blood, civil hiſtory, morality, policy, about the which mens affections, praiſes, fortunes, do turn and are converſant; but this ſame *lumen ſiccum* doth parch and offend moſt mens watry and ſoft natures. But to ſpeak truly of things as they are in worth, *rational knowledges* are the keys of all other arts; for as Ariſtotle ſaith aptly and elegantly, "That "the hand is the inſtrument of inſtruments, and the mind is the form of forms;" ſo theſe be truly ſaid to be the art of arts; neither do they only direct, but likewiſe confirm and ſtrengthen: even as the habit of ſhooting doth not only enable to ſhoot a nearer ſhoot, but alſo to draw a ſtronger bow.

The arts intellectual are four in number, divided according to the ends whereunto they are referred; for man's labour is to invent that which is ſought or propounded; or to judge that which is invented; or to retain that which is judged; or to deliver over that which is retained. So as the arts muſt be four; art of inquiry or invention; art of examination or judgment; art of cuſtody or memory; and art of elocution or tradition.

Invention is of two kinds, much differing; the one of arts and ſciences, and the other of ſpeech and arguments. The former of theſe I do report deficient; which ſeemeth to me to be ſuch a deficience, as if in the making of an inventory, touching the ſtate of a defunct, it ſhould be ſet down, That there is no ready money. For

as money will fetch all other commodities, ſo this knowledge is that which ſhould purchaſe all the reſt. And like as the Weſt-Indies had never been diſcovered, if the uſe of the mariner's needle had not been firſt diſcovered, though the one be vaſt regions, and the other a ſmall motion: ſo it cannot be found ſtrange, if ſciences be no farther diſcovered, if the art itſelf of invention and diſcovery hath been paſſed over.

That this part of knowledge is wanting to my judgment, ſtandeth plainly confeſſed: for firſt, logic doth not pretend to invent ſciences, or the axioms of ſciences, but paſſeth it over with a *cuique in ſua arte credendum*. And Celſus acknowledgeth it gravely, ſpeaking of the empirical and dogmatical ſects of phyſicians, "That "medicines and cures were firſt found out, and then after the reaſons and cauſes "were diſcourſed; and not the cauſes firſt found out, and by light from them "the medicines and cures diſcovered." And Plato in his *Theaetetus*, noteth well, "That particulars are infinite, and the higher generalities give no ſufficient "direction; and that the pith of all ſciences, which maketh the artſman differ "from the inexpert, is in the middle propoſitions, which in every particular know-"ledge are taken from tradition and experience." And therefore we ſee, that they which diſcourſe of the inventions and originals of things, refer them rather to chance than to art, and rather to beaſts, birds, fiſhes, ſerpents, than to men.

Dictamnum genetrix Cretaea carpit ab Ida,
Puberibus caulem foliis, et flore comantem
Purpureo: non illa feris incognita capris,
Gramina cum tergo volucres haeſere ſagittae.

So that it was no marvel, the manner of antiquity being to conſecrate inventors, that the Ægyptians had ſo few human idols in their temples, but almoſt all brute;

Omnigenumque Deum monſtra, et latrator Anubis,
Contra Neptunum, et Venerem, contraque Minervam, etc.

And if you like better the tradition of the Grecians, and aſcribe the firſt inventions to men, yet you will rather believe that Prometheus firſt ſtruck the flints, and marvelled at the ſpark, than that when he firſt ſtruck the flints he expected the ſpark; and therefore we ſee the Weſt-Indian Prometheus had no intelligence with the European, becauſe of the rareneſs with them of flint, that gave the firſt occaſion: ſo as it ſhould ſeem, that hitherto men are rather beholden to a wild goat for ſurgery, or to a nightingale for muſic, or to the ibis for ſome part of phyſic, or to the potlid that flew open for artillery, or generally to chance, or any thing elſe, than to logic, for the invention of arts and ſciences. Neither is the form of invention which Virgil deſcribeth much other.

Ut varias uſus meditando extunderet artes
Paulatim.

For if you obſerve the words well, it is no other method than that which brute beaſts are capable of and do put in uſe: which is a perpetual intending or practiſing ſome one thing, urged and impoſed by an abſolute neceſſity of conſervation of being; for ſo Cicero ſaith very truly, *Uſus uni rei deditus, et naturam et artem ſaepe vincit*. And therefore if it be ſaid of men,

Labor omnia vincit
Improbus, et duris urgens in rebus egeſtas;

it is likewiſe ſaid of beaſts, *Quis pſittaco docuit ſuum χαῖρε*; Who taught the raven in a drought to throw pebbles into an hollow tree, where ſhe eſpied water, that the water

water might riſe ſo as ſhe might come to it? Who taught the bee to ſail through ſuch a vaſt ſea of air, and to find the way from a field in flower, a great way off, to her hive? Who taught the ant to bite every grain of corn that ſhe burieth in her hill, leſt it ſhould take root and grow? Add then the word *extundere*, which importeth the extreme difficulty; and the word *paulatim*, which importeth the extreme ſlowneſs; and we are where we were, even amongſt the Ægyptians gods; there being little left to the faculty of reaſon, and nothing to the duty of art, for matter of invention.

Secondly, the induction which the logicians ſpeak of, and which ſeemeth familiar with Plato, whereby the principles of ſciences may be pretended to be invented, and ſo the middle propoſitions by derivation from the principles; their form of induction, I ſay, is utterly vicious and incompetent; wherein their error is the fouler, becauſe it is the duty of art to perfect and exalt nature; but they contrariwiſe have wronged, abuſed, and traduced nature. For he that ſhall attentively obſerve how the mind doth gather this excellent dew of knowledge, like unto that which the poet ſpeaketh of, *Aërei mellis coeleſtia dona*, diſtilling and contriving it out of particulars natural and artificial, as the flowers of the field and garden, ſhall find, that the mind of herſelf by nature doth manage and act an induction much better than they deſcribe it. For to conclude upon an enumeration of particulars without inſtance contradictory, is no concluſion, but a conjecture; for who can aſſure, in many ſubjects, upon thoſe particulars which appear of a ſide, that there are not other on the contrary ſide which appear not. As if Samuel ſhould have reſted upon thoſe ſons of Jeſſe, which were brought before him, and failed of David which was in the field. And this form, to ſay truth, is ſo groſs, as it had not been poſſible for wits ſo ſubtile, as have managed theſe things, to have offered it to the world, but that they haſted to their theories and dogmaticals, and were imperious and ſcornful toward particulars, which their manner was to uſe but as *lictores* and *viatores*, for ſerjeants and whifflers, *ad ſummovendam turbam*, to make way and make room for their opinions, rather than in their true uſe and ſervice: certainly it is a thing may touch a man with a religious wonder to ſee how the footſteps of ſeducement are the very ſame in divine and human truth; for as in divine truth man cannot endure to become as a child; ſo in human, they reputed the attending the inductions, whereof we ſpeak, as if it were a ſecond infancy or childhood.

Thirdly, allow ſome principles or axioms were rightly induced, yet nevertheleſs certain it is, that middle propoſitions cannot be deduced from them in ſubject of nature by ſyllogiſm, that is, by touch and reduction of them to principles in a middle term. It is true that in ſciences popular, as moralities, laws, and the like; yea and divinity, becauſe it pleaſeth God to apply himſelf to the capacity of the ſimpleſt, that form may have uſe, and in natural philoſophy likewiſe, by way of argument or ſatisfactory reaſon, *Quae aſſenſum parit, operis effoeta eſt*; but the ſubtilty of nature and operations will not be inchained in thoſe bonds: for arguments conſiſt of propoſitions, and propoſitions of words, and words are but the current tokens or marks of popular notions of things; which notions, if they be groſly and variably collected out of particulars, it is not the laborious examination either of conſequences of arguments, or of the truth of propoſitions, that can ever correct that error, being, as the phyſicians ſpeak, in the firſt digeſtion; and therefore it was not without cauſe, that ſo many excellent philoſophers became ſcepties and academics, and denied any certainty of knowledge or comprehenſion, and held opinion, that the knowledge of

man extended only to appearances and probabilities. It is true, that in Socrates it was ſuppoſed to be but a form of irony, *Scientiam diſſimulando ſimulavit:* for he uſed to diſable his knowledge, to the end to enhance his knowledge, like the humour of Tiberius in his beginnings, that would reign, but would not acknowledge ſo much; and in the later academy, which Cicero embraced, this opinion alſo of *acatalepſia*, I doubt, was not held ſincerely: for that all thoſe which excelled in *copia* of ſpeech, ſeem to have choſen that ſect as that which was fitteſt to give glory to their eloquence, and variable diſcourſes; being rather like progreſſes of pleaſure, than journeys to an end. But aſſuredly many ſcattered in both academies did hold it in ſubtilty and integrity. But here was their chief error; they charged the deceit upon the ſenſes, which in my judgment, notwithſtanding all their cavillations, are very ſufficient to certify and report truth, though not always immediately, yet by compariſon, by help of inſtrument, and by producing and urging ſuch things as are too ſubtile for the ſenſe, to ſome effect comprehenſible by the ſenſe; and other like aſſiſtance. But they ought to have charged the deceit upon the weakneſs of the intellectual powers, and upon the manner of collecting, and concluding upon the reports of the ſenſes. This I ſpeak not to diſable the mind of man, but to ſtir it up to ſeek help: for no man, be he never ſo cunning or practiſed, can make a ſtraight line or perfect circle by ſteadineſs of hand, which may be eaſily done by help of a ruler or compaſs.

Experientia literata, et interpretatio naturae.

This part of invention, concerning the invention of ſciences, I purpoſe, if God give me leave, hereafter to propound, having digeſted it into two parts; whereof the one I term *experientia literata*, and the other, *interpretatio naturae:* the former being but a degree and rudiment of the latter. But I will not dwell too long, nor ſpeak too much upon a promiſe.

The invention of ſpeech or argument is not properly an invention; for to invent, is to diſcover that we know not, and not to recover or reſummon that which we already know; and the uſe of this invention is no other, but out of the knowledge, whereof our mind is already poſſeſſed, to draw forth or call before us that which may be pertinent to the purpoſe which we take into our conſideration. So as, to ſpeak truly, it is no invention, but a remembrance or ſuggeſtion, with an application; which is the cauſe why the ſchools do place it after judgment, as ſubſequent and not precedent. Nevertheleſs, becauſe we do account it a chace, as well of deer in an incloſed park, as in a foreſt at large, and that it hath already obtained the name; let it be called invention, ſo as it be perceived and diſcerned that the ſcope and end of this invention is readineſs and preſent uſe of our knowledge, and not addition or amplification thereof.

To procure this ready uſe of knowledge there are two courſes, preparation and ſuggeſtion. The former of theſe ſeemeth ſcarcely a part of knowledge, conſiſting rather of diligence than of any artificial erudition. And herein Ariſtotle wittily, but hurtfully, doth deride the ſophiſts near his time, ſaying, "They did as if one "that profeſſed the art of ſhoemaking ſhould not teach how to make up a ſhoe, "but only exhibit in a readineſs a number of ſhoes of all faſhions and ſizes." But yet a man might reply, that if a ſhoemaker ſhould have no ſhoes in his ſhop but only work as he is beſpoken, he ſhould be weakly cuſtomed. But our Saviour, ſpeaking of divine knowledge, ſaith, *that the kingdom of heaven is like a good houſholder, that bringeth forth new and old ſtore:* and we ſee the ancient writers of rhetoric do give it in precept, that pleaders ſhould have the places whereof they have moſt continual uſe,

uſe, ready handled in all the variety that may be; as that, to ſpeak for the literal interpretation of the law againſt equity, and contrary; and to ſpeak for preſumptions and inferences againſt teſtimony, and contrary. And Cicero himſelf, being broken unto it by great experience, delivereth it plainly: that whatſoever a man ſhall have occaſion to ſpeak of, if he will take the pains, may have it in effect premeditate, and handled *in theſi*: ſo that when he cometh to a particular, he ſhall have nothing to do but to add names, and times, and places, and ſuch other circumſtances of individuals. We ſee likewiſe the exact diligence of Demoſthenes, who in regard of the great force that the entrance and acceſs into cauſes hath to make a good impreſſion, had ready framed a number of prefaces for orations and ſpeeches. All which authorities and precedents may overweigh Ariſtotle's opinion, that would have us change a rich wardrobe for a pair of ſhears.

But the nature of the collection of this proviſion or preparatory ſtore, though it be common both to logic and rhetoric, yet having made an entry of it here, where it came firſt to be ſpoken of, I think fit to refer over the farther handling of it to rhetoric.

The other part of invention, which I term ſuggeſtion, doth aſſign and direct us to certain marks or places, which may excite our mind to return and produce ſuch knowledge, as it hath formerly collected, to the end we may make uſe thereof. Neither is this uſe, truly taken, only to furniſh argument to diſpute probably with others, but likewiſe to miniſter unto our judgment to conclude aright within ourſelves. Neither may theſe places ſerve only to prompt our invention, but alſo to direct our inquiry. For a faculty of wiſe interrogating is half a knowledge. For as Plato ſaith, "Whoſoever ſeeketh, knoweth that which he ſeeketh for in a general "notion, elſe how ſhall he know it when he hath found it?" And therefore the larger your anticipation is, the more direct and compendious is your ſearch. But the ſame places which will help us what to produce of that which we know already, will alſo help us, if a man of experience were before us, what queſtions to aſk; or, if we have books and authors to inſtruct us, what points to ſearch and revolve: ſo as I cannot report, that this part of invention, which is that which the ſchools call topics, is deficient.

Nevertheleſs topics are of two ſorts, general and ſpecial. The general we have ſpoken to, but the particular hath been touched by ſome, but rejected generally as inartificial and variable. But leaving the humour which hath reigned too much in the ſchools, which is, to be vainly ſubtile in a few things, which are within their command, and to reject the reſt, I do receive particular topics, that is, places or directions of invention and inquiry in every particular knowledge, as things of great uſe, being mixtures of logic with the matter of ſciences: for in theſe it holdeth, *Ars inveniendi adoleſcit cum inventis*; for as in going of a way, we do not only gain that part of the way which is paſſed, but we gain the better ſight of that part of the way which remaineth; ſo every degree of proceeding in a ſcience giveth a light to that which followeth, which light if we ſtrengthen, by drawing it forth into queſtions or places of inquiry, we do greatly advance our purſuit.

Now we paſs unto the arts of judgment, which handle the natures of proofs and demonſtrations, which as to induction hath a coincidence with invention: for in all inductions, whether in good or vicious form, the ſame action of the mind which inventeth, judgeth; all one as in the ſenſe: but otherwiſe it is in proof by ſyllogiſm; for the proof being not immediate, but by mean, the invention of the mean is one thing,

thing, and the judgment of the conſequence is another; the one exciting only, the other examining. Therefore, for the real and exact form of judgment, we refer ourſelves to that which we have ſpoken of interpretation of nature.

For the other judgment by ſyllogiſm, as it is a thing moſt agreeable to the mind of man, ſo it hath been vehemently and excellently laboured; for the nature of man doth extremely covet to have ſomewhat in his underſtanding fixed and immoveable, and as a reſt and ſupport of the mind. And therefore as Ariſtotle endeavoureth to prove, that in all motion there is ſome point quieſcent; and as he elegantly expoundeth the ancient fable of Atlas, that ſtood fixed, and bore up the heaven from falling, to be meant of the poles or axle-tree of heaven, whereupon the converſion is accompliſhed; ſo aſſuredly men have a deſire to have an Atlas or axle-tree within, to keep them from fluctuation, which is like to a perpetual peril of falling; therefore men did haſten to ſet down ſome principles about which the variety of their diſputations might turn.

So then this art of judgment is but the reduction of propoſitions to principles in a middle term. The principles to be agreed by all, and exempted from argument: the middle term to be elected at the liberty of every man's invention: the reduction to be of two kinds, direct and inverted; the one when the propoſition is reduced to the principle, which they term a probation oſtenſive; the other when the contradictory of the propoſition is reduced to the contradictory of the principle, which is, that which they call *per incommodum*, or preſſing an abſurdity; the number of middle terms to be as the propoſition ſtandeth degrees more or leſs removed from the principle.

But this art hath two ſeveral methods of doctrine, the one by way of direction, the other by way of caution; the former frameth and ſetteth down a true form of conſequence, by the variations and deflections from which errors and inconſequences may be exactly judged. Toward the compoſition and ſtructure of which form it is incident to handle the parts thereof, which are propoſitions, and the parts of propoſitions, which are ſimple words; and this is that part of logic which is comprehended in the analytics.

The ſecond method of doctrine was introduced for expedite uſe and aſſurance ſake, diſcovering the more ſubtile forms of ſophiſms and illaqueations, with their redargutions, which is that which is termed elenches. For although in the more groſs ſorts of fallacies it happeneth, as Seneca maketh the compariſon well, as in jugling feats, which though we know not how they are done, yet we know well it is not as it ſeemeth to be; yet the more ſubtile ſort of them doth not only put a man beſides his anſwer, but doth many times abuſe his judgment.

This part concerning Elenches, is excellently handled by Ariſtotle in precept, but more excellently by Plato in example; not only in the perſons of the ſophiſts, but even in Socrates himſelf, who profeſſing to affirm nothing, but to infirm that which was affirmed by another, hath exactly expreſſed all the forms of objection, fallacy, and redargution. And although we have ſaid that the uſe of this doctrine is for redargution; yet it is manifeſt, the degenerate and corrupt uſe is for caption and contradiction, which paſſeth for a great faculty, and no doubt is of very great advantage, though the difference be good which was made between orators and ſophiſters, that the one is as the greyhound, which hath his advantage in the race, and the other as the hare, which hath her advantage in the turn, ſo as it is the advantage of the weaker creature.

But

But yet farther, this doctrine of Elenches hath a more ample latitude and extent, than is perceived; namely, unto divers parts of knowledge; whereof ſome are laboured and others omitted. For firſt, I conceive, though it may ſeem at firſt ſomewhat ſtrange, that that part which is variably referred, ſometimes to logic, ſometimes to metaphyſic, touching the common adjuncts of eſſences, is but an Elenche; for the great ſophiſm of all ſophiſms being equivocation or ambiguity of words and phraſe, eſpecially of ſuch words as are moſt general and intervene in every inquiry; it ſeemeth to me that the true and fruitful uſes, leaving vain ſubtilties and ſpeculations, of the inquiry of majority, minority, priority, poſteriority, identity, diverſity, poſſibility, act, totality, parts, exiſtence, privation, and the like, are but wiſe cautions againſt ambiguities of ſpeech. So again, the diſtribution of things into certain tribes, which we call categories or predicaments, are but cautions againſt the confuſion of definitions and diviſions.

Secondly, there is a ſeducement that worketh by the ſtrength of the impreſſion, and not by the ſubtilty of the illaqueation, not ſo much perplexing the reaſon, as overruling it by power of the imagination. But this part I think more proper to handle when I ſhall ſpeak of rhetoric.

But laſtly, there is yet a much more important and profound kind of fallacies in the mind of man, which I find not obſerved or inquired at all, and think good to place here, as that which of all others appertaineth moſt to rectify judgment: the force whereof is ſuch, as it doth not dazzle or ſnare the underſtanding in ſome particulars, but doth more generally and inwardly infect and corrupt the ſtate thereof. For the mind of man is far from the nature of a clear and equal glaſs, wherein the beams of things ſhould reflect according to their true incidence; nay, it is rather like an inchanted glaſs, full of ſuperſtition and impoſture, if it be not delivered and reduced. For this purpoſe, let us conſider the falſe appearances that are impoſed upon us by the general nature of the mind, beholding them in an example or two, as firſt in that inſtance which is the root of all ſuperſtition, namely, that to the nature of the mind of all men it is conſonant for the affirmative or active to effect, more than the negative or privative. So that a few times hitting, or preſence, countervails oft-times failing, or abſence; as was well anſwered by Diagoras to him that ſhewed him, in Neptune's temple, the great number of pictures of ſuch as had eſcaped ſhipwreck, and had paid their vows to Neptune, ſaying, "Adviſe now, you that "think it folly to invocate Neptune in tempeſt. Yea, but, ſaith Diagoras, where "are they painted that are drowned?" Let us behold it in another inſtance, namely, "That the ſpirit of man, being of an equal and uniform ſubſtance, doth uſually "ſuppoſe and feign in nature a greater equality and uniformity than is in truth." Hence it cometh, that the mathematicians cannot ſatisfy themſelves, except they reduce the motions of the celeſtial bodies to perfect circles, rejecting ſpiral lines, and labouring to be diſcharged of eccentrics. Hence it cometh, that whereas there are many things in nature, as it were *monodica, ſui juris*; yet the cogitations of man do feign unto them relatives, parallels, and conjugates, whereas no ſuch thing is; as they have feigned an element of fire to keep ſquare with earth, water, and air, and the like; nay, it is not credible, till it be opened, what a number of fictions and fanſies, the ſimilitude of human actions and arts, together with the making of man *communis menſura*, have brought into natural philoſophy, not much better than the hereſy of the Anthropomorphites, bred in the cells of groſs and ſolitary monks, and the opinion of Epicurus, anſwerable to the ſame in heatheniſm, who ſuppoſed the

the gods to be of human ſhape. And therefore Velleius the Epicurean needed not to have aſked, why God ſhould have adorned the heavens with ſtars, as if he had been an Ædilis; one that ſhould have ſet forth ſome magnificent ſhews or plays. For if that great work-maſter had been of an human diſpoſition, he would have caſt the ſtars into ſome pleaſant and beautiful works and orders, like the frets in the roofs of houſes; whereas one can ſcarce find a poſture in ſquare, or triangle, or ſtraight line, amongſt ſuch an infinite number; ſo differing an harmony there is between the ſpirit of man, and the ſpirit of nature.

Let us conſider, again, the falſe appearances impoſed upon us by every man's own individual nature and cuſtom, in that feigned ſuppoſition that Plato maketh of the cave; for certainly if a child were continued in a grot or cave under the earth until maturity of age, and came ſuddenly abroad, he would have ſtrange and abſurd imaginations. So in like manner, although our perſons live in the view of heaven, yet our ſpirits are included in the caves of our own complexions and cuſtoms, which miniſter unto us infinite errors and vain opinions, if they be not recalled to examination. But hereof we have given many examples in one of the errors, or peccant humours, which we ran briefly over in our firſt book.

And laſtly, let us conſider the falſe appearances that are impoſed upon us by words, which are framed and applied according to the conceit and capacities of the vulgar ſort; and although we think we govern our words, and preſcribe it well, *Loquendum ut vulgus, ſentiendum ut ſapientes*; yet certain it is, that words, as a Tartar's bow, do ſhoot back upon the underſtanding of the wiſeſt, and mightily intangle and pervert the judgment; ſo as it is almoſt neceſſary in all controverſies and diſputations, to imitate the wiſdom of the mathematicians, in ſetting down in the very beginning the definitions of our words and terms, that others may know how we accept and underſtand them, and whether they concur with us or no. For it cometh to paſs, for want of this, that we are ſure to end there where we ought to have begun, which is in queſtions and differences about words. To conclude therefore, it muſt be confeſſed that it is not poſſible to divorce ourſelves from theſe fallacies and falſe appearances, becauſe they are inſeparable from our nature and condition of life; ſo yet nevertheleſs the caution of them, for all elenches, as was ſaid, are but cautions, doth extremely import the true conduct of human judgment. The particular elenches or cautions againſt theſe three falſe appearances, I find altogether deficient.

Elenchi magni, ſive de idolis animi humani nativi et adventitiis.

There remaineth one part of judgment of great excellency, which to mine underſtanding is ſo ſlightly touched, as I may report that alſo deficient; which is, the application of the differing kinds of proofs to the differing kinds of ſubjects; for there being but four kinds of demonſtrations, that is, by the immediate conſent of the mind or ſenſe, by induction, by ſyllogiſm, and by congruity; which is that which Ariſtotle calleth demonſtration in orb, or circle, and not *à notioribus*; every of theſe hath certain ſubjects in the matter of ſciences, in which reſpectively they have chiefeſt uſe; and certain others, from which reſpectively they ought to be excluded, and the rigour and curioſity in requiring the more ſevere proofs in ſome things, and chiefly the facility in contenting ourſelves with the more remiſs proofs in others, hath been amongſt the greateſt cauſes of detriment and hindrance to knowledge. The diſtributions and aſſignations of demonſtrations, according to the analogy of ſciences, I note as deficient.

De analogia demonſtrationum.

The

The cuſtody or retaining of knowledge is either in writing or memory; whereof writing hath two parts, the nature of the character, and the order of the entry: for the art of characters, or other viſible notes of words or things, it hath neareſt conjugation with grammar; and therefore I refer it to the due place: for the diſpoſition and collocation of that knowledge which we preſerve in writing, it conſiſteth in a good digeſt of common-places, wherein I am not ignorant of the prejudice imputed to the uſe of common-place books, as cauſing a retardation of reading, and ſome ſloth or relaxation of memory. But becauſe it is but a counterfeit thing in knowledges, to be forward and pregnant, except a man be deep and full, I hold the entry of common-places, to be a matter of great uſe and eſſence in ſtudying, as that which aſſureth *copia* of invention, and contracteth judgment to ſtrength. But this is true, that of the methods of common-places that I have ſeen, there is none of any ſufficient worth, all of them carrying merely the face of a ſchool, and not of a world, and referring to vulgar matters, and pedantical diviſions, without all life, or reſpect to action.

For the other principal part of the cuſtody of knowledge, which is memory, I find that faculty in my judgment weakly inquired of. An art there is extant of it; but it ſeemeth to me that there are better precepts than that art, and better practices of that art, than thoſe received. It is certain the art, as it is, may be raiſed to points of oſtentation prodigious: but in uſe, as it is now managed, it is barren, not burdenſome, nor dangerous to natural memory, as is imagined, but barren; that is, not dexterous to be applied to the ſerious uſe of buſineſs and occaſions. And therefore I make no more eſtimation of repeating a great number of names or words upon once hearing, or the pouring forth of a number of verſes or rhimes *ex tempore*, or the making of a ſatirical ſimile of every thing, or the turning of every thing to a jeſt, or the falſifying or contradicting of every thing by cavil, or the like, whereof in the faculties of the mind there is great *copia*, and ſuch as by device and practice may be exalted to an extreme degree of wonder, than I do of the tricks of tumblers, funambuloes, baladines; the one being the ſame in the mind, that the other is in the body; matters of ſtrangeneſs without worthineſs.

This art of memory is but built upon two intentions; the one prenotion, the other emblem. Prenotion diſchargeth the indefinite ſeeking of that we would remember, and directeth us to ſeek in a narrow compaſs; that is, ſomewhat that hath congruity with our place of memory. Emblem reduceth conceits intellectual to images ſenſible, which ſtrike the memory more; out of which axioms may be drawn much more practical than that in uſe: and beſides which axioms, there are divers more touching help of memory, not inferior to them. But I did in the beginning diſtinguiſh, not to report thoſe things deficient, which are but only ill managed.

There remaineth the fourth kind of rational knowledge, which is tranſitive, concerning the expreſſing or transferring our knowledge to others, which I will term by the general name of tradition or delivery. Tradition hath three parts: the firſt concerning the organ of tradition; the ſecond concerning the method of tradition; and the third, concerning the illuſtration of tradition.

For the organ of tradition, it is either ſpeech or writing: for Ariſtotle ſaith well, "Words are the images of cogitations, and letters are the images of words;" but yet it is not of neceſſity that cogitations be expreſſed by the medium of words. For whatſoever is capable of ſufficient differences, and thoſe perceptible by the ſenſe, is

in nature competent to expreſs cogitations. And therefore we ſee in the commerce of barbarous people, that underſtand not one another's language, and in the practice of divers that are dumb and deaf, that mens minds are expreſſed in geſtures, though not exactly, yet to ſerve the turn. And we underſtand farther, that it is the uſe of China, and the kingdoms of the high Levant, to write in characters real, which expreſs neither letters nor words in groſs, but things or notions; inſomuch as countries and provinces, which underſtand not one another's language, can nevertheleſs read one another's writings, becauſe the characters are accepted more generally than the languages do extend; and therefore they have a vaſt multitude of characters, as many, I ſuppoſe, as radical words.

Theſe notes of cogitations are of two ſorts; the one when the note hath ſome ſimilitude or congruity with the notion; the other *ad placitum*, having force only by contract or acceptation. Of the former ſort are hieroglyphics and geſtures. For as to hieroglyphics, things of ancient uſe, and embraced chiefly by the Ægyptians, one of the moſt ancient nations, they are but as continued impreſſes and emblems. And as for geſtures, they are as tranſitory hieroglyphics, and are to hieroglyphics as words ſpoken are to words written, in that they abide not: but they have evermore, as well as the other, an affinity with the things ſignified; as Periander, being conſulted with how to preſerve a tyranny newly uſurped, bid the meſſenger attend and report what he ſaw him do, and went into his garden and topped all the higheſt flowers; ſignifying, that it conſiſted in the cutting off and keeping low of the nobility and grandees. *Ad placitum* are the characters real before mentioned, and words: although ſome have been willing by curious inquiry, or rather by apt feigning, to have derived impoſition of names from reaſon and intendment; a ſpeculation elegant, and by reaſon it ſearcheth into antiquity, reverent; but ſparingly mixed with truth, and of ſmall fruit. This portion of knowledge, touching the notes of things, and cogitations in general, I find not inquired, but deficient. And although it may ſeem of no great uſe, conſidering that words and writings by letters do far excel all the other ways; yet becauſe this part concerneth, as it were, the mint of knowledge, for words are the tokens current and accepted for conceits, as moneys are for values, and that it is fit men be not ignorant that moneys may be of another kind than gold and ſilver, I thought good to propound it to better inquiry.

De notis rerum.

Concerning ſpeech and words, the conſideration of them hath produced the ſcience of Grammar; for man ſtill ſtriveth to reintegrate himſelf in thoſe benedictions, from which by his fault he hath been deprived: and as he hath ſtriven againſt the firſt general curſe, by the invention of all other arts; ſo hath he ſought to come forth of the ſecond general curſe, which was the confuſion of tongues, by the art of grammar, whereof the uſe in a mother tongue is ſmall; in a foreign tongue more; but moſt in ſuch foreign tongues as have ceaſed to be vulgar tongues, and are turned only to learned tongues. The duty of it is of two natures; the one popular, which is for the ſpeedy and perfect attaining languages, as well for intercourſe of ſpeech as for underſtanding of authors; the other philoſophical, examining the power and nature of words, as they are the footſteps and prints of reaſon: which kind of analogy between words and reaſon is handled *ſparſim*, brokenly, though not intirely; and therefore I cannot report it deficient, though I think it very worthy to be reduced into a ſcience by itſelf.

Unto

Unto grammar alſo belongeth, as an appendix, the conſideration of the accidents of words, which are meaſure, ſound, and elevation or accent, and the ſweetneſs and harſhneſs of them: whence hath iſſued ſome curious obſervations in rhetoric, but chiefly poeſy, as we conſider it, in reſpect of the verſe, and not of the argument; wherein though men in learned tongues do tie themſelves to the ancient meaſures, yet in modern languages it ſeemeth to me, as free to make new meaſures of verſes as of dances; for a dance is a meaſured pace, as a verſe is a meaſured ſpeech. In theſe things the ſenſe is better judge than the art;

Coenae fercula noſtrae,
Mallem convivis, quam placuiſſe cocis.

And of the ſervile expreſſing antiquity in an unlike and an unfit ſubject, it is well ſaid, *Quod tempore antiquum videtur, id incongruitate eſt maxime novum.*

For ciphers, they are commonly in letters or alphabets, but may be in words. The kinds of ciphers, beſides the ſimple ciphers, with changes, and intermixtures of nulls and non-ſignificants, are many, according to the nature or rule of the infolding: wheel-ciphers, key-ciphers, doubles, *etc.* But the virtues of them, whereby they are to be preferred, are three; that they be not laborious to write and read; that they be impoſſible to decipher; and in ſome caſes, that they be without ſuſpicion. The higheſt degree whereof is to write *omnia per omnia*; which is undoubtedly poſſible with a proportion quincuple at moſt, of the writing infolding, to the writing infolded, and no other reſtraint whatſoever. This art of ciphering hath for relative an art of deciphering, by ſuppoſition unprofitable, but as things are, of great uſe. For ſuppoſe that ciphers were well managed, there be multitudes of them which exclude the decipherer. But in regard of the rawneſs and unſkilfulneſs of the hands through which they paſs, the greateſt matters are many times carried in the weakeſt ciphers.

In the enumeration of theſe private and retired arts, it may be thought I ſeek to make a great muſter-roll of ſciences, naming them for ſhew and oſtentation, and to little other purpoſe. But let thoſe which are ſkilful in them judge, whether I bring them in only for appearance, or whether in that which I ſpeak of them, though in few words, there be not ſome ſeed of proficience. And this muſt be remembered, that as there be many of great account in their countries and provinces, which when they come up to the ſeat of the eſtate, are but of mean rank, and ſcarcely regarded; ſo theſe arts being here placed with the principal and ſupreme ſciences, ſeem petty things; yet to ſuch as have choſen them to ſpend their labours and ſtudies in them, they ſeem great matters.

For the method of tradition, I ſee it hath moved a controverſy in our time. But as in civil buſineſs, if there be a meeting, and men fall at words, there is commonly an end of the matter for that time, and no proceeding at all: ſo in learning, where there is much controverſy, there is many times little inquiry. For this part of knowledge of method ſeemeth to me ſo weakly inquired, as I ſhall report it deficient.

Method hath been placed, and that not amiſs, in logic, as a part of judgment; for as the doctrine of ſyllogiſms comprehendeth the rules of judgment upon that which is invented, ſo the doctrine of method containeth the rules of judgment upon that which is to be delivered; for judgment precedeth delivery, as it followeth invention. Neither is the method or the nature of the tradition material only to the uſe of knowledge, but likewiſe to the progreſſion of knowledge: for ſince the labour

and life of one man cannot attain to perfection of knowledge, the wiſdom of the tradition is that which inſpireth the felicity of continuance and proceeding. And therefore the moſt real diverſity of method, is of method referred to uſe, and method referred to progreſſion, whereof the one may be termed magiſterial, and the other of probation.

The latter whereof ſeemeth to be *via deſerta et intercluſa*. For as knowledges are now delivered, there is a kind of contract of error, between the deliverer and the receiver; for he that delivereth knowledge, deſireth to deliver it in ſuch form as may be beſt believed, and not as may be beſt examined: and he that receiveth knowledge, deſireth rather preſent ſatisfaction, than expectant inquiry; and ſo rather not to doubt, than not to err; glory making the author not to lay open his weakneſs, and ſloth making the diſciple not to know his ſtrength.

But knowledge, that is delivered as a thread to be ſpun on, ought to be delivered and intimated, if it were poſſible, in the ſame method wherein it was invented, and ſo is it poſſible of knowledge induced. But in this ſame anticipated and prevented knowledge, no man knoweth how he came to the knowledge which he hath obtained. But yet nevertheleſs, *ſecundum majus et minus*, a man may reviſit and deſcend unto the foundations of his knowledge and conſent; and ſo tranſplant it into another, as it grew in his own mind. For it is in knowledges, as it is in plants, if you mean to uſe the plant, it is no matter for the roots; but if you mean to remove it to grow, then it is more aſſured to reſt upon roots than ſlips: ſo the delivery of knowledges, as it is now uſed, is as of fair bodies of trees without the roots; good for the carpenter, but not for the planter. But if you will have ſciences grow, it is leſs matter for the ſhaft or body of the tree, ſo you look well to the taking up of the roots: of which kind of delivery the method of the mathematics, in that ſubject, hath ſome ſhadow; but generally I ſee it neither put in uſe nor put in inquiſition, and therefore note it for deficient.

De methodo ſincera, ſive ad filios ſcientiarum.

Another diverſity of method there is, which hath ſome affinity with the former, uſed in ſome caſes by the diſcretion of the ancients, but diſgraced ſince by the impoſtures of many vain perſons, who have made it as a falſe light for their counterfeit merchandiſes; and that is, enigmatical and diſcloſed. The pretence whereof is to remove the vulgar capacities from being admitted to the ſecrets of knowledges, and to reſerve them to ſelected auditors, or wits of ſuch ſharpneſs as can pierce the veil.

Another diverſity of method, whereof the conſequence is great, is the delivery of knowledge in aphoriſms, or in methods; wherein we may obſerve, that it hath been too much taken into cuſtom, out of a few axioms or obſervations upon any ſubject to make a ſolemn and formal art, filling it with ſome diſcourſes, and illuſtrating it with examples, and digeſting it into a ſenſible method; but the writing in aphoriſms hath many excellent virtues, whereto the writing in method doth not approach.

For firſt it trieth the writer, whether he be ſuperficial or ſolid: for aphoriſms, except they ſhould be ridiculous, cannot be made but of the pith and heart of ſciences; for diſcourſe of illuſtration is cut off, recitals of examples are cut off; diſcourſe of connection and order is cut off; deſcriptions of practice are cut off; ſo there remaineth nothing to fill the aphoriſms, but ſome good quantity of obſervation: and therefore no man can ſuffice, nor in reaſon will attempt to write aphoriſms, but he that is ſound and grounded. But in methods,

Tantum

Tantum ſeries juncturaque pollet,
Tantum de medio ſumptis accedit honoris;

as a man ſhall make a great ſhew of an art, which if it were disjointed, would come to little. Secondly, methods are more fit to win conſent or belief; but leſs fit to point to action; for they carry a kind of demonſtration in orb or circle, one part illuminating another, and therefore ſatisfy. But particulars being diſperſed, do beſt agree with diſperſed directions. And laſtly, aphoriſms, repreſenting a knowledge broken, do invite men to inquire farther; whereas methods carrying the ſhew of a total, do ſecure men as if they were at fartheſt.

Another diverſity of method, which is likewiſe of great weight, is, the handling of knowledge by aſſertions, and their proofs; or by queſtions, and their determinations; the latter kind whereof, if it be immoderately followed, is as prejudicial to the proceeding of learning, as it is to the proceeding of an army to go about to beſiege every little fort or hold. For if the field be kept, and the ſum of the enterpriſe purſued, thoſe ſmaller things will come in of themſelves; indeed a man would not leave ſome important place with an enemy at his back. In like manner, the uſe of confutation in the delivery of ſciences ought to be very ſparing; and to ſerve to remove ſtrong preoccupations and prejudgments, and not to miniſter and excite diſputations and doubts.

Another diverſity of method is according to the ſubject or matter which is handled; for there is a great difference in the delivery of the mathematics, which are the moſt abſtracted of knowledges, and policy, which is the moſt immerſed; and howſoever contention hath been moved, touching an uniformity of method in multiformity of matter: yet we ſee how that opinion, beſides the weakneſs of it, hath been of ill deſert towards learning, as that which taketh the way to reduce learning to certain empty and barren generalities; being but the very huſks and ſhells of ſciences, all the kernel being forced out and expulſed with the torture and preſs of the method: And therefore as I did allow well of particular topics for invention, ſo do I allow likewiſe of particular methods of tradition.

Another diverſity of judgment in the delivery and teaching of knowledge, is according unto the light and preſuppoſitions of that which is delivered; for that knowledge which is new and foreign from opinions received, is to be delivered in another form than that that is agreeable and familiar; and therefore Ariſtotle, when he thinks to tax Democritus, doth in truth commend him, where he ſaith, "If we "ſhall indeed diſpute, and not follow after ſimilitudes," *etc.* For thoſe, whoſe conceits are ſeated in popular opinions, need only but to prove or diſpute: but thoſe whoſe conceits are beyond popular opinions, have a double labour; the one to make themſelves conceived, and the other to prove and demonſtrate: ſo that it is of neceſſity with them to have recourſe to ſimilitudes and tranſlations to expreſs themſelves. And therefore in the infancy of learning, and in rude times, when thoſe conceits which are now trivial were then new, the world was full of parables and ſimilitudes; for elſe would men either have paſſed over without mark, or elſe rejected for paradoxes that which was offered, before they had underſtood or judged. So in divine learning, we ſee how frequent parables and tropes are: for it is a rule, "That what-"ſoever ſcience is not conſonant to preſuppoſitions, muſt pray in aid of ſimilitudes."

There be alſo other diverſities of methods vulgar and received: as that of reſolution or *analyſis*, of conſtitution or *ſyſtaſis*, of concealment or cryptic, *etc.* which I do allow well of, though I have ſtood upon thoſe which are leaſt handled and obſerved.

De prudentia traditionis.

ed. All which I have remembered to this purpoſe, becauſe I would erect and conſtitute one general inquiry, which ſeems to me deficient touching the wiſdom of tradition.

But unto this part of knowledge concerning method, doth farther belong, not only the architecture of the whole frame of a work, but alſo the ſeveral beams and columns thereof, not as to their ſtuff, but as to their quantity and figure: and therefore method conſidereth not only the diſpoſition of the argument or ſubject, but likewiſe the propoſitions; not as to their truth or matter, but as to their limitation and manner. For herein Ramus merited better a great deal in reviving the good rules of propoſitions, Καθόλα πρῶτον κατὰ παντὸς, *etc.* than he did in introducing the canker of epitomes; and yet, as it is the condition of human things, that, according to the ancient fables, "The moſt precious things have the moſt pernicious "keepers;" it was ſo, that the attempt of the one made him fall upon the other. For he had need be well conducted, that ſhould deſign to make axioms convertible; if he make them not withal circular, and *non promovent*, or incurring into themſelves: but yet the intention was excellent.

The other conſiderations of method concerning propoſitions, are chiefly touching the utmoſt propoſitions, which limit the dimenſions of ſciences; for every knowledge may be fitly ſaid, beſides the profundity, which is the truth and ſubſtance of it that makes it ſolid, to have a longitude and a latitude, accounting the latitude towards other ſciences, and the longitude towards action; that is, from the greateſt generality, to the moſt particular precept: The one giveth rule how far one knowledge ought to intermeddle within the province of another, which is the rule they call καθ' αὑτό: the other giveth rule, unto what degree of particularity a knowledge ſhould deſcend: which latter I find paſſed over in ſilence, being in my judgment the more material; for certainly there muſt be ſomewhat left to practice; but how much is worthy the inquiry. We ſee remote and ſuperficial generalities do but offer knowledge to ſcorn of practical men, and are no more aiding to practice, than an Orte-

De productione axiomatum.

lius's univerſal map is to direct the way between London and York. The better ſort of rules have been not unfitly compared to glaſſes of ſteel unpoliſhed; where you may ſee the images of things, but firſt they muſt be filed; ſo the rules will help, if they be laboured and poliſhed by practice. But how cryſtalline they may be made at the firſt, and how far forth they may be poliſhed aforehand, is the queſtion; the inquiry whereof ſeemeth to me deficient.

There hath been alſo laboured, and put in practice, a method, which is not a lawful method, but a method of impoſture, which is, to deliver knowledges in ſuch manner as men may ſpeedily come to make a ſhew of learning, who have it not; ſuch was the travel of Raymundus Lullius in making that art, which bears his name, not unlike to ſome books of typocoſmy which have been made ſince, being nothing but a maſs of words of all arts, to give men countenance, that thoſe which uſe the terms might be thought to underſtand the art; which collections are much like a fripper's or broker's ſhop, that hath ends of every thing, but nothing of worth.

Now we deſcend to that part which concerneth the illuſtration of tradition, comprehended in that ſcience which we call Rhetoric, or art of eloquence; a ſcience excellent and excellently well laboured. For although in true value it is inferior to wiſdom, as it is ſaid by God to Moſes, when he diſabled himſelf for want of this faculty, *Aaron ſhall be thy ſpeaker, and thou ſhalt be to him as God.* Yet with peo-

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ple it is the more mighty: for ſo Solomon ſaith, *Sapiens corde appellabitur prudens, ſed dulcis eloquio majora reperiet*; ſignifying, that profoundneſs of wiſdom will help a man to a name or admiration, but that it is eloquence that prevaileth in an active life; and as to the labouring of it, the emulation of Ariſtotle with the rhetoricians of his time, and the experience of Cicero, hath made them in their works of rhetorics exceed themſelves. Again, the excellency of examples of eloquence in the orations of Demoſthenes and Cicero, added to the perfection of the precepts of eloquence, hath doubled the progreſſion in this art: and therefore the deficiencies which I ſhall note, will rather be in ſome collections, which may as hand-maids attend the art, than in the rules or uſe of the art itſelf.

Notwithſtanding, to ſtir the earth a little about the roots of this ſcience, as we have done of the reſt; the duty and office of rhetoric is to apply reaſon to imagination, for the better moving of the will: for we ſee reaſon is diſturbed in the adminiſtration thereof by three means; by illaqueation or ſophiſm, which pertains to logic; by imagination or impreſſion, which pertains to rhetoric; and by paſſion or affection, which pertains to morality. And as in negotiation with others, men are wrought by cunning, by importunity, and by vehemency; ſo in this negotiation within ourſelves, men are undetermined by inconſequences, ſolicited and importuned by impreſſions or obſervations, and tranſported by paſſions. Neither is the nature of man ſo unfortunately built, as that thoſe powers and arts ſhould have force to diſturb reaſon, and not to eſtabliſh and advance it; for the end of logic is to teach a form of argument to ſecure reaſon, and not to intrap it. The end of morality, is to procure the affections to obey reaſon, and not to invade it. The end of rhetoric, is to fill the imagination to ſecond reaſon, and not to oppreſs it; for theſe abuſes of arts come in but *ex obliquo* for caution.

And therefore it was great injuſtice in Plato, though ſpringing out of a juſt hatred of the rhetoricians of his time, to eſteem of rhetoric but as a voluptuary art, reſembling it to cookery, that did mar wholeſome meats, and help unwholeſome by variety of ſauces, to the pleaſure of the taſte. For we ſee that ſpeech is much more converſant in adorning that which is good, than in colouring that which is evil; for there is no man but ſpeaketh more honeſtly than he can do or think; and it was excellently noted by Thucydides in Cleon, that becauſe he uſed to hold on the bad ſide in cauſes of eſtate, therefore he was ever inveighing againſt eloquence and good ſpeech, knowing that no man can ſpeak fair of courſes ſordid and baſe. And therefore as Plato ſaid elegantly, "That Virtue, if ſhe could be ſeen, would move great "love and affection:" ſo ſeeing that ſhe cannot be ſhewed to the ſenſe by corporal ſhape, the next degree is, to ſhew her to the imagination in lively repreſentation: for to ſhew her to reaſon only in ſubtilty of argument, was a thing ever derided in Chryſippus, and many of the Stoics, who thought to thruſt virtue upon men by ſharp diſputations and concluſions, which have no ſympathy with the will of man.

Again, if the affections in themſelves were pliant and obedient to reaſon, it were true, there ſhould be no great uſe of perſuaſions and inſinuations to the will, more than of naked propoſition and proofs: but in regard of the continual mutinies and ſeditions of the affections,

Video meliora, proboque,
Deteriora ſequor;

Reaſon would become captive and ſervile, if eloquence of perſuaſions did not prac-

tiſe and win the imagination from the affections part, and contract a confederacy between the reaſon and imagination againſt the affections; for the affections themſelves carry ever an appetite to good, as reaſon doth. The difference is, that the affection beholdeth merely the preſent, reaſon beholdeth the future and ſum of time. And therefore the preſent filling the imagination more, reaſon is commonly vanquiſhed; but after that force of eloquence and perſuaſion hath made things future and remote appear as preſent, then upon revolt of the imagination reaſon prevaileth.

We conclude therefore, that rhetoric can be no more charged with the colouring of the worſt part, than logic with ſophiſtry, or morality with vice. For we know the doctrines of contraries are the ſame, though the uſe be oppoſite. It appeareth alſo, that logic differeth from rhetoric, not only as the fiſt from the palm, the one cloſe, the other at large; but much more in this, that logic handleth reaſon exact, and in truth; and rhetoric handleth it as it is planted in popular opinions and manners. And therefore Ariſtotle doth wiſely place rhetoric as between logic on the one ſide, and moral or civil knowledge on the other, as participating of both: for the proofs and demonſtrations of logic are toward all men indifferent and the ſame: but the proofs and perſuaſions of rhetoric ought to differ according to the auditors:

Orpheus in ſylvis, inter delphinas Arion.

Which application, in perfection of idea, ought to extend ſo far, that if a man ſhould ſpeak of the ſame thing to ſeveral perſons, he ſhould ſpeak to them all reſpectively, and ſeveral ways: though this politic part of eloquence in private ſpeech, it is eaſy for the greateſt orators to want; whilſt by the obſerving their well graced forms of ſpeech, they loſe the volubility of application: and therefore it ſhall not be amiſs to recommend this to better inquiry, not being curious whether we place it here, or in that part which concerneth policy.

De prudentia ſermonis privati.

Now therefore will I deſcend to the deficiencies, which, as I ſaid, are but attendances: and firſt, I do not find the wiſdom and diligence of Ariſtotle well purſued, who began to make a collection of the popular ſigns and colours of good and evil, both ſimple and comparative, which are as the ſophiſms of rhetoric, as I touched before. For example;

Colores boni et mali, ſimplicis et comparati.

SOPHISMA.

Quod laudatur, bonum: quod vituperatur, malum.

REDARGUTIO.

Laudat venales qui vult extrudere merces.

Malum eſt, malum eſt, inquit emptor; ſed cum receſſerit, tum gloriabitur.

The defects in the labour of Ariſtotle are three; one, that there be but a few of many; another, that their elenchus's are not annexed; and the third, that he conceived but a part of the uſe of them: for their uſe is not only in probation, but much more in impreſſion. For many forms are equal in ſignification, which are differing in impreſſion; as the difference is great in the piercing of that which is ſharp, and that which is flat, though the ſtrength of the percuſſion be the ſame: for there is no man but will be a little more raiſed by hearing it ſaid; "Your enemies "will be glad of this;"

Hoc Ithacus velit, et magno mercentur Atridae;

than by hearing it ſaid only, "This is evil for you."

Secondly,

Secondly, I do reſume alſo that which I mentioned before, touching proviſion or preparatory ſtore, for the furniture of ſpeech and readineſs of invention, which appeareth to be of two ſorts; the one in reſemblance to a ſhop of pieces unmade up, the other to a ſhop of things ready made up, both to be applied to that which is frequent and moſt in requeſt: the former of theſe I will call *antitheta*, and the latter *formulae*.

Antitheta are *theſes* argued *pro et contra*, wherein men may be more large and laborious; but, in ſuch as are able to do it, to avoid prolixity of entry, I wiſh the ſeeds of the ſeveral arguments to be caſt up into ſome brief and acute ſentences, not to be cited, but to be as ſcanes or bottoms of thread, to be unwinded at large when they come to be uſed; ſupplying authorities and examples by reference. Antitheta rerum.

Pro Verbis Legis.

Non eſt interpretatio, ſed divinatio, quae recedit à litera.

Cum receditur à litera judex tranſit in legiſlatorem.

Pro Sententia Legis.

Ex omnibus verbis eſt eliciendus ſenſus, qui interpretatur ſingula.

Formulae are but decent and apt paſſages or conveyances of ſpeech, which may ſerve indifferently for differing ſubjects; as of preface, concluſion, digreſſion, tranſition, excuſation, *etc.* For as in buildings there is great pleaſure and uſe in the well-caſting of the ſtair-caſes, entries, doors, windows, and the like; ſo in ſpeech, the conveyances and paſſages are of ſpecial ornament and effect.

A Conclusion in a Deliberative.

So may we redeem the faults paſſed, and prevent the inconveniencies future.

There remain two *appendices* touching the tradition of knowledge, the one critical, the other pedantical; for all knowledge is either delivered by teachers, or attained by mens proper endeavours: and therefore as the principal part of tradition of knowledge concerneth chiefly writing of books, ſo the relative part thereof concerneth reading of books: whereunto appertain incidently theſe conſiderations. The firſt is concerning the true correction and edition of authors, wherein nevertheleſs raſh diligence hath done great prejudice. For theſe critics have often preſumed that that which they underſtood not, is falſe ſet down. As the prieſt, that where he found it written of St. Paul, *Demiſſus eſt per ſportam*, mended his book, and made it *Demiſſus eſt per portam*, becauſe *ſporta* was an hard word, and out of his reading: and ſurely theſe errors, though they be not ſo palpable and ridiculous, are yet of the ſame kind. And therefore as it hath been wiſely noted, the moſt corrected copies are commonly the leaſt correct.

The ſecond is concerning the expoſition and explication of authors, which reſteth in annotations and commentaries, wherein it is over uſual to blanch the obſcure places, and diſcourſe upon the plain.

The third is concerning the times, which in many caſes give great light to true interpretations.

The fourth is concerning ſome brief cenſure and judgment of the authors, that men thereby may make ſome election unto themſelves what books to read.

And the fifth is concerning the ſyntax and diſpoſition of ſtudies, that men may know in what order or purſuit to read.

For pedantical knowledge, it containeth that difference of tradition which is proper for youth, whereunto appertain divers conſiderations of great fruit.

As first the timing and seasoning of knowledges; as with what to initiate them, and from what for a time to refrain them.

Secondly, the consideration where to begin with the easiest, and so proceed to the more difficult, and in what courses to press the more difficult, and then to turn them to the more easy; for it is one method to practise swimming with bladders, and another to practise dancing with heavy shoes.

A third is the application of learning according unto the propriety of the wits; for there is no defect in the faculties intellectual but seemeth to have a proper cure contained in some studies: as for example, if a child be bird-witted, that is, hath not the faculty of attention, the mathematics giveth a remedy thereunto, for in them, if the wit be caught away but a moment, one is to begin anew: and as sciences have a propriety towards faculties for cure and help, so faculties or powers have a sympathy towards sciences for excellency or speedy profiting; and therefore it is an inquiry of great wisdom what kinds of wits and natures are most proper for what sciences.

Fourthly, the ordering of exercises is matter of great consequence to hurt or help: for, as is well observed by Cicero, men in exercising their faculties, if they be not well advised, do exercise their faults, and get ill habits as well as good; so there is a great judgment to be had in the continuance and intermission of exercises. It were too long to particularize a number of other considerations of this nature; things but of mean appearance, but of singular efficacy: for as the wronging or cherishing of seeds or young plants, is that that is most important to their thriving; and as it was noted, that the first six kings, being in truth as tutors of the state of Rome in the infancy thereof, was the principal cause of the immense greatness of that state which followed; so the culture and manurance of minds in youth hath such a forcible, though unseen, operation, as hardly any length of time or contention of labour can countervail it afterwards. And it is not amiss to observe also, how small and mean faculties gotten by education, yet when they fall into great men or great matters, do work great and important effects; whereof we see a notable example in Tacitus, of two stage-players, Percennius and Vibulenus, who by their faculty of playing put the Pannonian armies into an extreme tumult and combustion; for there arising a mutiny amongst them, upon the death of Augustus Cæsar, Blæsus the lieutenant had committed some of the mutineers, which were suddenly rescued; whereupon Vibulenus got to be heard speak, which he did in this manner: "These poor innocent wretches appointed to cruel death, you have restored to behold the light: but who shall restore my brother to me, or life unto my brother, that was sent hither in message from the regions of Germany, to treat of the common cause? And he hath murdered him this last night by some of his fencers and ruffians, that he hath about him for his executioners upon soldiers. Answer, Blæsus, what is done with his body? The mortalest enemies do not deny burial; when I have performed my last duties to the corps with kisses, with tears, command me to be slain besides him, so that these my fellows, for our good meaning, and our true hearts to the legions, may have leave to bury us." With which speech he put the army into an infinite fury and uproar; whereas truth was he had no brother, neither was there any such matter, but he played it merely as if he had been upon the stage.

But to return, we are now come to a period of rational knowledges, wherein if I have made the divisions other than those that are received, yet would I not be thought

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to disallow all those divisions which I do not use; for there is a double necessity imposed upon me of altering the divisions. The one, because it differeth in end and purpose, to sort together those things which are next in nature, and those things which are next in use; for if a secretary of state should sort his papers, it is like in his study, or general cabinet, he would sort together things of a nature, as treaties, instructions, *etc.* but in his boxes, or particular cabinet, he would sort together those that he were like to use together, though of several natures; so in this general cabinet of knowledge it was necessary for me to follow the divisions of the nature of things; whereas if myself had been to handle any particular knowledge, I would have respected the divisions fittest for use. The other, because the bringing in of the deficiences did by consequence alter the partitions of the rest; for let the knowledge extant, for demonstration sake, be fifteen, let the knowledge with the deficiencies be twenty, the parts of fifteen are not the parts of twenty, for the parts of fifteen are three and five, the parts of twenty are two, four, five and ten; so as these things are without contradiction, and could not otherwise be.

We proceed now to that knowledge which considereth of the Appetite and Will of Man, whereof Solomon saith, *Ante omnia, fili, custodi cor tuum, nam inde procedunt actiones vitae.* In the handling of this science, those which have written seem to me to have done as if a man that professed to teach to write, did only exhibit fair copies of alphabets, and letters joined, without giving any precepts or directions for the carriage of the hand and framing of the letters; so have they made good and fair exemplars and copies, carrying the draughts and portraitures of good, virtue, duty, felicity; propounding them well described as the true objects and scopes of man's will and desires; but how to attain these excellent marks, and how to frame and subdue the will of man to become true and conformable to these pursuits, they pass it over altogether, or slightly and unprofitably; for it is not the disputing that moral virtues are in the mind of man by habit and not by nature, or the distinguishing that generous spirits are won by doctrines and persuasions, and the vulgar sort by reward and punishment, and the like scattered glances and touches, that can excuse the absence of this part.

The reason of this omission I suppose to be that hidden rock whereupon both this and many other barks of knowledge have been cast away; which is, that men have despised to be conversant in ordinary and common matters, the judicious direction whereof nevertheless is the wisest doctrine, for life consisteth not in novelties nor subtilities, but contrariwise they have compounded sciences chiefly of a certain resplendent or lustrous mass of matter, chosen to give glory either to the subtility of disputations, or to the eloquence of discourses. But Seneca giveth an excellent check to eloquence: *Nocet illis eloquentia, quibus non rerum cupiditatem facet, sed sui.* Doctrine should be such as should make men in love with the lesson, and not with the teacher, being directed to the auditor's benefit, and not to the author's commendation; and therefore those are of the right kind which may be concluded as Demosthenes concludes his counsel, *Quae si feceritis, non oratorem duntaxat in praesentia laudabitis, sed vosmetipsos etiam, non ita multo post statu rerum vestrarum meliore.* Neither needed men of so excellent parts to have despaired of a fortune, which the poet Virgil promised himself, and indeed obtained, who got as much glory of eloquence, wit, and learning in the expressing of the observations of husbandry, as of the heroical acts of Æneas:

Nec ſum animi dubius, verbis ea vincere magnum
Quam ſit, et anguſtis hunc addere rebus honorem. Georg. iii. 289.

And ſurely if the purpoſe be in good earneſt not to write at leiſure that which men may read at leiſure, but really to inſtruct and ſuborn action and active life, theſe georgics of the mind concerning the huſbandry and tillage thereof, are no leſs worthy than the heroical deſcriptions of virtue, duty, and felicity. Wherefore the main and primitive diviſion of moral knowledge ſeemeth to be into the Exemplar or Platform of Good, and the Regiment or Culture of the Mind; the one deſcribing the nature of good, the other preſcribing rules how to ſubdue, apply, and accommodate the will of man thereunto.

The doctrine touching the Platform or Nature of Good conſidereth it either ſimple or compared, either the kinds of good, or the degrees of good; in the latter whereof thoſe infinite diſputations which were touching the ſupreme degree thereof, which they term felicity, beatitude, or the higheſt good, the doctrines concerning which were as the heathen divinity, are by the chriſtian faith diſcharged. And, as Ariſtotle ſaith, "That young men may be happy, but not otherwiſe but by hope;" ſo we muſt all acknowledge our minority, and embrace the felicity which is by hope of the future world.

Freed therefore, and delivered from this doctrine of the philoſophers heaven, whereby they feigned an higher elevation of man's nature than was, for we ſee in what an height of ſtile Seneca writeth, *Vere magnum, habere fragilitatem hominis, ſecuritatem Dei*, we may with more ſobriety and truth receive the reſt of their inquiries and labours; wherein for the nature of good, poſitive or ſimple, they have ſet it down excellently, in deſcribing the forms of virtue and duty with their ſituations and poſtures, in diſtributing them into their kinds, parts, provinces, actions, and adminiſtrations, and the like: nay farther, they have commended them to man's nature and ſpirit, with great quickneſs of argument and beauty of perſuaſions; yea, and fortified and intrenched them, as much as diſcourſe can do, againſt corrupt and popular opinions. Again, for the degrees and comparative nature of good, they have alſo excellently handled it in their triplicity of good, in the compariſon between a contemplative and an active life, in the diſtinction between virtue with reluctation, and virtue ſecured, in their encounters between honeſty and profit, in their balancing of virtue with virtue, and the like; ſo as this part deſerveth to be reported for excellently laboured.

Notwithſtanding, if before they had come to the popular and received notions of virtue and vice, pleaſure and pain, and the reſt, they had ſtayed a little longer upon the inquiry concerning the roots of good and evil, and the ſtrings of thoſe roots, they had given, in my opinion, a great light to that which followed; and ſpecially if they had conſulted with nature, they had made their doctrines leſs prolix and more profound: which being by them in part omitted and in part handled with much confuſion, we will endeavour to reſume and open in a more clear manner.

There is formed in every thing a double nature of good, the one as every thing is a total or ſubſtantive in itſelf, the other as it is a part or member of a greater body; whereof the latter is in degree the greater and the worthier, becauſe it tendeth to the conſervation of a more general form: therefore we ſee the iron in particular ſympathy moveth to the loadſtone, but yet if it exceed a certain quantity, it forſaketh the affection to the loadſtone, and like a good patriot moveth to the earth, which is the region and country of maſſy bodies; ſo may we go forward and ſee that water

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and maſſy bodies move to the center of the earth, but rather than to ſuffer a divulſion in the continuance of nature they will move upwards from the center of the earth, forſaking their duty to the earth in regard of their duty to the world. This double nature of good and the comparative thereof is much more engraven upon man, if he degenerate not, unto whom the conſervation of duty to the public ought to be much more precious than the conſervation of life and being; according to that memorable ſpeech of Pompeius magnus, when being in commiſſion of purveyance for a famine at Rome, and being diſſuaded with great vehemency and inſtance by his friends about him, that he ſhould not hazard himſelf to ſea in an extremity of weather, he ſaid only to them *Neceſſe eſt ut eam, non ut vivam:* but it may be truly affirmed that there was never any philoſophy, religion, or other diſcipline, which did ſo plainly and highly exalt the good which is communicative, and depreſs the good which is private and particular, as the holy faith: well declaring, that it was the ſame God that gave the chriſtian law to men, who gave thoſe laws of nature to inanimate creatures that we ſpake of before; for we read that the elected ſaints of God have wiſhed themſelves anathematized and razed out of the book of life, in an extaſy of charity, and infinite feeling of communion.

This being ſet down and ſtrongly planted, doth judge and determine moſt of the controverſies wherein moral philoſophy is converſant. For firſt, it decideth the queſtion touching the preferment of the contemplative or active life, and decideth it againſt Ariſtotle: for all the reaſons which he bringeth for the contemplative, are private, and reſpecting the pleaſure and dignity of a man's ſelf, in which reſpects, no queſtion, the contemplative life hath the preeminence: not much unlike to that compariſon, which Pythagoras made for the gracing and magnifying of philoſophy and contemplation; who being aſked what he was, anſwered, "That if "Hiero were ever at the Olympian games, he knew the manner, that ſome came "to try their fortune for the prizes, and ſome came as merchants to utter their "commodities, and ſome came to make good cheer and meet their friends, and "ſome came to look on, and that he was one of them that came to look on." But men muſt know, that in this theatre of man's life, it is reſerved only for God and angels to be lookers on: neither could the like queſtion ever have been received in the church, notwithſtanding their *Pretioſa in oculis Domini mors ſanctorum ejus*; by which place they would exalt their civil death and regular profeſſions, but upon this defence, that the monaſtical life is not ſimply contemplative, but performeth the duty either of inceſſant prayers and ſupplications, which hath been truly eſteemed as an office in the church, or elſe of writing or taking inſtructions for writing concerning the law of God; as Moſes did when he abode ſo long in the mount. And ſo we ſee Enoch the ſeventh from Adam, who was the firſt contemplative, and walked with God; yet did alſo endow the church with prophecy, which St. Jude citeth. But for contemplation which ſhould be finiſhed in itſelf, without caſting beams upon ſociety, aſſuredly divinity knoweth it not.

It decideth alſo the controverſies between Zeno and Socrates, and their ſchools and ſucceſſions on the one ſide, who placed felicity in virtue ſimply or attended; the actions and exerciſes whereof do chiefly embrace and concern ſociety; and on the other ſide, the Cyreniacs and Epicureans, who placed it in pleaſure, and made virtue, as it is uſed in ſome comedies of errors, wherein the miſtreſs and the maid change habits, to be but as a ſervant, without which pleaſure cannot be ſerved and attended: and the reformed ſchool of the Epicureans, which placed it in ſerenity of mind and free-

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dom from perturbation; as if they would have depoſed Jupiter again, and reſtored Saturn and the firſt age, when there was no ſummer nor winter, ſpring nor autumn, but all after one air and ſeaſon; and Herillus, who placed felicity in extinguiſhment of the diſputes of the mind, making no fixed nature of good and evil, eſteeming things according to the clearneſs of the deſires, or the reluctation; which opinion was revived in the hereſy of the Anabaptiſts, meaſuring things according to the motions of the ſpirit, and the conſtancy or wavering of belief: all which are manifeſt to tend to private repoſe and contentment, and not to point of ſociety.

It cenſureth alſo the philoſophy of Epictetus, which preſuppoſeth that felicity muſt be placed in thoſe things which are in our power, leſt we be liable to fortune and diſturbance; as if it were not a thing much more happy to fail in good and virtuous ends for the public, than to obtain all that we can wiſh to ourſelves in our proper fortune; as Conſalvo ſaid to his ſoldiers, ſhewing them Naples, and proteſting, "He had rather die one foot forwards, than to have his life ſecured for long, by "one foot of retreat." Whereunto the wiſdom of that heavenly leader hath ſigned, who hath affirmed, *that a good conſcience is a continual feaſt*; ſhewing plainly, that the conſcience of good intentions, howſoever ſucceeding, is a more continual joy to nature, than all the proviſion which can be made for ſecurity and repoſe.

It cenſureth likewiſe that abuſe of philoſophy, which grew general about the time of Epictetus, in converting it into an occupation or profeſſion; as if the purpoſe had been not to reſiſt and extinguiſh perturbations, but to fly and avoid the cauſes of them, and to ſhape a particular kind and courſe of life to that end, introducing ſuch an health of mind, as was that health of body, of which Ariſtotle ſpeaketh of Herodicus, who did nothing all his life long but intend his health: whereas if men refer themſelves to duties of ſociety; as that health of body is beſt, which is ableſt to endure all alterations and extremities: ſo likewiſe that health of mind is moſt proper, which can go through the greateſt temptations and perturbations. So as Diogenes's opinion is to be accepted, who commended not them which abſtained, but them which ſuſtained, and could refrain their mind *in praecipitio*, and could give unto the mind, as is uſed in horſemanſhip, the ſhorteſt ſtop or turn.

Laſtly, it cenſureth the tenderneſs and want of application in ſome of the moſt ancient and reverend philoſophers and philoſophical men, that did retire too eaſily from civil buſineſs, for avoiding of indignities and perturbations; whereas the reſolution of men truly moral, ought to be ſuch as the ſame Conſalvo ſaid the honour of a ſoldier ſhould be, *è tela craſſiore*, and not ſo fine, as that every thing ſhould catch in it and endanger it.

To reſume private or particular good, it falleth into the diviſion of good active and paſſive: for this difference of good, not unlike to that which amongſt the Romans was expreſſed in the familiar or houſhold terms of *Promus* and *Condus*, is formed alſo in all things, and is beſt diſcloſed in the two ſeveral appetites in creatures; the one to preſerve or continue themſelves, and the other to dilate or multiply themſelves: whereof the latter ſeemeth to be the worthier; for in nature the heavens, which are the more worthy, are the agent; and the earth, which is the leſs worthy, is the patient: in the pleaſures of living creatures, that of generation is greater than that of food: in divine doctrine, *Beatius eſt dare, quam accipere:* and in life there is no man's ſpirit ſo ſoft, but eſteemeth the effecting of ſomewhat that he hath fixed in his deſire, more than ſenſuality. Which priority of the active good is much

much upheld by the conſideration of our eſtate to be mortal and expoſed to fortune: for if we might have a perpetuity and certainty in our pleaſures, the ſtate of them would advance their price; but when we ſee it is but *Magni aeſtimamus mori tardius*, and *Ne glorieris de craſtino, neſcis partum diei*, it maketh us to deſire to have ſomewhat ſecured and exempted from time, which are only our deeds and works; as it is ſaid, *Opera eorum ſequuntur eos*. The preeminence likewiſe of this active good is upheld by the affection which is natural in man towards variety and proceeding, which in the pleaſures of the ſenſe, which is the principal part of paſſive good, can have no great latitude. *Cogita quamdiu eadem feceris; cibus, ſomnus, ludus per hunc circulum curritur; mori velle non tantum fortis, aut miſer, aut prudens, ſed etiam faſtidioſus poteſt.* But in enterpriſes, purſuits, and purpoſes of life, there is much variety, whereof men are ſenſible with pleaſure in their inceptions, progreſſions, recoils, re-integrations, approaches and attainings to their ends. So as it was well ſaid, *Vita ſine propoſito languida et vaga eſt.* Neither hath this active good any identity with the good of ſociety, though in ſome caſe it hath an incidence into it: for although it do many times bring forth acts of beneficence, yet it is with a reſpect private to a man's own power, glory, amplification, continuance; as appeareth plainly, when it findeth a contrary ſubject. For that gigantine ſtate of mind which poſſeſſeth the troublers of the world, ſuch as was Lucius Sylla, and infinite other in ſmaller model, who would have all men happy or unhappy as they were their friends or enemies, and would give form to the world according to their own humours, which is the true theomachy, pretendeth and aſpireth to active good, though it recedeth fartheſt from good of ſociety, which we have determined to be the greater.

To reſume paſſive good, it receiveth a ſubdiviſion of conſervative and perfective. For let us take a brief review of that which we have ſaid; we have ſpoken firſt of the good of ſociety, the intention whereof embraceth the form of human nature, whereof we are members and portions, and not our own proper and individual form; we have ſpoken of active good, and ſuppoſed it as a part of private and particular good. And rightly, for there is impreſſed upon all things a triple deſire or appetite proceeding from love to themſelves; one of preſerving and continuing their form; another of advancing and perfecting their form; and a third of multiplying and extending their form upon other things; whereof the multiplying or ſignature of it upon other things, is that which we handled by the name of active good. So as there remaineth the conſerving of it, and perfecting or raiſing of it; which latter is the higheſt degree of paſſive good. For to preſerve in ſtate is the leſs, to preſerve with advancement is the greater. So in man,

Igneus eſt ollis vigor, et coeleſtis origo.

His approach or aſſumption to divine or angelical nature is the perfection of his form; the error or falſe imitation of which good, is that which is the tempeſt of human life, while man, upon the inſtinct of an advancement formal and eſſential, is carried to ſeek an advancement local. For as thoſe which are ſick, and find no remedy, do tumble up and down and change place, as if by a remove local they could obtain a remove internal: ſo is it with men in ambition, when failing of the means to exalt their nature, they are in a perpetual eſtuation to exalt their place. So then paſſive good is, as was ſaid, either conſervative or perfective.

To reſume the good of conſervation or comfort, which conſiſteth in the fruition of that which is agreeable to our natures; it ſeemeth to be the moſt pure and natural of pleaſures, but yet the ſofteſt and the loweſt. And this alſo receiveth a difference,

which hath neither been well judged of, nor well inquired. For the good of fruition or contentment, is placed either in the ſincereneſs of the fruition, or in the quickneſs and vigour of it: the one ſuperinduced by equality, the other by viciſſitude; the one having leſs mixture of evil, the other more impreſſion of good. Whether of theſe is the greater good, is a queſtion controverted; but whether man's nature may not be capable of both, is a queſtion not inquired.

The former queſtion being debated between Socrates and a ſophiſt, Socrates placing felicity in an equal and conſtant peace of mind, and the ſophiſt in much deſiring and much enjoying, they fell from argument to ill words: the ſophiſt ſaying that Socrates's felicity was the felicity of a block or ſtone; and Socrates ſaying that the ſophiſt's felicity was the felicity of one that had the itch, who did nothing but itch and ſcratch. And both theſe opinions do not want their ſupports: for the opinion of Socrates is much upheld by the general conſent even of the Epicures themſelves, that virtue beareth a great part in felicity: and if ſo, certain it is, that virtue hath more uſe in clearing perturbations, than in compaſſing deſires. The ſophiſt's opinion is much favoured by the aſſertion we laſt ſpake of, that good of advancement is greater than good of ſimple preſervation; becauſe every obtaining a deſire hath a ſhew of advancement, as motion though in a circle hath a ſhew of progreſſion.

But the ſecond queſtion decided the true way maketh the former ſuperfluous: for can it be doubted but that there are ſome who take more pleaſure in enjoying pleaſures, than ſome other, and yet nevertheleſs are leſs troubled with the loſs or leaving of them: ſo as this ſame, *Non uti, ut non appetas; non appetere, ut non metuas; ſunt animi puſilli et diffidentis.* And it ſeemeth to me that moſt of the doctrines of the philoſophers are more fearful and cautionary than the nature of things requireth: ſo have they increaſed the fear of death in offering to cure it; for when they would have a man's whole life to be but a diſcipline or preparation to die, they muſt needs make men think that it is a terrible enemy againſt whom there is no end of preparing. Better ſaith the poet,

Qui finem vitae extremum inter munera ponat
Naturae:

So have they ſought to make mens minds too uniform and harmonical, by not breaking them ſufficiently to contrary motions: the reaſon whereof I ſuppoſe to be, becauſe they themſelves were men dedicated to a private, free, and unapplied courſe of life. For as we ſee, upon the lute or like inſtrument, a ground, though it be ſweet and have ſhew of many changes, yet breaketh not the hand to ſuch ſtrange and hard ſtops and paſſages, as a ſet ſong or voluntary: much after the ſame manner was the diverſity between a philoſophical and a civil life. And therefore men are to imitate the wiſdom of jewellers, who if there be a grain, or a cloud, or an ice which may be ground forth without taking too much of the ſtone, they help it; but if it ſhould leſſen and abate the ſtone too much, they will not meddle with it; ſo ought men ſo to procure ſerenity, as they deſtroy not magnanimity.

Having therefore deduced the good of man, which is private and particular, as far as ſeemeth fit, we will now return to that good of man which reſpecteth and beholdeth Society, which we may term duty; becauſe the term of duty is more proper to a mind well framed and diſpoſed towards others, as the term of virtue is applied to a mind well formed and compoſed in itſelf; though neither can a man underſtand virtue without ſome relation to ſociety, nor duty without an inward diſpoſition.

ſition. This part may ſeem at firſt to pertain to ſcience civil and politic, but not if it be well obſerved; for it concerneth the regimen and government of every man over himſelf, and not over others. And as in architecture the direction of the framing the poſts, beams, and other parts of building, is not the ſame with the manner of joining them and erecting the building; and in mechanics, the direction how to frame an inſtrument or engine, is not the ſame with the manner of ſetting it on work and employing it; and yet nevertheleſs in expreſſing of the one you incidently expreſs the aptneſs towards the other: ſo the doctrine of conjugation of men in ſociety differeth from that of their conformity thereunto.

This part of duty is ſubdivided into two parts; the common duty of every man as a man or member of a ſtate, the other the reſpective or ſpecial duty of every man in his profeſſion, vocation, and place. The firſt of theſe is extant and well laboured, as hath been ſaid. The ſecond likewiſe I may report rather diſperſed, than deficient; which manner of diſperſed writing in this kind of argument I acknowledge to be beſt: for who can take upon him to write of the proper duty, virtue, challenge, and right of every ſeveral vocation, profeſſion, and place? For although ſometimes a looker on may ſee more than a gameſter, and there be a proverb more arrogant than ſound, "That the vale beſt diſcovereth the hill;" yet there is ſmall doubt but that men can write beſt, and moſt really and materially in their own profeſſions; and that the writing of ſpeculative men of active matter, for the moſt part, doth ſeem to men of experience, as Phormio's argument of the wars ſeemed to Hannibal, to be but dreams and dotage. Only there is one vice which accompanieth them that write in their own profeſſions, that they magnify them in exceſs; but generally it were to be wiſhed, as that which would make learning indeed ſolid and fruitful, that active men would or could become writers.

In which I cannot but mention, *honoris cauſa*, your majeſty's excellent book touching the duty of a king, a work richly compounded of divinity, morality, and policy, with great aſperſion of all other arts; and being in mine opinion one of the moſt ſound and healthful writings that I have read, not diſtempered in the heat of invention, nor in the coldneſs of negligence; not ſick of buſineſs, as thoſe are who loſe themſelves in their order, nor of convulſions, as thoſe which cramp in matters impertinent; not ſavouring of perfumes and paintings, as thoſe do who ſeek to pleaſe the reader more than nature beareth; and chiefly well diſpoſed in the ſpirits thereof, being agreeable to truth and apt for action, and far removed from that natural infirmity whereunto I noted thoſe that write in their own profeſſions to be ſubject, which is, that they exalt it above meaſure: for your majeſty hath truly deſcribed, not a king of Aſſyria, or Perſia, in their external glory, but a Moſes, or a David, paſtors of their people. Neither can I ever loſe out of my remembrance, what I heard your majeſty in the ſame ſacred ſpirit of government deliver in a great cauſe of judicature, which was, "That kings ruled by their laws as God did "by the laws of nature, and ought as rarely to put in uſe their ſupreme preroga-"tive, as God doth his power of working miracles." And yet notwithſtanding, in your book of a free monarchy, you do well give men to underſtand, that you know the plenitude of the power and right of a king, as well as the circle of his office and duty. Thus have I preſumed to alledge this excellent writing of your majeſty, as a prime or eminent example of Tractates concerning ſpecial and reſpective duties, wherein I ſhould have ſaid as much if it had been written a thouſand years ſince: neither am I moved with certain courtly decencies, which eſteem it flattery to praiſe

in presence; no, it is flattery to praise in absence, that is, when either the virtue is absent, or the occasion is absent, and so the praise is not natural but forced, either in truth or in time. But let Cicero be read in his oration *pro Marcello*, which is nothing but an excellent table of Cæsar's virtue, and made to his face; besides the example of many other excellent persons wiser a great deal than such observers, and we will never doubt, upon a full occasion, to give just praises to present or absent.

But to return, there belongeth farther to the handling of this part, touching the duties of professions and vocations, a relative or opposite touching the frauds, cautels, impostures, and vices of every profession, which hath been likewise handled. But how? Rather in a satire and cynically, than seriously and wisely; for men have rather sought by wit to deride and traduce much of that which is good in professions, than with judgment to discover and sever that which is corrupt. For, as Solomon saith, he that cometh to seek after knowledge with a mind to scorn and censure, shall be sure to find matter for his humour, but no matter for his instruction: *Quaerenti derisori scientiam, ipsa se abscondit: sed studiosa sit obviam.* But the managing of this argument with integrity and truth, which I note as deficient, seemeth to me to be one of the best fortifications for honesty and virtue that can be planted. For, as the fable goeth of the basilisk, that if he see you first, you die for it; but if you see him first, he dieth: so is it with deceits and evil arts, which, if they be first espied, lose their life; but if they prevent, they indanger. So that we are much beholden to Machiavel and others, that write what men do, and not what they ought to do: for it is not possible to join serpentine wisdom with the columbine innocency, except men know exactly all the conditions of the serpent; his baseness and going upon his belly, his volubility and lubricity, his envy and sting, and the rest; that is, all forms and natures of evil: for without this, virtue lieth open and unfenced. Nay, an honest man can do no good upon those that are wicked, to reclaim them, without the help of the knowledge of evil: for men of corrupted minds presuppose that honesty groweth out of simplicity of manners, and believing of preachers, schoolmasters and mens exterior language. So as, except you can make them perceive that you know the utmost reaches of their own corrupt opinions, they despise all morality; *Non recipit stultus verba prudentiae, nisi ea dixeris, quae versantur in corde ejus.*

De cautelis et malis artibus.

Unto this part touching respective duty doth also appertain the duties between husband and wife, parent and child, master and servant: so likewise the laws of friendship and gratitude, the civil bond of companies, colleges and politic bodies, of neighbourhood, and all other proportionate duties; not as they are parts of government and society, but as to the framing of the mind of particular persons.

The knowledge concerning good respecting society doth handle it also not simply alone, but comparatively, whereunto belongeth the weighing of duties between person and person, case and case, particular and public: as we see in the proceeding of Lucius Brutus against his own sons, which was so much extolled; yet what was said?

Infelix, utcunque ferent ea fata minores.

So the case was doubtful, and had opinion on both sides. Again, we see when M. Brutus and Cassius invited to a supper certain whose opinions they meant to feel, whether they were fit to be made their associates, and cast forth the question touching the killing of a tyrant being an usurper, they were divided in opinion, some holding that servitude was the extreme of evils, and others that tyranny was better than

than a civil war; and a number of the like cases there are of comparative duty: amongst which that of all others is the most frequent, where the question is of a great deal of good to ensue of a small injustice, which Jason of Thessalia determined against the truth: *Aliqua sunt injuste facienda, ut multa juste fieri possint.* But the reply is good, *Auctorem praesentis justitiae habes, sponsorem futurae non habes*; men must pursue things which are just in present, and leave the future to the divine providence. So then we pass on from this general part touching the exemplar and description of good.

Now therefore that we have spoken of this fruit of life, it remaineth to speak of the husbandry that belongeth thereunto, without which part the former seemeth to be no better than a fair image, or *statua*, which is beautiful to contemplate, but is without life and motion: whereunto Aristotle himself subscribeth in these words, *Necesse est scilicet de virtute dicere, et quid sit, et ex quibus gignatur. Inutile enim fere fuerit, virtutem quidem nosse, acquirendae autem ejus modos et vias ignorare: non enim de virtute tantum, qua specie sit, quaerendum est, sed et quomodo sui copiam faciat; utrumque enim volumus, et rem ipsam nosse et ejus compotes fieri: hoc autem ex voto non succedet, nisi sciamus et ex quibus et quomodo.* In such full words and with such iteration doth he inculcate this part: so saith Cicero in great commendation of Cato the second, that he had applied himself to philosophy, *non ita disputandi causa, sed ita vivendi.* And although the neglect of our times, wherein few men do hold any consultations touching the reformation of their life, as Seneca excellently saith, *De partibus vitae quisque deliberat, de summa nemo*, may make this part seem superfluous; yet I must conclude with that aphorism of Hippocrates, *Qui gravi morbo correpti dolores non sentiunt, iis mens aegrotat*; they need medicine not only to assuage the disease, but to awake the sense. And if it be said, that the cure of mens minds belongeth to sacred divinity, it is most true: but yet moral philosophy may be preferred unto her as a wise servant and humble handmaid. For as the Psalm saith, that *the eyes of the handmaid look perpetually towards the mistress*, and yet no doubt many things are left to the discretion of the handmaid, to discern of the mistress's will; so ought moral philosophy to give a constant attention to the doctrines of divinity, and yet so as it may yield of herself, within due limits, many sound and profitable directions. De cultura animi.

This part therefore, because of the excellency thereof, I cannot but find exceeding strange that it is not reduced to written inquiry, the rather because it consisteth of much matter, wherein both speech and action is often conversant, and such wherein the common talk of men, which is rare, but yet cometh sometimes to pass, is wiser than their books. It is reasonable therefore that we propound it in the more particularity, both for the worthiness, and because we may acquit ourselves for reporting it deficient, which seemeth almost incredible, and is otherwise conceived and presupposed by those themselves that have written. We will therefore enumerate some heads or points thereof, that it may appear the better what it is, and whether it be extant.

First therefore, in this, as in all things which are practical, we ought to cast up our account, what is in our power, and what not; for the one may be dealt with by way of alteration, but the other by way of application only. The husbandman cannot command, neither the nature of the earth, nor the seasons of the weather, no more can the physician the constitution of the patient, nor the variety of accidents. So in the culture and cure of the mind of man, two things are without our command;

points of nature, and points of fortune: for to the basis of the one, and the conditions of the other, our work is limited and tied. In these things therefore, it is left unto us to proceed by application.

Vincenda est omnis fortuna ferendo:

and so likewise,

Vincenda est omnis natura ferendo.

But when that we speak of suffering, we do not speak of a dull and neglected suffering, but of a wise and industrious suffering, which draweth and contriveth use and advantage out of that which seemeth adverse and contrary, which is that properly which we call accommodating or applying. Now the wisdom of application resteth principally in the exact and distinct knowledge of the precedent state or disposition, unto which we do apply; for we cannot fit a garment, except we first take measure of the body.

So then the first article of this knowledge is to set down sound and true distributions, and descriptions of the several characters and tempers of mens natures and dispositions, especially having regard to those differences which are most radical, in being the fountains and causes of the rest, or most frequent in concurrence or commixture; wherein it is not the handling of a few of them in passage, the better to describe the mediocrities of virtues, that can satisfy this intention: for if it deserve to be considered, "that there are minds which are proportioned to great matters, "and others to small," which Aristotle handleth, or ought to have handled by the name of magnanimity, doth it not deserve as well to be considered, "that there are "minds proportioned to intend many matters, and others to few?" So that some can divide themselves, others can perchance do exactly well, but it must be but in few things at once; and so there cometh to be a narrowness of mind, as well as a pusillanimity. And again, "that some minds are proportioned to that which may "be dispatched at once, or within a short return of time; others to that which be-"gins afar off, and is to be won with length of pursuit,"

Jam tum tenditque fovetque.

So that there may be fitly said to be a longanimity, which is commonly ascribed to God as a magnanimity. So farther deserved it to be considered by Aristotle, "that there is a disposition in conversation, supposing it in things which do in no sort "touch or concern a man's self, to sooth and please; and a disposition contrary to "contradict and cross:" and deserveth it not much better to be considered, "that "there is a disposition, not in conversation or talk, but in matter of more serious na-"ture, and supposing it still in things merely indifferent, to take pleasure in the "good of another, and a disposition contrariwise, to take distaste at the good of "another?" which is that properly which we call good-nature or ill-nature, benignity or malignity. And therefore I cannot sufficiently marvel, that this part of knowledge, touching the several characters of natures and dispositions, should be omitted both in morality and policy, considering it is of so great ministry and suppeditation to them both. A man shall find in the traditions of astrology some pretty and apt divisions of mens natures, according to the predominances of the planets; lovers of quiet, lovers of action, lovers of victory, lovers of honour, lovers of pleasure, lovers of arts, lovers of change, and so forth. A man shall find in the wisest sort of these relations, which the Italians make touching conclaves, the natures of the several cardinals, handsomely and lively painted forth; a man shall meet with, in every day's conference, the denominations of sensitive, dry, formal, real, humorous, certain,

certain, *huomo di prima impreſſione*, *huomo di ultima impreſſione*, and the like: and yet nevertheleſs this kind of obſervations wandereth in words, but is not fixed in inquiry. For the diſtinctions are found, many of them, but we conclude no precepts upon them: wherein our fault is the greater, becauſe both hiſtory, poeſy, and daily experience, are as goodly fields where theſe obſervations grow; whereof we make a few poeſies to hold in our hands, but no man bringeth them to the confectionary, that receipts might be made of them for the uſe of life.

Of much like kind are thoſe impreſſions of nature, which are impoſed upon the mind by the ſex, by the age, by the region, by health and ſickneſs, by beauty and deformity, and the like, which are inherent, and not external; and again, thoſe which are cauſed by external fortune: as ſovereignty, nobility, obſcure birth, riches, want, magiſtracy, privateneſs, proſperity, adverſity, conſtant fortune, variable fortune, riſing *per ſaltum*, *per gradus*, and the like. And therefore we ſee that Plautus maketh it a wonder to ſee an old man beneficent, *benignitas hujus ut adoleſcentuli eſt.* St. Paul concludeth, that ſeverity of diſcipline was to be uſed to the Cretans, *Increpa eos dure*, upon the diſpoſition of their country, *Cretenſes ſemper mendaces, malae beſtiae, ventres pigri.* Salluſt noteth, that it is uſual with kings to deſire contradictories; *Sed plerumque regiae voluntates, ut vehementes ſunt, ſic mobiles, ſaepeque ipſae ſibi adverſae.* Tacitus obſerveth, how rarely raiſing of the fortune mendeth the diſpoſition, *Solus Veſpaſianus mutatus in melius.* Pindarus maketh an obſervation, that great and ſudden fortune for the moſt part defeateth men, *Qui magnam felicitatem concoquere non poſſunt.* So the *Pſalm* ſheweth it is more eaſy to keep a meaſure in the enjoying of fortune, than in the increaſe of fortune: *Divitae ſi affluant, nolite cor apponere.* Theſe obſervations, and the like, I deny not but are touched a little by Ariſtotle, as in paſſage, in his Rhetorics, and are handled in ſome ſcattered diſcourſes; but they were never incorporated into moral philoſophy, to which they do eſſentially appertain; as the knowledge of the diverſity of grounds and moulds doth to agriculture, and the knowledge of the diverſity of complexions and conſtitutions doth to the phyſician; except we mean to follow the indiſcretion of empirics, which adminiſter the ſame medicines to all patients.

Another article of this knowledge, is the inquiry touching the affections: for as in medicining of the body, it is in order firſt to know the divers complexions and conſtitutions; ſecondly, the diſeaſes; and laſtly, the cures: ſo in medicining of the mind, after knowledge of the divers characters of mens natures, it followeth, in order, to know the diſeaſes and infirmities of the mind, which are no other than the perturbations and diſtempers of the affections. For as the ancient politicians in popular ſtates were wont to compare the people to the ſea, and the orators to the winds, becauſe as the ſea would of itſelf be calm and quiet, if the winds did not move and trouble it; ſo the people would be peaceable and tractable if the ſeditious orators did not ſet them in working and agitation: ſo it may be fitly ſaid, that the mind in the nature thereof would be temperate and ſtayed, if the affections, as winds, did not put it into tumult and perturbation. And here again I find ſtrange as before, that Ariſtotle ſhould have written divers volumes of Ethics, and never handled the affections, which is the principal ſubject thereof; and yet in his Rhetorics, where they are conſidered but collaterally, and in a ſecond degree, as they may be moved by ſpeech, he findeth place for them, and handleth them well for the quantity; but where their true place is, he pretermiteth them. For it is not his diſputations about pleaſure and pain that can ſatisfy this inquiry, no more than he that ſhould generally handle the nature of light, can be ſaid to handle the

nature

nature of colours; for pleaſure and pain are to the particular affections, as light is to particular colours. Better travels, I ſuppoſe, had the Stoics taken in this argument, as far as I can gather by that which we have at ſecond hand. But yet, it is like, it was after their manner, rather in ſubtilty of definitions, which, in a ſubject of this nature, are but curioſities, than in active and ample deſcriptions and obſervations. So likewiſe I find ſome particular writings of an elegant nature, touching ſome of the affections; as of anger, of comfort upon adverſe accidents, of tenderneſs of countenance, and other. But the poets and writers of hiſtories are the beſt doctors of this knowledge, where we may find painted forth with great life, how affections are kindled and incited; and how pacified and refrained; and how again contained from act, and farther degree; how they diſcloſe themſelves; how they work; how they vary; how they gather and fortify; how they are inwrapped one within another; and how they do fight and encounter one with another; and other the like particularities. Amongſt the which, this laſt is of ſpecial uſe in moral and civil matters: how, I ſay, to ſet affection againſt affection, and to maſter one by another, even as we uſe to hunt beaſt with beaſt, and fly bird with bird, which otherwiſe perhaps we could not ſo eaſily recover: upon which foundation is erected that excellent uſe of *praemium* and *poena*, whereby civil ſtates conſiſt, employing the predominant affections of fear and hope, for the ſuppreſſing and bridling the reſt. For as in the government of ſtates, it is ſometimes neceſſary to bridle one faction with another, ſo it is in the government within.

Now come we to thoſe points which are within our own command, and have force and operation upon the mind, to affect the will and appetite, and to alter manners: wherein they ought to have handled cuſtom, exerciſe, habit, education, example, imitation, emulation, company, friends, praiſe, reproof, exhortation, fame, laws, books, ſtudies: theſe as they have determinate uſe in moralities, from theſe the mind ſuffereth, and of theſe are ſuch receipts and regimens compounded and deſcribed, as may ſerve to recover or preſerve the health and good eſtate of the mind, as far as pertaineth to human medicine; of which number we will inſiſt upon ſome one or two, as an example of the reſt, becauſe it were too long to proſecute all; and therefore we do reſume cuſtom and habit to ſpeak of.

The opinion of Ariſtotle ſeemeth to me a negligent opinion, that of thoſe things which conſiſt by nature, nothing can be changed by cuſtom; uſing for example, that if a ſtone be thrown ten thouſand times up, it will not learn to aſcend, and that by often ſeeing or hearing, we do not learn to hear or ſee the better. For though this principle be true in things wherein nature is peremptory, the reaſon whereof we cannot now ſtand to diſcuſs, yet it is otherwiſe in things wherein nature admitteth a latitude. For he might ſee that a ſtrait glove will come more eaſily on with uſe; and that a wand will by uſe bend otherwiſe than it grew; and that by uſe of the voice we ſpeak louder and ſtronger; and that by uſe of enduring heat or cold, we endure it the better, and the like: which latter ſort have a nearer reſemblance unto that ſubject of manners he handleth, than thoſe inſtances which he alledgeth. But allowing his concluſion, that virtues and vices conſiſt in habit, he ought ſo much the more to have taught the manner of ſuperinducing that habit: for there be many precepts of the wiſe ordering the exerciſes of the mind, as there is of ordering the exerciſes of the body, whereof we will recite a few.

The firſt ſhall be, that we beware we take not at the firſt either too high a ſtrain, or too weak: for if too high in a diffident nature you diſcourage; in a confident nature

nature you breed an opinion of facility, and ſo a ſloth; and in all natures you breed a farther expectation than can hold out, and ſo an inſatisfaction in the end: if too weak of the other ſide, you may not look to perform and overcome any great taſk.

Another precept is, to practiſe all things chiefly at two ſeveral times, the one when the mind is beſt diſpoſed, the other when it is worſt diſpoſed; that by the one you may gain a great ſtep, by the other you may work out the knots and ſtonds of the mind, and make the middle times the more eaſy and pleaſant.

Another precept is that which Ariſtotle mentioneth by the way, which is, to bear ever towards the contrary extreme of that whereunto we are by nature inclined: like unto the rowing againſt the ſtream, or making a wand ſtraight, by binding him contrary to his natural crookedneſs.

Another precept is, that the mind is brought to any thing better, and with more ſweetneſs and happineſs, if that whereunto you pretend be not firſt in the intention, but *tanquam aliud agendo*, becauſe of the natural hatred of the mind againſt neceſſity and conſtraint. Many other axioms there are touching the managing of exerciſe and cuſtom; which being ſo conducted, doth prove indeed another nature; but being governed by chance, doth commonly prove but an ape of nature, and bringeth forth that which is lame and counterfeit.

So if we ſhould handle books and ſtudies, and what influence and operation they have upon manners, are there not divers precepts of great caution and direction appertaining thereunto? Did not one of the fathers in great indignation call poeſy *vinum daemonum*, becauſe it increaſeth temptations, perturbations, and vain opinions? Is not the opinion of Ariſtotle worthy to be regarded, wherein he ſaith, "That "young men are no fit auditors of moral philoſophy, becauſe they are not ſettled "from the boiling heat of their affections, nor attempered with time and experi-"ence?" And doth it not hereof come, that thoſe excellent books and diſcourſes of the ancient writers, whereby they have perſuaded unto virtue moſt effectually, by repreſenting her in ſtate and majeſty; and popular opinions againſt virtue in their paraſites coats, fit to be ſcorned and derided, are of ſo little effect towards honeſty of life, becauſe they are not read, and revolved by men in their mature and ſettled years, but confined almoſt to boys and beginners? But is it not true alſo, that much leſs young men are fit auditors of matters of policy, till they have been thoroughly ſeaſoned in religion and morality, leſt their judgments be corrupted, and made apt to think that there are no true differences of things, but according to utility and fortune, as the verſe deſcribes it?

Proſperum et felix ſcelus virtus vocatur.

And again,

Ille crucem pretium ſceleris tulit, hic diadema:

which the poets do ſpeak ſatirically, and in indignation on virtue's behalf: but books of policy do ſpeak it ſeriouſly and poſitively; for it ſo pleaſeth Machiavel to ſay, "that if Cæſar had been overthrown, he would have been more odious than "ever was Catiline:" as if there had been no difference, but in fortune, between a very fury of luſt and blood, and the moſt excellent ſpirit, his ambition reſerved, of the world? Again, is there not a caution likewiſe to be given of the doctrines of moralities themſelves, ſome kinds of them, leſt they make men too preciſe, arrogant, incompatible, as Cicero ſaith of Cato in *Marco Catone: Haec bona, quae videmus, divina et egregia, ipſius ſcitote eſſe propria: quae nonnunquam requirimus, ea ſunt omnia,*

non

non à natura, ſed à magiſtro? Many other axioms and advices there are touching thoſe proprieties and effects, which ſtudies do infuſe and inſtil into manners. And ſo likewiſe is there touching the uſe of all thoſe other points, of company, fame, laws, and the reſt, which we recited in the beginning in the doctrine of morality.

But there is a kind of culture of the mind that ſeemeth yet more accurate and elaborate than the reſt, and is built upon this ground: that the minds of all men are ſometimes in a ſtate more perfect, and at other times in a ſtate more depraved. The purpoſe therefore of this practice is, to fix and cheriſh the good hours of the mind, and to obliterate and take forth the evil. The fixing of the good hath been practiſed by two means, vows or conſtant reſolutions, and obſervances or exerciſes; which are not to be regarded ſo much in themſelves, as becauſe they keep the mind in continual obedience. The obliteration of the evil hath been practiſed by two means, ſome kind of redemption or expiation of that which is paſt, and an inception or account *de novo*, for the time to come: but this part ſeemeth ſacred and religious, and juſtly; for all good moral philoſophy, as was ſaid, is but an handmaid to religion.

Wherefore we will conclude with that laſt point, which is of all other means the moſt compendious and ſummary; and, again, the moſt noble and effectual to the reducing of the mind unto virtue and good eſtate; which is, the electing, and propounding unto a man's ſelf good and virtuous ends of his life, ſuch as may be in a reaſonable ſort within his compaſs to attain. For if theſe two things be ſuppoſed, that a man ſet before him honeſt and good ends, and again that he be reſolute, conſtant, and true unto them; it will follow, that he ſhall mould himſelf into all virtue at once. And this is indeed like the work of nature, whereas the other courſe is like the work of the hand: for as when a carver makes an image, he ſhapes only that part whereupon he worketh, as if he be upon the face, that part which ſhall be the body is but a rude ſtone ſtill, till ſuch time as he comes to it: but, contrariwiſe, when nature makes a flower or living creature, ſhe formeth rudiments of all the parts at one time: ſo in obtaining virtue by habit, while a man practiſeth temperance, he doth not profit much to fortitude, nor the like: but when he dedicateth and applieth himſelf to good ends, look, what virtue ſoever the purſuit and paſſage towards thoſe ends doth commend unto him, he is inveſted of a precedent diſpoſition to conform himſelf thereunto. Which ſtate of mind Ariſtotle doth excellently expreſs himſelf, that it ought not to be called virtuous but divine: his words are theſe; *Immanitati autem conſentaneum eſt, opponere eam, quae ſupra humanitatem eſt, heroicam ſive divinam virtutem.* And a little after, *Nam ut ferae neque vitium neque virtus eſt, ſic neque Dei. Sed hic quidem ſtatus altius quiddam virtute eſt, ille aliud quiddam à vitio.* And therefore we may ſee what celſitude of honour Plinius Secundus attributeth to Trajan in his funeral oration; where he ſaid, "that men "needed to make no other prayers to the gods, but that they would continue as "good lords to them as Trajan had been;" as if he had not been only an imitation of divine nature, but a pattern of it. But theſe be heathen and profane paſſages, having but a ſhadow of that divine ſtate of mind, which religion and the holy faith doth conduct men unto, by imprinting upon their ſouls charity, which is excellently called *the bond of perfection*, becauſe it comprehendeth and faſteneth all virtues together. And as it is elegantly ſaid by Menander of vain love, which is but a falſe imitation of divine love, *Amor melior ſophiſta laevo ad humanam vitam*, that love

love teacheth a man to carry himself better than the sophist or preceptor, which he calleth left-handed, because, with all his rules and precepts, he cannot form a man so dexterously, nor with that facility, to prize himself, and govern himself, as love can do. So certainly if a man's mind be truly inflamed with charity, it doth work him suddenly into greater perfection than all the doctrine of morality can do, which is but a sophist in comparison of the other. Nay farther, as Xenophon observed truly, that all other affections, though they raise the mind, yet they do it by distorting and uncomelines of ecstasies or excesses; but only love doth exalt the mind, and nevertheless at the same instant doth settle and compose it: so in all other excellencies, though they advance nature, yet they are subject to excess. Only charity admitteth no excess; for so we see, by aspiring to be like God in power, the angels transgressed and fell; *Ascendam, et ero similis Altissimo:* by aspiring to be like God in knowledge, man transgressed and fell; *Eritis sicut Dii, scientes bonum et malum:* but by aspiring to a similitude of God in goodness, or love, neither man nor angel ever transgressed, or shall transgress. For unto that imitation we are called; *Diligite inimicos vestros, benefacite eis qui oderunt vos, et orate pro persequentibus et calumniantibus vos ut sitis filii Patris vestri, qui in coelis est, qui solem suum oriri facit super bonos et malos, et pluit super justos et injustos.* So in the first platform of the divine nature itself, the heathen religion speaketh thus, *Optimus Maximus*; and the sacred Scriptures thus, *Misericordia ejus super omnia opera ejus.*

Wherefore I do conclude this part of moral knowledge concerning the culture and regimen of the mind; wherein if any man, considering the parts thereof, which I have enumerated, do judge that my labour is but to collect into an art or science, that which hath been pretermitted by others, as matters of common sense and experience, he judgeth well: but as Philocrates sported with Demosthenes, "You "may not marvel, Athenians, that Demosthenes and I do differ, for he drinketh "water, and I drink wine." And like as we read of an ancient parable of the two gates of sleep,

Sunt geminae somni portae, quarum altera fertur
Cornea, qua veris facilis datur exitus umbris:
Altera candenti perfecta nitens elephanto,
Sed falsa ad coelum mittunt insomnia manes.

So if we put on sobriety and attention, we shall find it a sure maxim in knowledge, that the more pleasant liquor of wine is the more vaporous, and the braver gate of ivory sendeth forth the falser dreams.

But we have now concluded that general part of human philosophy, which contemplateth man segregate, and as he consisteth of body and spirit. Wherein we may farther note, that there seemeth to be a relation or conformity between the good of the mind and the good of the body. For as we divided the good of the body into health, beauty, strength, and pleasure; so the good of the mind, inquired in rational and moral knowledges, tendeth to this to make the mind sound and without perturbation; beautiful and graced with decency; and strong and agile for all duties of life. These three, as in the body, so in the mind, seldom meet, and commonly sever. For it is easy to observe, that many have strength of wit and courage, but have neither health from perturbations, nor any beauty or decency in their doings: some again have an elegancy and fineness of carriage, which have neither soundness of honesty, nor substance of sufficiency: and some again have honest and reformed minds, that can neither become themselves, nor manage business. And

ſometimes two of them meet, and rarely all three. As for pleaſure, we have likewiſe determined, that the mind ought not to be reduced to ſtupidity, but to retain pleaſure; confined rather in the ſubject of it, than in the ſtrength and vigour of it.

Civil Knowledge is converſant about a ſubject which of all others is moſt immerſed in matter, and hardlieſt reduced to axiom. Nevertheleſs, as Cato the cenſor ſaid, "that the Romans were like ſheep, for that a man might better drive a "flock of them, than one of them; for in a flock, if you could get but ſome few "to go right, the reſt would follow:" ſo in that reſpect moral philoſophy is more difficult than policy. Again, moral philoſophy propoundeth to itſelf the framing of internal goodneſs; but civil knowledge requireth only an external goodneſs; for that as to ſociety ſufficeth. And therefore it cometh oft to paſs that there be evil times in good governments: for ſo we find in the holy ſtory, when the kings were good; yet it is added, *Sed adhuc populus non direxerat cor ſuum ad Dominum Deum patrum ſuorum.* Again, ſtates, as great engines, move ſlowly, and are not ſo ſoon put out of frame: for as in Egypt the ſeven good years ſuſtained the ſeven bad; ſo governments for a time well grounded, do bear out errors following. But the reſolution of particular perſons is more ſuddenly ſubverted. Theſe reſpects do ſomewhat qualify the extreme difficulty of civil knowledge.

This knowledge hath three parts, according to the three ſummary actions of ſociety, which are Converſation, Negotiation, and Government. For man ſeeketh in ſociety comfort, uſe, and protection: and they be three wiſdoms of divers natures, which do often ſever; wiſdom of behaviour, wiſdom of buſineſs, and wiſdom of ſtate.

The wiſdom of Converſation ought not to be over-much affected, but much leſs deſpiſed: for it hath not only an honour in itſelf, but an influence alſo into buſineſs and government. The poet ſaith, *Nec vultu deſtrue verba tuo.* A man may deſtroy the force of his words with his countenance: ſo may he of his deeds, ſaith Cicero, recommending to his brother affability and eaſy acceſs, *Nil intereſt habere oſtium apertum, vultum clauſum.* "It is nothing won to admit men with an open door, "and to receive them with a ſhut and reſerved countenance." So, we ſee, Atticus, before the firſt interview between Cæſar and Cicero, the war depending, did ſeriouſly adviſe Cicero touching the compoſing and ordering of his countenance and geſture. And if the government of the countenance be of ſuch effect, much more is that of the ſpeech, and other carriage appertaining to converſation; the true model whereof ſeemeth to me well expreſſed by Livy, though not meant for this purpoſe; *Ne aut arrogans videar, aut obnoxius; quorum alterum eſt alienae libertatis obliti, alterum ſuae:* "The ſum of behaviour is to retain a man's own dignity, "without intruding upon the liberty of others." On the other ſide, if behaviour and outward carriage be intended too much, firſt it may paſs into affectation, and then *Quid deformius, quam ſcenam in vitam transferre,* to act a man's life? But although it proceed not to that extreme, yet it conſumeth time, and employeth the mind too much. And therefore as we uſe to adviſe young ſtudents from company keeping, by ſaying, *Amici, fures temporis*; ſo certainly the intending of the diſcretion of behaviour is a great thief of meditation. Again, ſuch as are accompliſhed in that form of urbanity, pleaſe themſelves in it, and ſeldom aſpire to higher virtue; whereas thoſe that have defect in it, do ſeek comelineſs by reputation: for where reputation

tation is, almoſt every thing becometh; but where that is not, it muſt be ſupplied by punctilios and compliments. Again, there is no greater impediment of action, than an over-curious obſervance of decency, and the guide of decency, which is time and ſeaſon. For as Solomon ſaith, *Qui reſpicit ad ventos, non ſeminat; et qui reſpicit ad nubes, not metet:* a man muſt make his opportunity as oft as find it. To conclude; behaviour ſeemeth to me as a garment of the mind, and to have the conditions of a garment. For it ought to be made in faſhion; it ought not to be too curious; it ought to be ſhaped ſo as to ſet forth any good making of the mind, and hide any deformity; and above all, it ought not to be too ſtrait, or reſtrained for exerciſe or motion. But this part of civil knowledge hath been elegantly handled, and therefore I cannot report it for deficient.

The wiſdom touching Negotiation or Buſineſs hath not been hitherto collected into writing, to the great derogation of learning, and the profeſſors of learning. For from this root ſpringeth chiefly that note or opinion, which by us is expreſſed in adage to this effect; that there is no great concurrence between learning and wiſdom. For of the three wiſdoms which we have ſet down to pertain to civil life, for wiſdom of behaviour, it is by learned men for the moſt part deſpiſed, as an inferior to virtue, and an enemy to meditation; for wiſdom of government, they acquit themſelves well when they are called to it, but that happeneth to few: but for the wiſdom of buſineſs, wherein man's life is moſt converſant, there be no books of it, except ſome few ſcattered advertiſements, that have no proportion to the magnitude of this ſubject. For if books were written of this, as the other, I doubt not but learned men, with mean experience, would far excel men of long experience, without learning, and outſhoot them in their own bow. De negotiis gerendis.

Neither needeth it at all to be doubted, that this knowledge ſhould be ſo variable, as it falleth not under precept; for it is much leſs infinite than ſcience of government, which, we ſee, is laboured, and in ſome part reduced. Of this wiſdom, it ſeemeth, ſome of the ancient Romans, in the ſadeſt and wiſeſt times, were profeſſors; for Cicero reporteth, that it was then in uſe for ſenators that had name and opinion for general wiſe men, as Coruncanius, Curius, Lælius, and many others, to walk at certain hours in the place, and to give audience to thoſe that would uſe their advice; and that the particular citizens would reſort unto them, and conſult with them of the marriage of a daughter, or of the employing of a ſon, or of a purchaſe or bargain, or of an accuſation, and every other occaſion incident to man's life. So as there is a wiſdom of counſel and advice even in private caſes, ariſing out of an univerſal inſight into the affairs of the world; which is uſed indeed upon particular caſes propounded, but is gathered by general obſervation of caſes of like nature. For ſo we ſee in the book which Q. Cicero writeth to his brother, *De petitione conſulatus*, being the only book of buſineſs, that I know, written by the ancients, although it concerned a particular action then on foot, yet the ſubſtance thereof conſiſteth of many wiſe and politic axioms, which contain not a temporary, but a perpetual direction in the caſe of popular elections. But chiefly we may ſee in thoſe aphoriſms which have place amongſt divine writings, compoſed by Solomon the king, of whom the ſcriptures teſtify, that his heart was as the ſands of the ſea, encompaſſing the world and all worldly matters: we ſee, I ſay, not a few profound and excellent cautions, precepts, poſitions, extending to much variety of occaſions; whereupon we will ſtay awhile, offering to conſideration ſome number of examples.

Sed et cunctis ſermonibus, qui dicuntur, ne accommodes aurem tuam, ne forte audias ſervum tuum maledicentem tibi.

Here is recommended the provident ſtay of inquiry of that which we would be loth to find; as it was judged great wiſdom in Pompeius Magnus that he burned Sertorius's papers unperuſed.

Vir ſapiens, ſi cum ſtulto contenderit, ſive iraſcatur, ſive rideat, non inveniet requiem.

Here is deſcribed the great diſadvantage which a wiſe man hath in undertaking a lighter perſon than himſelf, which is ſuch an engagement, as whether a man turn the matter to jeſt, or turn it to heat, or howſoever he change copy, he can no ways quit himſelf well of it.

Qui delicate à pueritia nutrit ſervum ſuum, poſtea ſentiet eum contumacem.

Here is ſignified, that if a man begin too high a pitch in his favours, it doth commonly end in unkindneſs and unthankfulneſs.

Vidiſti virum velocem in opere ſuo, coram regibus ſtabit, nec erit inter ignobiles.

Here is obſerved, that of all virtues for riſing to honour, quickneſs of diſpatch is the beſt; for ſuperiors many times love not to have thoſe they employ, too deep or too ſufficient, but ready and diligent.

Vidi cunctos viventes, qui ambulant ſub ſole, cum adoleſcente ſecundo, qui conſurgit pro eo.

Here is expreſſed that which was noted by Sylla firſt, and after him by Tiberius; *Plures adorant ſolem orientem, quam occidentem vel meridianum.*

Si ſpiritus poteſtatem habentis aſcenderit ſuper te, locum tuum ne dimiſeris, quia curatio faciet ceſſare peccata maxima.

Here caution is given, that upon diſpleaſure, retiring is of all courſes the unfitteſt; for a man leaveth things at worſt, and depriveth himſelf of means to make them better.

Erat civitas parva, et pauci in ea viri; venit contra eam rex magnus, et vadavit eam, inſtruxitque munitiones per gyrum, et perfecta eſt obſidio; inventuſque eſt in ea vir pauper et ſapiens, et liberavit eam per ſapientiam ſuam, et nullus deinceps recordatus eſt hominis illius pauperis.

Here the corruption of ſtates is ſet forth, that eſteem not virtue or merit longer than they have uſe of it.

Mollis reſponſio frangit iram.

Here is noted, that ſilence or rough anſwer exaſperateth; but an anſwer preſent and temperate pacifieth.

Iter pigrorum, quaſi ſepes ſpinarum.

Here is lively repreſented how laborious ſloth proveth in the end; for when things are deferred to the laſt inſtant, and nothing prepared beforehand, every ſtep findeth a brier or an impediment, which catcheth or ſtopeth.

Melior eſt finis orationis, quam principium.

Here is taxed the vanity of formal ſpeakers, that ſtudy more about prefaces and inducements, than upon the concluſions and iſſues of ſpeech.

Qui cognoſcit in judicio faciem, non bene facit; iſte et pro buccella panis deſeret veritatem.

Here is noted, that a judge were better be a briber, than a reſpecter of perſons; for a corrupt judge offendeth not ſo lightly as a facile.

Vir pauper calumnians pauperes, ſimilis eſt imbri vehementi, in quo paratur fames.

Here

Here is expreſſed the extremity of neceſſitous extortions, figured in the ancient fable of the full and the hungry horſe-leech.

Fons turbatus pede, et vena corrupta, eſt juſtus cadens coram impio.

Here is noted that one judicial and exemplar iniquity in the face of the world, doth trouble the fountains of juſtice more than many particular injuries paſſed over by connivance.

Qui ſubtrahit aliquid à patre et à matre, et dicit hoc non eſſe peccatum, particeps eſt homicidii.

Here is noted, that whereas men in wronging their beſt friends, uſe to extenuate their fault, as if they might preſume or be bold upon them, it doth contrariwiſe indeed aggravate their fault, and turneth it from injury to impiety.

Noli eſſe amicus homini iracundo, nec ambulato cum homine furioſo.

Here caution is given, that in the election of our friends we do principally avoid thoſe which are impatient, as thoſe that will eſpouſe us to many factions and quarrels.

Qui conturbat domum ſuam, poſſidebit ventum.

Here is noted that in domeſtical ſeparations and breaches men do promiſe to themſelves quieting of their mind and contentment, but ſtill they are deceived of their expectation, and it turneth to wind.

Filius ſapiens laetificat patrem: filius vero ſtultus moeſtitia eſt matri ſuae.

Here is diſtinguiſhed, that fathers have moſt comfort of the good proof of their ſons; but mothers have moſt diſcomfort of their ill proof, becauſe women have little diſcerning of virtue, but of fortune.

Qui celat delictum, quaerit amicitiam; ſed qui altero ſermone repetit, ſeparat foederatos.

Here caution is given, that reconcilement is better managed by an amneſty, and paſſing over that which is paſt, than by apologies and excuſations.

In omni opere bono erit abundantia; ubi autem verba ſunt plurima, ibi frequenter egeſtas.

Here is noted, that words and diſcourſe abound moſt where there is idleneſs and want.

Primus in ſua cauſa juſtus; ſed venit altera pars, et inquirit in eum.

Here is obſerved that in all cauſes the firſt tale poſſeſſeth much, in ſuch ſort, that the prejudice thereby wrought will be hardly removed, except ſome abuſe or falſity in the information be detected.

Verba bilinguis quaſi ſimplicia, et ipſa perveniunt ad interiora ventris.

Here is diſtinguiſhed, that flattery and inſinuation, which ſeemeth ſet and artificial, ſinketh not far; but that entereth deep which hath ſhew of nature, liberty, and ſimplicity.

Qui erudit deriſorem, ipſe ſibi injuriam facit; et qui arguit impium, ſibi maculam generat.

Here caution is given how we tender reprehenſion to arrogant and ſcornful natures, whoſe manner is to eſteem it for contumely, and accordingly to return it.

Da ſapienti occaſionem, et addetur ei ſapientia.

Here is diſtinguiſhed the wiſdom brought into habit, and that which is but verbal, and ſwimming only in conceit; for the one upon the occaſion preſented is quickened and redoubled, the other is amazed and confuſed.

Quomodo in aquis reſplendent vultus proſpicientium, ſic cordia hominum manifeſta ſunt prudentibus.

Here the mind of a wiſe man is compared to a glaſs, wherein the images of all diverſity of natures and cuſtoms are repreſented, from which repreſentation proceedeth that application,

Qui ſapit, innumeris moribus aptus erit.

Thus have I ſtaid ſomewhat longer upon theſe ſentences politic of Solomon than is agreeable to the proportion of an example, led with a deſire to give authority to this part of knowledge which I noted as deficient, by ſo excellent a precedent; and have alſo attended them with brief obſervations, ſuch as to my underſtanding offer no violence to the ſenſe, though I know they may be applied to a more divine uſe: but it is allowed even in divinity, that ſome interpretations, yea and ſome writings, have more of the eagle than others; but taking them as inſtructions for life, they might have received large diſcourſe, if I would have broken them and illuſtrated them by deducements and examples.

Neither was this in uſe only with the Hebrews, but it is generally to be found in the wiſdom of the more ancient times; that as men found out any obſervation that they thought was good for life, they would gather it and expreſs it in parable, or aphoriſm, or fable. But for fables, they were vicegerents and ſupplies where examples failed: now that the times abound with hiſtory, the aim is better when the mark is alive. And therefore the form of writing, which of all others is the fitteſt for this variable argument of negotiation and occaſions, is that which Machiavel choſe wiſely and aptly for government; namely, diſcourſe upon hiſtories or examples: for knowledge drawn freſhly, and in our view, out of particulars, knoweth the way beſt to particulars again; and it hath much greater life for practice when the diſcourſe attendeth upon the example, than when the example attendeth upon the diſcourſe. For this is no point of order, as it ſeemeth at firſt, but of ſubſtance: for when the example is the ground, being ſet down in an hiſtory at large, it is ſet down with all circumſtances, which may ſometimes control the diſcourſe thereupon made, and ſometimes ſupply it as a very pattern for action; whereas the examples alledged for the diſcourſe's ſake, are cited ſuccinctly, and without particularity, and carry a ſervile aſpect towards the diſcourſe which they are brought in to make good.

But this difference is not amiſs to be remembered, that as hiſtory of times is the beſt ground for diſcourſe of government, ſuch as Machiavel handleth, ſo hiſtory of lives is the moſt proper for diſcourſe of buſineſs, becauſe it is more converſant in private actions. Nay, there is a ground of diſcourſe for this purpoſe fitter than them both, which is diſcourſe upon letters; ſuch as are wiſe and weighty, as many are of Cicero *ad Atticum*, and others. For letters have a great and more particular repreſentation of buſineſs than either chronicles or lives. Thus have we ſpoken both of the matter and form of this part of civil knowledge touching negotiation, which we note to be deficient.

But yet there is another part of this part, which differeth as much from that whereof we have ſpoken, as *ſapere* and *ſibi ſapere*; the one moving as it were to the circumference, the other to the center: for there is a wiſdom of counſel, and again there is a wiſdom of preſſing a man's own fortune, and they do ſometimes meet, and often ſever: for many are wiſe in their own ways that are weak for government or counſel; like ants, which is a wiſe creature for itſelf, but very hurtful for the gar-

den. This wiſdom the Romans did take much knowledge of: *Nam pol ſapiens*, ſaith the comical poet, *fingit fortunam ſibi*; and it grew to an adage, *Faber quiſque fortunae propriae:* and Livy attributeth it to Cato the firſt, *in hoc viro tanta vis animi et ingenii inerat, ut quocunque loco natus eſſet, ſibi ipſe fortunam facturus videretur.*

This conceit or poſition, if it be too much declared and profeſſed, hath been thought a thing impolitic and unlucky, as was obſerved in Timotheus the Athenian; who having done many great ſervices to the eſtate in his government, and giving an account thereof to the people, as the manner was, did conclude every particular with this clauſe, "and in this fortune had no part." And it came to paſs that he never proſpered in any thing he took in hand afterwards; for this is too high and too arrogant, ſavouring of that which Ezekiel ſaith of Pharaoh, *Dicis, Fluvius eſt meus, et ego feci memetipſum:* or of that which another prophet ſpeaketh, that *men offer ſacrifices to their nets and ſnares*; and that which the poet expreſſeth,

Dextra mihi Deus, et telum, quod miſſile libro.
Nunc adſint:

For theſe confidences were ever unhallowed, and unbleſſed: and therefore thoſe that were great politicians indeed ever aſcribed their ſucceſſes to their felicity, and not to their ſkill or virtue. For ſo Sylla ſurnamed himſelf *Felix* not *Magnus:* ſo Cæſar ſaid to the maſter of the ſhip, *Cæſarem portas et fortunam ejus.*

But yet nevertheleſs theſe poſitions, *Faber quiſque fortunae ſuae*; *Sapiens dominabitur aſtris: Invia virtuti nulla eſt via*, and the like, being taken and uſed as ſpurs to induſtry, and not as ſtirrups to inſolency, rather for reſolution than for preſumption or outward declaration, have been ever thought ſound and good, and are, no queſtion, imprinted in the greateſt minds, who are ſo ſenſible of this opinion, as they can ſcarce contain it within: As we ſee in Auguſtus Cæſar, who was rather diverſe from his uncle, than inferior in virtue, how when he died, he deſired his friends about him to give him a *Plaudite*, as if he were conſcious to himſelf that he had played his part well upon the ſtage. This part of knowledge we do report alſo as deficient; not but that it is practiſed too much, but it hath not been reduced to writing. And therefore leſt it ſhould ſeem to any that it is not comprehenſible by axiom, it is requiſite, as we did in the former, that we ſet down ſome heads or paſſages of it.

Faber fortunae, ſive de ambitu vitae.

Wherein it may appear at the firſt a new and unwonted argument to teach men how to raiſe and make their fortune: a doctrine, wherein every man perchance will be ready to yield himſelf a diſciple till he ſeeth difficulty; for fortune layeth as heavy impoſitions as virtue, and it is as hard and ſevere a thing to be a true politician, as to be truly moral. But the handling thereof concerneth learning greatly, both in honour and in ſubſtance: In honour, becauſe pragmatical men may not go away with an opinion that learning is like a lark, that can mount, and ſing, and pleaſe herſelf, and nothing elſe; but may know that ſhe holdeth as well of the hawk, that can ſoar aloft, and can alſo deſcend and ſtrike upon the prey. In ſubſtance, becauſe it is the perfect law of inquiry of truth, "that nothing be in the "globe of matter, which ſhould not be likewiſe in the globe of cryſtal, or "form;" that is, that there be not any thing in being and action, which ſhould not be drawn and collected into contemplation and doctrine. Neither doth learning admire or eſteem of this architecture of fortune, otherwiſe than as of an inferior work: for no man's fortune can be an end worthy of his being, and many times

times the worthieſt men do abandon their fortune willingly for better reſpects; but nevertheleſs fortune, as an organ of virtue and merit, deſerveth the conſideration.

Firſt, therefore, the precept which I conceive to be moſt ſummary towards the prevailing in fortune, is to obtain that window which Momus did require; who ſeeing in the frame of man's heart ſuch angles and receſſes, found fault there was not a window to look into them: that is, to procure good informations of particulars touching perſons, their natures, their deſires and ends, their cuſtoms and faſhions, their helps and advantages, and whereby they chiefly ſtand; ſo again their weakneſſes and diſadvantages, and where they lie moſt open and obnoxious; their friends, factions, and dependencies; and again their oppoſites, enviers, competitors, their moods and times, *Sola viri molles aditus et tempora noras*; their principles, rules, and obſervations, and the like: and this not only of perſons, but of actions, what are on foot from time to time, and how they are conducted, favoured, oppoſed, and how they import, and the like. For the knowledge of preſent actions is not only material in itſelf, but without it alſo the knowledge of perſons is very erroneous; for men change with the actions, and whilſt they are in purſuit they are one, and when they return to their nature they are another. Theſe informations of particulars, touching perſons and actions, are as the minor propoſitions in every active ſyllogiſm, for no excellency of obſervations, which are as the major propoſitions, can ſuffice to ground a concluſion, if there be error and miſtaking in the minors.

That this knowledge is poſſible Solomon is our ſurety, who ſaith, *Conſilium in corde viri tanquam aqua profunda, ſed vir prudens exhauriet illud:* And although the knowledge itſelf falleth not under precept, becauſe it is of individuals, yet the inſtructions for the obtaining of it may.

We will begin therefore with this precept, according to the ancient opinion, that the ſinews of wiſdom are ſlowneſs of belief and diſtruſt: that more truſt be given to countenances and deeds than to words; and in words, rather to ſudden paſſages and ſurpriſed words than to ſet and purpoſed words. Neither let that be feared which is ſaid, *fronti nulla fides*; which is meant of a general outward behaviour, and not of the private and ſubtile motions and labours of the countenance and geſture; which, as Q. Cicero elegantly ſaith, is *animi janua*, "the gate of the mind." None more cloſe than Tiberius, and yet Tacitus ſaith of Gallus, *Etenim vultu offenſionem conjectaverat*. So again, noting the differing character and manner of his commending Germanicus and Druſus in the ſenate, he ſaith, touching his faſhion wherein he carried his ſpeech of Germanicus, thus: *Magis in ſpeciem adornatis verbis, quam ut penitus ſentire videretur*; but of Druſus thus, *Paucioribus, ſed intentior, et fida oratione:* and in another place, ſpeaking of his character of ſpeech when he did any thing that was gracious and popular, he ſaith, that in other things he was *velut eluctantium verborum:* but then again, *Solutius vero loquebatur quando ſubvenerit*. So that there is no ſuch artificer of diſſimulation, nor no ſuch commanded countenance, *vultus juſſus*, that can ſever from a feigned tale ſome of theſe faſhions, either a more ſlight and careleſs faſhion, or more ſet and formal, or more tedious and wandring, or coming from a man more drily and hardly.

Neither are deeds ſuch aſſured pledges, as that they may be truſted without a judicious conſideration of their magnitude and nature: *Fraus ſibi in parvis fidem praeſtruit, ut majore emolumento fallat:* and the Italian thinketh himſelf upon the point to be bought and ſold, when he is better uſed than he was wont to be, without manifeſt cauſe. For ſmall favours, they do but lull men aſleep, both as to caution and as to induſtry,

induſtry, and are, as Demoſthenes calleth them, *Alimenta ſocordiae.* So again we ſee how falſe the nature of ſome deeds are, in that particular which Mutianus practiſed upon Antonius Primus, upon that hollow and unfaithful reconcilement which was made between them: whereupon Mutianus advanced many of the friends of Antonius: *ſimul amicis ejus praefecturas et tribunatus largitur:* wherein, under pretence to ſtrengthen him, he did deſolate him, and won from him his dependences.

As for words, though they be like waters to phyſicians, full of flattery and uncertainty, yet they are not to be deſpiſed, ſpecially with the advantage of paſſion and affection. For ſo we ſee Tiberius, upon a ſtinging and incenſing ſpeech of Agrippina, came a ſtep forth of his diſſimulation, when he ſaid, "You are hurt, becauſe you do not reign;" of which Tacitus ſaith, *Audita haec raram occulti pectoris vocem elicuere, correptamque Graeco verſu admonuit: ideo laedi, quia non regnaret.* And therefore the poet doth elegantly call paſſions, tortures, that urge men to confeſs their ſecrets:

Vino tortus et ira.

And experience ſheweth, there are few men ſo true to themſelves, and ſo ſettled, but that, ſometimes upon heat, ſometimes upon bravery, ſometimes upon kindneſs, ſometimes upon trouble of mind and weakneſs, they open themſelves; ſpecially if they be put to it with a counter-diſſimulation, according to the proverb of Spain, *Di mentira, y ſacaras verdad,* "Tell a lye, and find a truth."

As for the knowing of men, which is at ſecond hand from reports: mens weakneſs and faults are beſt known from their enemies, their virtues and abilities from their friends, their cuſtoms and times from their ſervants, their conceits and opinions from their familiar friends, with whom they diſcourſe moſt. General fame is light, and the opinions conceived by ſuperiors or equals are deceitful; for to ſuch, men are more maſked, *Verior fama è domeſticis emanat.*

But the ſoundeſt diſcloſing and expounding of men is, by their natures and ends; wherein the weakeſt ſort of men are beſt interpreted by their natures, and the wiſeſt by their ends. For it was both pleaſantly and wiſely ſaid, though I think very untruly, by a nuncio of the pope, returning from a certain nation, where he ſerved as lieger; whoſe opinion being aſked touching the appointment of one to go in his place, he wiſhed that in any caſe they did not ſend one that was too wiſe; becauſe no very wiſe man would ever imagine, what they in that country were like to do: and certainly it is an error frequent for men to ſhoot over, and to ſuppoſe deeper ends, and more compaſs-reaches than are: the Italian proverb being elegant, and for the moſt part true,

Di danari, di ſenno, e di fede,
Ce' nè manco che non credi:

"There is commonly leſs money, leſs wiſdom, and leſs good faith, than men do account upon."

But princes, upon a far other reaſon, are beſt interpreted by their natures, and private perſons by their ends: for princes being at the top of human deſires, they have for the moſt part no particular ends whereto they aſpire, by diſtance from which a man might take meaſure and ſcale of the reſt of their actions and deſires; which is one of the cauſes that maketh their hearts more inſcrutable. Neither is it ſufficient to inform ourſelves in mens ends and natures of the variety of them only, but alſo of the predominancy, what humour reigneth moſt, and what end is principally ſought. For ſo we ſee, when Tigellinus ſaw himſelf out-ſtripped by Petro-

nius Turpilianus in Nero's humours of pleaſures; *metus ejus rimatur*, he wrought upon Nero's fears, whereby he broke the other's neck.

But to all this part of inquiry, the moſt compendious way reſteth in three things: the firſt, to have general acquaintance and inwardneſs with thoſe which have general acquaintance, and look moſt into the world; and eſpecially according to the diverſity of buſineſs, and the diverſity of perſons, to have privacy and converſation with ſome one friend at leaſt, which is perfect and well intelligenced in every ſeveral kind. The ſecond is, to keep a good mediocrity in liberty of ſpeech and ſecrecy: in moſt things liberty, ſecrecy where it importeth; for liberty of ſpeech inviteth and provoketh liberty to be uſed again, and ſo bringeth much to a man's knowledge; and ſecrecy, on the other ſide, induceth truſt and inwardneſs. The laſt is the reducing of a man's ſelf to this watchful and ſerene habit, as to make account and purpoſe, in every conference and action as well to obſerve as to act. For as Epictetus would have a philoſopher in every particular action to ſay to himſelf, *Et hoc volo, et etiam inſtitutum ſervare:* ſo a politic man in every thing ſhould ſay to himſelf, *Et hoc volo, ac etiam aliquid addiſcere.* I have ſtayed the longer upon this precept of obtaining good information; becauſe it is a main part by itſelf, which anſwereth to all the reſt. But above all things caution muſt be taken, that men have a good ſtay and hold of themſelves, and that this much knowing do not draw on much meddling; for nothing is more unfortunate than light and raſh intermeddling in many matters. So that this variety of knowledge tendeth in concluſion but only to this, to make a better and freer choice of thoſe actions which may concern us, and to conduct them with the leſs error and the more dexterity.

The ſecond precept concerning this knowledge, is for men to take good information touching their own perſons, and well to underſtand themſelves: knowing that, as St. James ſaith, though men look oft in a glaſs, yet they do ſuddenly forget themſelves; wherein as the divine glaſs is the word of God, ſo the politic glaſs is the ſtate of the world, or times wherein we live; in the which we are to behold ourſelves.

For men ought to take an impartial view of their own abilities and virtues; and again of their wants and impediments; accounting theſe with the moſt; and thoſe other with the leaſt; and from this view and examination, to frame the conſiderations following.

Firſt, to conſider how the conſtitution of their nature ſorteth with the general ſtate of the times; which if they find agreeable and fit, then in all things to give themſelves more ſcope and liberty; but if differing and diſſonant, then in the whole courſe of their life to be more cloſe, retired, and reſerved: as we ſee in Tiberius, who was never ſeen at a play, and came not into the ſenate in twelve of his laſt years; whereas Auguſtus Cæſar lived ever in mens eyes, which Tacitus obſerveth: *Alia Tiberio morum via.*

Secondly, to conſider how their nature ſorteth with profeſſions and courſes of life, and accordingly to make election, if they be free; and, if engaged, to make the departure at the firſt opportunity, as we ſee was done by duke Valentine, that was deſigned by his father to a ſacerdotal profeſſion, but quitted it ſoon after in regard of his parts and inclination; being ſuch nevertheleſs, as a man cannot tell well whether they were worſe for a prince or for a prieſt.

Thirdly, to conſider how they ſort with thoſe whom they are like to have competitors and concurrents, and to take that courſe wherein there is moſt ſolitude, and

themſelves like to be moſt eminent; as Julius Cæſar did, who at firſt was an orator or pleader; but when he ſaw the excellency of Cicero, Hortenſius, Catulus, and others, for eloquence, and ſaw there was no man of reputation for the wars but Pompeius, upon whom the ſtate was forced to rely; he forſook his courſe begun toward a civil and popular greatneſs, and transferred his deſigns to a martial greatneſs.

Fourthly, in the choice of their friends and dependences, to proceed according to the compoſition of their own nature; as we may ſee in Cæſar; all whoſe friends and followers were men active and effectual, but not ſolemn, or of reputation.

Fifthly, to take ſpecial heed how they guide themſelves by examples, in thinking they can do as they ſee others do; whereas perhaps their natures and carriages are far differing. In which error it ſeemeth Pompey was, of whom Cicero ſaith, that he was wont often to ſay, *Sylla potuit, ego non potero?* Wherein he was much abuſed, the natures and proceedings of himſelf and his example, being the unlikeſt in the world; the one being fierce, violent, and preſſing the fact; the other ſolemn, and full of majeſty and circumſtance; and therefore the leſs effectual.

But this precept touching the politic knowledge of ourſelves, hath many other branches whereupon we cannot inſiſt.

Next to the well underſtanding and diſcerning of a man's ſelf, there followeth the well opening and revealing a man's ſelf; wherein we ſee nothing more uſual than for the more able man to make the leſs ſhew. For there is a great advantage in the well ſetting forth of a man's virtues, fortunes, merits; and again, in the artificial covering of a man's weakneſſes, defects, diſgraces, ſtaying upon the one, ſliding from the other; cheriſhing the one by circumſtances, gracing the other by expoſition, and the like; wherein we ſee what Tacitus ſaith of Mutianus, who was the greateſt politician of his time, *Omnium, quae dixerat, feceratque, arte quadam oſtentator*; which requireth indeed ſome art, leſt it turn tedious and arrogant; but yet ſo, as oſtentation, though it be to the firſt degree of vanity, ſeemeth to me rather a vice in manners than in policy: for as it is ſaid, *Audacter calumniare, ſemper aliquid haeret*; ſo except it be in a ridiculous degree of deformity, *Audacter te vendita, ſemper aliquid haeret*. For it will ſtick with the more ignorant and inferior ſort of men, though men of wiſdom and rank do ſmile at it, and deſpiſe it; and yet the authority won with many, doth countervail the diſdain of a few. But if it be carried with decency and government, as with a natural, pleaſant, and ingenuous faſhion, or at times when it is mixed with ſome peril and unſafety, as in military perſons, or at times when others are moſt envied; or with eaſy and careleſs paſſage to it and from it, without dwelling too long, or being too ſerious; or with an equal freedom of taxing a man's ſelf, as well as gracing himſelf; or by occaſion of repelling or putting down others injury or inſolence; it doth greatly add to reputation; and ſurely not a few ſolid natures that want this ventoſity, and cannot ſail in the height of the winds, are not without ſome prejudice and diſadvantage by their moderation.

But for theſe flouriſhes and enhancements of virtue, they are not perchance unneceſſary, ſo it is at leaſt neceſſary that virtue be not diſvalued and imbaſed under the juſt price, which is done in three manners; by offering and obtruding a man's ſelf, wherein men think he is rewarded, when he is accepted: by doing too much, which will not give that which is well done leave to ſettle, and in the end induceth ſatiety: and by finding too ſoon the fruit of a man's virtue, in commendation, applauſe, honour, favour; wherein if a man be pleaſed with a little, let him hear what

is truly ſaid; *Cave ne inſuetus rebus majoribus videaris, ſi haec te res parva, ſicuti magna, delectat.*

But the covering of defects is of no leſs importance than the valuing of good parts: which may be done likewiſe in three manners, by caution, by colour, and by confidence. Caution is, when men do ingeniouſly and diſcreetly avoid to be put into thoſe things for which they are not proper: whereas contrariwiſe, bold and unquiet ſpirits will thruſt themſelves into matters without difference, and ſo publiſh and proclaim all their wants: colour is, when men make a way for themſelves, to have a conſtruction made of their faults or wants, as proceeding from a better cauſe, or intended for ſome other purpoſe: for of the one it is well ſaid,

Saepe latet vitium proximitate boni.

And therefore whatſoever want a man hath, he muſt ſee that he pretend the virtue that ſhadoweth it; as if he be dull, he muſt affect gravity; if a coward, mildneſs; and ſo the reſt. For the ſecond, a man muſt frame ſome probable cauſe why he ſhould not do his beſt, and why he ſhould diſſemble his abilities; and for that purpoſe muſt uſe to diſſemble thoſe abilities which are notorious in him, to give colour that his true wants are but induſtries and diſſimulations. For confidence, it is the laſt, but ſureſt remedy; namely, to depreſs and ſeem to deſpiſe whatſoever a man cannot attain, obſerving the good principle of the merchants, who endeavour to raiſe the price of their own commodities, and to beat down the price of others. But there is a confidence that paſſeth this other, which is, to face out a man's own defects, in ſeeming to conceive that he is beſt in thoſe things wherein he is failing; and, to help that again, to ſeem on the other ſide that he hath leaſt opinion of himſelf in thoſe things wherein he is beſt; like as we ſhall ſee it commonly in poets, that if they ſhew their verſes, and you except to any, they will ſay "that that line coſt them more labour than any of the reſt;" and preſently will ſeem to diſable and ſuſpect rather ſome other line, which they know well enough to be the beſt in the number. But above all, in this righting and helping of a man's ſelf in his own carriage, he muſt take heed he ſhew not himſelf diſmantled, and expoſed to ſcorn and injury, by too much ſweetneſs, goodneſs, and facility of nature, but ſhew ſome ſparkles of liberty, ſpirit, and edge: which kind of fortified carriage, with a ready reſcuing of a man's ſelf from ſcorns, is ſometimes of neceſſity impoſed upon men by ſomewhat in their perſon or fortune, but it ever ſucceedeth with good felicity.

Another precept of this knowledge is, by all poſſible endeavour to frame the mind to be pliant and obedient to occaſion; for nothing hindereth mens fortunes ſo much as this: *Idem manebat, neque idem decebat.* Men are where they were, when occaſions turn; and therefore to Cato, whom Livy maketh ſuch an architect of fortune, he addeth, that he had *verſatile ingenium.* And thereof it cometh, that theſe grave ſolemn wits, which muſt be like themſelves, and cannot make departures, have more dignity than felicity. But in ſome it is nature to be ſomewhat viſcous and inwrapped, and not eaſy to turn. In ſome it is a conceit, that is almoſt a nature, which is, that men can hardly make themſelves believe that they ought to change their courſe, when they have found good by it in former experience; for Machiavel noteth wiſely, how Fabius Maximus would have been temporizing ſtill, according to his old bias, when the nature of the war was altered, and required hot purſuit. In ſome other it is want of point and penetration in their judgment, that they do not

not discern when things have a period, but come in too late after the occasion; as Demosthenes compareth the people of Athens to country fellows, when they play in a fence school, that if they have a blow, then they remove the weapon to that ward, and not before. In some other it is a lothness to lose labours passed, and a conceit that they can bring about occasions to their ply; and yet in the end, when they see no other remedy, then they come to it with disadvantage; as Tarquinius, that gave for the third part of Sibyla's book the treble price, when he might at first have had all three for the simple. But from whatsoever root or cause this restiveness of mind proceedeth, it is a thing most prejudicial, and nothing is more politic than to make the wheels of our mind concentric and voluble with the wheels of fortune.

Another precept of this knowledge, which hath some affinity with that we last spoke of, but with difference, is that which is well expressed, *fatis accede deisque*, that men do not only turn with the occasions, but also run with the occasions, and not strain their credit or strength to over-hard or extreme points; but choose in their actions that which is most passable: for this will preserve men from foil, not occupy them too much about one matter, win opinion of moderation, please the most, and make a shew of a perpetual felicity in all they undertake; which cannot but mightily increase reputation.

Another part of this knowledge seemeth to have some repugnancy with the former two, but not as I understand it, and it is that which Demosthenes uttereth in high terms: *Et quemadmodum receptum est, ut exercitum ducat imperator, sic et à cordatis viris res ipsae ducendae; ut quae ipsis videntur, ea gerantur, et non ipsi eventus tantum persequi cogantur.* For, if we observe, we shall find two differing kinds of sufficiency in managing of business: some can make use of occasions aptly and dexterously, but plot little: some can urge and pursue their own plots well, but cannot accommodate nor take in; either of which is very imperfect without the other.

Another part of this knowledge is the observing a good mediocrity in the declaring, or not declaring a man's self: for although depth of secrecy, and making way, *qualis est via navis in mari*, which the French calleth *fourdes menées*, when men set things in work without opening themselves at all, be sometimes both prosperous and admirable, yet many times *Dissimulatio errores parit, qui dissimulatorem ipsum illaqueant.* And therefore, we see, the greatest politicians have in a natural and free manner professed their desires, rather than been reserved and disguised in them: for so we see that Lucius Sylla made a kind of profession, "that he wished all men "happy or unhappy, as they stood his friends or enemies." So Cæsar, when he first went into Gaul, made no scruple to profess, "that he had rather be first in a village, "than second at Rome." So again, as soon as he had begun the war, we see what Cicero saith of him, *Alter*, meaning of Cæsar, *non recusat, sed quodammodo postulat, ut, ut est, sic appelletur tyrannus.* So we may see in a letter of Cicero to Atticus, that Augustus Cæsar, in his very entrance into affairs, when he was a darling of the senate, yet in his harangues to the people would swear: *Ita parentis honores consequi liceat*, which was no less than the tyranny, save that, to help it, he would stretch forth his hand towards a statue of Cæsar's, that was erected in the place: and men laughed, and wondered, and said, Is it possible, or did you ever hear the like? and yet thought he meant no hurt, he did it so handsomely and ingenuously. And all these were prosperous: whereas Pompey, who tended to the same end, but in a more dark and dissembling manner, as Tacitus saith of him, *Occultior, non melior*, wherein Sallust concurreth,

concurreth, *ore probo, animo inverecundo*, made it his deſign, by infinite ſecret engines to caſt the ſtate into an abſolute anarchy and confuſion, that the ſtate might caſt itſelf into his arms for neceſſity and protection, and ſo the ſovereign power be put upon him, and he never ſeen in it: and when he had brought it, as he thought, to that point when he was choſen conſul alone, as never any was, yet he could make no great matter of it, becauſe men underſtood him not; but was fain in the end to go the beaten track of getting arms into his hands, by colour of the doubt of Cæſar's deſigns: ſo tedious, caſual, and unfortunate are theſe deep diſſimulations; whereof, it ſeemeth, Tacitus made this judgment, that they were a cunning of an inferior form in regard of true policy, attributing the one to Auguſtus, the other to Tiberius, where, ſpeaking of Livia, he ſaith, *Et cum artibus mariti, ſimulatione filii bene compoſita*; for ſurely the continual habit of diſſimulation is but a weak and ſluggiſh cunning, and not greatly politic.

Another precept of this architecture of fortune is, to accuſtom our minds to judge of the proportion or value of things, as they conduce and are material to our particular ends; and that to do ſubſtantially and not ſuperficially. For we ſhall find the logical part, as I may term it, of ſome mens minds good, but the mathematical part erroneous; that is, they can well judge of conſequences, but not of proportions and compariſons, preferring things of ſhew and ſenſe before things of ſubſtance and effect. So ſome fall in love with acceſs to princes, others with popular fame and applauſe, ſuppoſing they are things of great purchaſe; when, in many caſes, they are but matters of envy, peril, and impediment.

So ſome meaſure things according to the labour and difficulty, or aſſiduity, which are ſpent about them; and think if they be ever moving, that they muſt needs advance and proceed: as Cæſar ſaith in a deſpiſing manner of Cato the ſecond, when he deſcribeth how laborious and indefatigable he was to no great purpoſe: *Haec omnia magno ſtudio agebat*. So in moſt things men are ready to abuſe themſelves in thinking the greateſt means to be beſt, when it ſhould be the fitteſt.

As for the true marſhalling of mens purſuits towards their fortune, as they are more or leſs material, I hold them to ſtand thus: firſt, the amendment of their own minds; for the remove of the impediments of the mind will ſooner clear the paſſages of fortune, than the obtaining fortune will remove the impediments of the mind. In the ſecond place I ſet down wealth and means, which, I know, moſt men would have placed firſt, becauſe of the general uſe which it beareth towards all variety of occaſions. But that opinion I may condemn with like reaſon as Machiavel doth that other, that moneys were the ſinews of the wars, whereas, ſaith he, the true ſinews of the wars are the ſinews of mens arms, that is, a valiant, populous, and military nation; and he voucheth aptly the authority of Solon, who when Crœſus ſhewed him his treaſury of gold, ſaid to him, that if another came that had better iron, he would be maſter of his gold. In like manner it may be truly affirmed, that it is not moneys that are the ſinews of fortune, but it is the ſinews and ſteel of mens minds, wit, courage, audacity, reſolution, temper, induſtry, and the like. In the third place I ſet down reputation, becauſe of the peremptory tides and currents it hath, which if they be not taken in their due time, are ſeldom recovered, it being extreme hard to play an after-game of reputation. And laſtly I place honour, which is more eaſily won by any of the other three, much more by all, than any of them can be purchaſed by honour. To conclude this precept, as there is order and priority in matter, ſo is there in time, the prepoſterous placing whereof is one of the commoneſt

commoneſt errors, while men fly to their ends when they ſhould intend their beginnings; and do not take things in order of time as they come on, but marſhal them according to greatneſs, and not according to inſtance, not obſerving the good precept, *Quod nunc inſtat agamus.*

Another precept of this knowledge is, not to embrace any matters which do occupy too great a quantity of time, but to have that ſounding in a man's ears, *Sed fugit interea, fugit irreparabile tempus:* and that is the cauſe why thoſe which take their courſe of riſing by profeſſions of burden, as lawyers, orators, painful divines, and the like, are not commonly ſo politic for their own fortune, otherwiſe than in their ordinary way, becauſe they want time to learn particulars, to wait occaſions, and to deviſe plots.

Another precept of this knowledge is, to imitate nature, which doth nothing in vain; which ſurely a man may do if he do well interlace his buſineſs, and bend not his mind too much upon that which he principally intendeth. For a man ought in every particular action ſo to carry the motions of his mind, and ſo to have one thing under another, as if he cannot have that he ſeeketh in the beſt degree, yet to have it in a ſecond, or ſo in a third; and if he can have no part of that which he purpoſed, yet to turn the uſe of it to ſomewhat elſe; and if he cannot make any thing of it for the preſent, yet to make it as a ſeed of ſomewhat in time to come; and if he can contrive no effect or ſubſtance from it, yet to win ſome good opinion by it, or the like. So that he ſhould exact an account of himſelf of every action, to reap ſomewhat, and not to ſtand amazed and confuſed if he fail of that he chiefly meant: for nothing is more impolitic than to mind actions wholly one by one; for he that doth ſo, loſeth infinite occaſions which intervene, and are many times more proper and propitious for ſomewhat that he ſhall need afterwards, than for that which he urgeth for the preſent; and therefore men muſt be perfect in that rule, *Haec oportet facere, et illa non omittere.*

Another precept of this knowledge is, not to engage a man's ſelf peremptorily in any thing, though it ſeem not liable to accident, but ever to have a window to fly out at, or a way to retire; following the wiſdom in the ancient fable of the two frogs, which conſulted when their plaſh was dry whither they ſhould go, and the one moved to go down into a pit, becauſe it was not likely the water would dry there, but the other anſwered, "True, but if it do, how ſhall we get out again?"

Another precept of this knowledge is, that ancient precept of Bias, conſtrued not to any point of perfidiouſneſs, but only to caution and moderation, *Et ama tanquam inimicus futurus, et odi tanquam amaturus:* for it utterly betrayeth all utility for men to embark themſelves too far in unfortunate friendſhips, troubleſome ſpleens, and childiſh and humorous envies or emulations.

But I continue this beyond the meaſure of an example, led, becauſe I would not have ſuch knowledges, which I note as deficient, to be thought things imaginative, or in the air; or an obſervation or two much made of, but things of bulk and maſs, whereof an end is hardlier made than a beginning. It muſt be likewiſe conceived that in thoſe points which I mention and ſet down, they are far from complete tractates of them, but only as ſmall pieces for patterns: and laſtly, no man, I ſuppoſe, will think that I mean fortunes are not obtained without all this ado; for I know they come tumbling into ſome mens laps, and a number obtain good fortunes by diligence in a plain way, little intermeddling, and keeping themſelves from groſs errors.

But

But as Cicero, when he ſetteth down an idea of a perfect orator, doth not mean that every pleader ſhould be ſuch; and ſo likewiſe, when a prince or a courtier hath been deſcribed by ſuch as have handled thoſe ſubjects, the mold hath uſed to be made according to the perfection of the art, and not according to common practice: ſo I underſtand it, that it ought to be done in the deſcription of a politic man, I mean politic for his own fortune.

But it muſt be remembered all this while, that the precepts which we have ſet down, are of that kind which may be counted and called *bonae artes*. As for evil arts, if a man would ſet down for himſelf that principle of Machiavel; "that a man "ſeek not to attain virtue itſelf, but the appearance only thereof; becauſe the credit "of virtue is a help, but the uſe of it is cumber:" or that other of his principles; "that he preſuppoſe that men are not fitly to be wrought otherwiſe but by fear, "and therefore that he ſeek to have every man obnoxious, low, and in ſtrait," which the Italians call *ſeminar ſpine*, to ſow thorns: or that other principle contained in the verſe which Cicero citeth, *Cadant amici, dummodo inimici intercidant*, as the Triumvirs, which ſold, every one to other, the lives of their friends, for the deaths of their enemies: or that other proteſtation of L. Catilina, to ſet on fire, and trouble ſtates, to the end to fiſh in droumy waters, and to unwrap their fortunes, *Ego ſi quid in fortunis meis excitatum ſit incendium, id non aqua, ſed ruina reſtinguam*: or that other principle of Lyſander; "that children are to be deceived with comfits, and men with "oaths:" and the like evil and corrupt poſitions, whereof, as in all things, there are more in number than of the good: certainly, with theſe diſpenſations from the laws of charity and integrity, the preſſing of a man's fortune may be more haſty and compendious. But it is in life, as it is in ways, the ſhorteſt way is commonly the fouleſt, and ſurely the fairer way is not much about.

But men, if they be in their own power, and do bear and ſuſtain themſelves, and be not carried away with a whirlwind or tempeſt of ambition, ought, in the purſuit of their own fortune, to ſet before their eyes, not only that general map of the world, that *all things are vanity and vexation of ſpirit*, but many other more particular cards and directions: chiefly that, that being, without well-being, is a curſe, and the greater being the greater curſe; and that all virtue is moſt rewarded, and all wickedneſs moſt puniſhed in itſelf: according as the poet ſaith excellently:

Quae vobis quae digna viri, pro laudibus iſtis
Praemia poſſe rear ſolvi? pulcherrima primum
Dii moreſque dabunt veſtri.

And ſo of the contrary. And, ſecondly, they ought to look up to the eternal providence and divine judgment, which often ſubverteth the wiſdom of evil plots and imaginations, according to that Scripture, *He hath conceived miſchief, and ſhall bring forth a vain thing*. And although men ſhould refrain themſelves from injury and evil arts, yet this inceſſant and ſabbathleſs purſuit of a man's fortune leaveth not that tribute which we owe to God of our time, who, we ſee, demandeth a tenth of our ſubſtance, and a ſeventh, which is more ſtrict, of our time: and it is to ſmall purpoſe to have an erected face towards heaven, and a perpetual groveling ſpirit upon earth, eating duſt, as doth the ſerpent, *Atque affigit humo divinae particulam aurae*. And if any man flatter himſelf that he will employ his fortune well, though he ſhould obtain it ill, as was ſaid concerning Auguſtus Cæſar, and after of Septimius Severus, "that "either they ſhould never have been born, or elſe they ſhould never have died," they did ſo much miſchief in the purſuit and aſcent of their greatneſs, and ſo much good

good when they were eſtabliſhed: yet theſe compenſations and ſatisfactions are good to be uſed, but never good to be purpoſed. And, laſtly, it is not amiſs for men in their race towards their fortune, to cool themſelves a little with that conceit which is elegantly expreſſed by the emperor Charles the fifth, in his inſtructions to the king his ſon, "that fortune hath ſomewhat of the nature of a woman, that if ſhe be too much wooed, "ſhe is the farther off." But this laſt is but a remedy for thoſe whoſe taſtes are corrupted; let men rather build upon that foundation which is as a corner-ſtone of divinity and philoſophy, wherein they join cloſe, namely, that ſame *Primum quaerite.* For divinity ſaith, *Primum quaerite regnum Dei, et iſta omnia adjicientur vobis:* and philoſophy ſaith, *Primum quaerite bona animi, caetera aut aderunt, aut non oberunt.* And although the human foundation hath ſomewhat of the ſands, as we ſee in M. Brutus, when he brake forth into that ſpeech,

Te colui, virtus, ut rem: aſt tu nomen inane es:

yet the divine foundation is upon the rock. But this may ſerve for a taſte of that knowledge which I noted as deficient.

Concerning Government, it is a part of knowledge, ſecret and retired in both theſe reſpects, in which things are deemed ſecret; for ſome things are ſecret becauſe they are hard to know, and ſome becauſe they are not fit to utter; we ſee all governments are obſcure and inviſible.

Totamque infuſa per artus,
Mens agitat molem, et magno ſe corpore miſcet.

Such is the deſcription of governments: we ſee the government of God over the world is hidden, inſomuch as it ſeemeth to participate of much irregularity and confuſion: the government of the ſoul in moving the body is inward and profound, and the paſſages thereof hardly to be reduced to demonſtration. Again, the wiſdom of antiquity, the ſhadows whereof are in the poets, in the deſcription of torments and pains, next unto the crime of rebellion, which was the giants offence, doth deteſt the crime of futility, as in Siſyphus and Tantalus. But this was meant of particulars; nevertheleſs even unto the general rules and diſcourſes of policy and government there is due a reverent and reſerved handling.

But, contrariwiſe, in the governors towards the governed, all things ought, as far as the frailty of man permitteth, to be manifeſt and revealed. For ſo it is expreſſed in the Scriptures touching the government of God, that this globe which ſeemeth to us a dark and ſhady body, is in the view of God as cryſtal, *Et in conſpectu ſedis tanquam mare vitreum ſimile cryſtallo.* So unto princes and ſtates, ſpecially towards wiſe ſenates and councils, the natures and diſpoſitions of the people, their conditions and neceſſities, their factions and combinations, their animoſities and diſcontents, ought to be, in regard of the variety of their intelligences, the wiſdom of their obſervations, and the height of the ſtation where they keep centinel, in great part clear and tranſparent. Wherefore, conſidering that I write to a king that is a maſter of this ſcience, and is ſo well aſſiſted, I think it decent to paſs over this part in ſilence, as willing to obtain the certificate which one of the ancient philoſophers aſpired unto; who being ſilent when others contended to make demonſtration of their abilities by ſpeech, deſired it might be certified for his part, "that there was "one that knew how to hold his peace."

Notwithſtanding, for the more public part of government, which is laws, I think good to note only one deficiency: which is, that all thoſe which have written of laws, have written either as philoſophers, or as lawyers, and none as ſtateſmen. As

for the philoſophers, they make imaginary laws for imaginary commonwealths, and their diſcourſes are as the ſtars, which give little light, becauſe they are ſo high. For the lawyers, they write according to the ſtates where they live, what is received law, and not what ought to be law; for the wiſdom of a lawmaker is one, and of a lawyer is another. For there are in nature certain fountains of juſtice, whence all civil laws are derived but as ſtreams: and like as waters do take tinctures and taſtes from the ſoils through which they run, ſo do civil laws vary according to the regions and governments where they are planted, though they proceed from the ſame fountains. Again, the wiſdom of a lawmaker conſiſteth not only in a platform of juſtice, but in the application thereof; taking into conſideration, by what means laws may be made certain, and what are the cauſes and remedies of the doubtfulneſs and incertainty of law; by what means laws may be made apt and eaſy to be executed, and what are the impediments and remedies in the execution of laws; what influence laws touching private right of *meum* and *tuum* have into the public ſtate, and how they may be made apt and agreeable; how laws are to be penned and delivered, whether in texts or in acts, brief or large, with preambles, or without; how they are to be pruned and reformed from time to time, and what is the beſt means to keep them from being too vaſt in volumes, or too full of multiplicity and croſſneſs; how they are to be expounded, when upon cauſes emergent, and judicially diſcuſſed; and when upon reſponſes and conferences touching general points or queſtions; how they are to be preſſed rigorouſly or tenderly; how they are to be mitigated by equity and good conſcience, and whether diſcretion and ſtrict law are to be mingled in the ſame courts, or kept apart in ſeveral courts; again, how the practice, profeſſion, and erudition of law is to be cenſured and governed; and many other points touching the adminiſtration, and, as I may term it, animation of laws. Upon which I inſiſt the leſs, becauſe I purpoſe, if God give me leave, having begun a work of this nature, in aphoriſms, to propound it hereafter, noting it in the mean time for deficient.

De prudentia legiſlatoria, ſive de fontibus juris.

And for your majeſty's laws of England, I could ſay much of their dignity, and ſomewhat of their defect; but they cannot but excel the civil laws in fitneſs for the government; for the civil law was, *Non hos quaeſitum munus in uſus*; it was not made for the countries which it governeth: hereof I ceaſe to ſpeak, becauſe I will not intermingle matter of action with matter of general learning.

Thus have I concluded this portion of learning touching civil knowledge, and with civil knowledge have concluded human philoſophy; and with human philoſophy, philoſophy in general; and being now at ſome pauſe, looking back into that I have paſſed through, this writing ſeemeth to me, *ſi nunquam fallit imago*, as far as a man can judge of his own work, not much better than that noiſe or ſound which muſicians make while they are in tuning their inſtruments, which is nothing pleaſant to hear, but yet is a cauſe why the muſic is ſweeter afterwards. So have I been content to tune the inſtruments of the muſes, that they may play that have better hands. And ſurely, when I ſet before me the condition of theſe times, in which learning hath made her third viſitation or circuit in all the qualities thereof; as the excellency and vivacity of the wits of this age; the noble helps and lights which we have by the travels of ancient writers; the art of printing, which communicateth books to men of all fortunes; the openneſs of the world by navigation, which hath diſcloſed multitudes of experiments, and a maſs of natural hiſtory; the

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leiſure wherewith theſe times abound, not employing men ſo generally in civil buſineſs, as the ſtates of Græcia did, in reſpect of their popularity, and the ſtate of Rome in reſpect of the greatneſs of their monarchy; the preſent diſpoſition of theſe times at this inſtant to peace; the conſumption of all that ever can be ſaid in controverſies of religion, which have ſo much diverted men from other ſciences; the perfection of your majeſty's learning, which as a phœnix may call whole vollies of wits to follow you; and the inſeparable propriety of time, which is ever more and more to diſcloſe truth: I cannot but be raiſed to this perſuaſion, that this third period of time will far ſurpaſs that of the Græcian and Roman learning: only if men will know their own ſtrength, and their own weakneſs both; and take one from the other, light of invention, and not fire of contradiction; and eſteem of the inquiſition of truth, as of an enterpriſe, and not as of a quality or ornament; and employ wit and magnificence to things of worth and excellency, and not to things vulgar, and of popular eſtimation. As for my labours, if any man ſhall pleaſe himſelf, or others, in the reprehenſion of them, they ſhall make that ancient and patient requeſt, *Verbera, ſed audi*. Let men reprehend them, ſo they obſerve and weigh them. For the appeal is lawful, though it may be it ſhall not be needful, from the firſt cogitations of men to their ſecond, and from the nearer times to the times farther off. Now let us come to that learning, which both the former times were not ſo bleſſed as to know, ſacred and inſpired Divinity, the ſabbath and port of all mens labours and peregrinations.

The prerogative of God extendeth as well to the reaſon, as to the will of man; ſo that as we are to obey his law, though we find a reluctation in our will; ſo we are to believe his word, though we find a reluctation in our reaſon. For if we believe only that which is agreeable to our ſenſe, we give conſent to the matter, and not to the author, which is no more than we would do towards a ſuſpected and diſcredited witneſs: but that faith which was *accounted to Abraham for righteouſneſs*, was of ſuch a point, as whereat Sarah laughed, who therein was an image of natural reaſon.

Howbeit, if we will truly conſider it, more worthy it is to believe, than to know as we now know. For in knowledge man's mind ſuffereth from ſenſe, but in belief it ſuffereth from ſpirit, ſuch one as it holdeth for more authoriſed than itſelf; and ſo ſuffereth from the worthier agent. Otherwiſe it is of the ſtate of man glorified, for then faith ſhall ceaſe, and *we ſhall know as we are known*.

Wherefore we conclude, that ſacred theology, which in our idiom we call divinity, is grounded only upon the word and oracle of God, and not upon the light of nature: for it is written, *Coeli enarrant gloriam Dei*: but it is not written, *Coeli enarrant voluntatem Dei*: but of that it is ſaid, *Ad legem et teſtimonium, ſi non fecerint ſecundum verbum iſtud, etc.* This holdeth not only in thoſe points of faith which concern the great myſteries of the Deity, of the creation, of the redemption, but likewiſe thoſe which concern the law moral truly interpreted; *Love your enemies: do good to them that hate you: be like to your heavenly Father, that ſuffereth his rain to fall upon the juſt and unjuſt*. To this it ought to be applauded, *Nec vox hominem ſonat*, it is a voice beyond the light of nature. So we ſee the heathen poets, when they fall upon a libertine paſſion, do ſtill expoſtulate with laws and moralities, as if they were oppoſite and malignant to nature; *Et quod natura remittit, Invida jura negant*. So ſaid Dendamis the Indian unto Alexander's meſſengers; "That he "had heard ſomewhat of Pythagoras, and ſome other of the wiſe men of Græcia,

" and that he held them for excellent men: but that they had a fault, which was, that " they had in too great reverence and veneration a thing they called law and man- " ners." So it must be confessed that a great part of the law moral is of that perfection, whereunto the light of nature cannot aspire: how then is it, that man is said to have, by the light and law of nature, some notions and conceits of virtue and vice, justice and wrong, good and evil? Thus, because the light of nature is used in two several senses; the one, that which springeth from reason, sense, induction, argument, according to the laws of heaven and earth; the other, that which is imprinted upon the spirit of man by an inward instinct, according to the law of conscience, which is a sparkle of the purity of his first estate: in which latter sense only he is participant of some light and discerning touching the perfection of the moral law: but how? Sufficient to check the vice, but not to inform the duty. So then the doctrine of religion, as well moral as mystical, is not to be attained, but by inspiration and revelation from God.

The use, notwithstanding, of reason in spiritual things, and the latitude thereof, is very great and general; for it is not for nothing that the apostle calleth religion our *reasonable service* of God, insomuch as the very ceremonies and figures of the old law were full of reason and signification, much more than the ceremonies of idolatry and magic, that are full of non-significants and surd characters. But most especially the christian faith, as in all things, so in this, deserveth to be highly magnified, holding and preserving the golden mediocrity in this point, between the law of the heathen, and the law of Mahomet, which have embraced the two extremes. For the religion of the heathen had no constant belief or confession, but left all to the liberty of argument; and the religion of Mahomet, on the other side, interdicteth argument altogether: the one having the very face of error, and the other of imposture; whereas the faith doth both admit and reject disputation with difference.

The use of human reason in religion is of two sorts: the former, in the conception and apprehension of the mysteries of God to us revealed; the other, in the inferring and deriving of doctrine and direction thereupon. The former extendeth to the mysteries themselves; but how? By way of illustration, and not by way of argument. The latter consisteth indeed of probation and argument. In the former, we see, God vouchsafeth to descend to our capacity, in the expressing of his mysteries in such sort as may be sensible unto us; and doth graft his revelations and holy doctrine upon the notions of our reason, and applieth his inspirations to open our understanding, as the form of the key to the ward of the lock. For the latter, there is allowed us an use of reason and argument, secondary and respective, although not original and absolute. For after the articles and principles of religion are placed and exempted from examination of reason, it is then permitted unto us to make derivations and inferences from, and according to the analogy of them, for our better direction. In nature this holdeth not, for both the principles are examinable by induction, though not by a medium or syllogism; and, besides, those principles or first positions have no discordance with that reason, which draweth down and deduceth the inferior positions. But yet it holdeth not in religion alone, but in many knowledges, both of greater and smaller nature, namely, wherein there are not only *posita* but *placita*; for in such there can be no use of absolute reason: we see it familiarly in games of wit, as chess, or the like; the draughts and first laws of the game are positive, but how? Merely *ad placitum*, and not examin-

able

able by reaſon: but then how to direct our play thereupon with beſt advantage to win the game, is artificial and rational. So in human laws, there be many grounds and maxims, which are *placita juris*, poſitive upon authority, and not upon reaſon, and therefore not to be diſputed: but what is moſt juſt, not abſolutely, but relatively and according to thoſe maxims, that affordeth a long field of diſputation. Such therefore is that ſecondary reaſon, which hath place in divinity, which is grounded upon the *placets* of God.

De uſu legitimo rationis humanae in divinis.

Here therefore I note this deficiency, that there hath not been, to my underſtanding, ſufficiently inquired and handled the true limits and uſe of reaſon in ſpiritual things, as a kind of divine dialectic: which for that it is not done, it ſeemeth to me a thing uſual, by pretext of true conceiving that which is revealed, to ſearch and mine into that which is not revealed, and, by pretext of enucleating inferences and contradictories, to examine that which is poſitive: the one ſort falling into the error of Nicodemus, demanding to have things made more ſenſible than it pleaſeth God to reveal them, *Quomodo poſſit homo naſci cum ſit ſenex?* the other ſort into the error of the diſciples, which were ſcandalized at a ſhew of contradiction, *Quid eſt hoc, quod dicit nobis? Modicum et non videbitis me, et iterum modicum, et videbitis me, etc.*

Upon this I have inſiſted the more, in regard of the great and bleſſed uſe thereof; for this point, well laboured and defined of, would, in my judgment, be an opiate to ſtay and bridle not only the vanity of curious ſpeculations, wherewith the ſchools labour, but the fury of controverſies, wherewith the church laboureth. For it cannot but open mens eyes, to ſee that many controverſies do merely pertain to that which is either not revealed, or poſitive, and that many others do grow upon weak and obſcure inferences or derivations; which latter ſort, if men would revive the bleſſed ſtile of that great doctor of the Gentiles, would be carried thus; *Ego, non Dominus*; and again, *Secundum conſilium meum*; in opinions and counſels, and not in poſitions and oppoſitions. But men are now over-ready to uſurp the ſtile, *Non ego, ſed Dominus*; and not ſo only, but to bind it with the thunder and denunciation of curſes and anathemas, to the terror of thoſe which have not ſufficiently learned out of Solomon, that *the cauſeleſs curſe ſhall not come.*

Divinity hath two principal parts; the matter informed or revealed, and the nature of the information or revelation: and with the latter we will begin, becauſe it hath moſt coherence with that which we have now laſt handled. The nature of the information conſiſteth of three branches; the limits of the information, the ſufficiency of the information, and the acquiring or obtaining the information. Unto the limits of the information, belong theſe conſiderations; how far forth particular perſons continue to be inſpired; how far forth the church is inſpired; and how far forth reaſon may be uſed: the laſt point whereof I have noted as deficient. Unto the ſufficiency of the information belong two conſiderations; what points of religion are fundamental, and what perfective, being matter of farther building and perfection upon one and the ſame foundation; and again, how the gradations of light, according to the diſpenſation of times, are material to the ſufficiency of belief.

De gradibus unitatis in civitate Dei.

Here again I may rather give it in advice, than note it as deficient, that the points fundamental, and the points of farther perfection only ought to be with piety and wiſdom diſtinguiſhed; a ſubject tending to much like end, as that I noted before; for as that other were likely to abate the number of controverſies, ſo this is like to abate

abate the heat of many of them. We ſee Moſes when he ſaw the Iſraelite and the Ægyptian fight, he did not ſay, *Why ſtrive you?* but drew his ſword and ſlew the Ægyptian: but when he ſaw the two Iſraelites fight, he ſaid, *You are brethren, why ſtrive you?* If the point of doctrine be an Ægyptian, it muſt be ſlain by *the ſword of the Spirit*, and not reconciled: but if it be an Iſraelite, though in the wrong, then, *Why ſtrive you?* We ſee of the fundamental points, our Saviour penneth the league thus; *He that is not with us, is againſt us*; but of points not fundamental, thus; *He that is not againſt us, is with us.* So we ſee the coat of our Saviour was intire without ſeam, and ſo is the doctrine of the Scriptures in itſelf; but the garment of the church was of divers colours, and yet not divided: we ſee the chaff may and ought to be ſevered from the corn in the ear, but the tares may not be pulled up from the corn in the field. So as it is a thing of great uſe well to define, what, and of what latitude thoſe points are, which do make men merely aliens and diſincorporate from the church of God.

For the obtaining of the information, it reſteth upon the true and ſound interpretation of the Scriptures, which are the fountains of the water of life. The interpretations of the Scriptures are of two ſorts: methodical, and ſolute or at large. For this divine water, which excelleth ſo much that of Jacob's well, is drawn forth much in the ſame kind, as natural water uſeth to be out of wells and fountains; either it is firſt forced up into a ciſtern, and from thence fetched and derived for uſe; or elſe it is drawn and received in buckets and veſſels immediately where it ſpringeth. The former ſort whereof, though it ſeem to be the more ready, yet, in my judgment, is more ſubject to corrupt. This is that method which hath exhibited unto us the ſcholaſtical divinity, whereby divinity hath been reduced into an art, as into a ciſtern, and the ſtreams of doctrine or poſitions fetched and derived from thence.

In this men have ſought three things, a ſummary brevity, a compacted ſtrength, and a complete perfection; whereof the two firſt they fail to find, and the laſt they ought not to ſeek. For as to brevity, we ſee, in all ſummary methods, while men purpoſe to abridge, they give cauſe to dilate. For the ſum, or abridgment, by contraction becometh obſcure; the obſcurity requireth expoſition, and the expoſition is deduced into large commentaries, or into common places and titles, which grow to be more vaſt than the original writings, whence the ſum was at firſt extracted. So, we ſee, the volumes of the ſchoolmen are greater much than the firſt writings of the fathers, whence the maſter of the Sentences made his ſum or collection. So, in like manner, the volumes of the modern doctors of the civil law exceed thoſe of the ancient juriſconſults, of which Trebonian compiled the digeſt. So as this courſe of ſums and commentaries is that which doth infallibly make the body of ſciences more immenſe in quantity, and more baſe in ſubſtance.

And for ſtrength, it is true, that knowledges reduced into exact methods have a ſhew of ſtrength, in that each part ſeemeth to ſupport and ſuſtain the other; but this is more ſatisfactory than ſubſtantial: like unto buildings which ſtand by architecture and compaction, which are more ſubject to ruin, than thoſe that are built more ſtrong in their ſeveral parts, though leſs compacted. But it is plain, that the more you recede from your grounds, the weaker do you conclude: and as in nature, the more you remove yourſelf from particulars, the greater peril of error you do incur; ſo much more in divinity, the more you recede from the Scriptures, by inferences and conſequences, the more weak and dilute are your poſitions.

And

And as for perfection, or completeneſs in divinity, it is not to be ſought; which makes this courſe of artificial divinity the more ſuſpect. For he that will reduce a knowledge into an art, will make it round and uniform: but, in divinity, many things muſt be left abrupt and concluded with this: *O altitudo ſapientiae et ſcientiae Dei! quam incomprehenſibilia ſunt judicia ejus, et non inveſtigabiles viae ejus?* So again the apoſtle ſaith, *Ex parte ſcimus*; and to have the form of a total, where there is but matter for a part, cannot be without ſupplies by ſuppoſition and preſumption. And therefore I conclude, that the true uſe of theſe ſums and methods hath place in inſtitutions or introductions preparatory unto knowledge; but in them, or by deducement from them, to handle the main body and ſubſtance of a knowledge, is in all ſciences prejudicial, and in divinity dangerous.

As to the interpretation of the Scriptures ſolute and at large, there have been devers kinds introduced and deviſed; ſome of them rather curious and unſafe, than ſober and warranted. Notwithſtanding, thus much muſt be confeſſed, that the Scriptures being given by inſpiration, and not by human reaſon, do differ from all other books in the author; which by conſequence doth draw on ſome difference to be uſed by the expoſitor. For the inditer of them did know four things which no man attains to know; which are, the myſteries of the kingdom of glory, the perfection of the laws of nature, the ſecrets of the heart of man, and the future ſucceſſion of all ages. For as to the firſt, it is ſaid, *He that preſſeth into the light, ſhall be oppreſſed of the glory.* And again, *No man ſhall ſee my face and live.* To the ſecond, *When he prepared the heavens I was preſent, when by law and compaſs he incloſed the deep.* To the third, *Neither was it needful that any ſhould bear witneſs to him of man, for he knew well what was in man.* And to the laſt, *From the beginning are known to the Lord all his works.*

From the former of theſe two have been drawn certain ſenſes and expoſitions of Scriptures, which had need be contained within the bounds of ſobriety; the one anagogical, and the other philoſophical. But as to the former, man is not to prevent his time; *Videmus nunc per ſpeculum in aenigmate, tunc autem facie ad faciem*; wherein, nevertheleſs, there ſeemeth to be a liberty granted, as far forth as the poliſhing of this glaſs, or ſome moderate explication of this ænigma. But to preſs too far into it, cannot but cauſe a diſſolution and overthrow of the ſpirit of man: for in the body there are three degrees of that we receive into it, aliment, medicine, and poiſon; whereof aliment is that which the nature of man can perfectly alter and overcome; medicine is that which is partly converted by nature, and partly converteth nature; and poiſon is that which worketh wholly upon nature, without that, that nature can in any part work upon it: ſo in the mind, whatſoever knowledge reaſon cannot at all work upon and convert, is a mere intoxication, and indangereth a diſſolution of the mind and underſtanding.

But for the latter, it hath been extremely ſet on foot of late time by the ſchool of Paracelſus, and ſome others, that have pretended to find the truth of all natural philoſophy in the Scriptures; ſcandalizing and traducing all other philoſophy as heatheniſh and profane. But there is no ſuch enmity between God's word and his works: neither do they give honour to the Scriptures, as they ſuppoſe, but much embaſe them. For to ſeek heaven and earth in the word of God, whereof it is ſaid, *heaven and earth ſhall paſs, but my word ſhall not paſs*, is to ſeek temporary things amongſt eternal: and as to ſeek divinity in philoſophy, is to ſeek the living amongſt the dead; ſo to ſeek philoſophy in divinity, is to ſeek the dead amongſt the living; neither

neither are the pots or lavers, whoſe place was in the outward part of the temple, to be ſought in the holieſt place of all, where the ark of the teſtimony was ſeated. And again, the ſcope or purpoſe of the Spirit of God is not to expreſs matters of nature in the Scriptures, otherwiſe than in paſſage, and for application to man's capacity, and to matters moral or divine. And it is a true rule, *Auctoris aliud agentis parva auctoritas:* for it were a ſtrange concluſion, if a man ſhould uſe a ſimilitude for ornament or illuſtration ſake, borrowed from nature or hiſtory according to vulgar conceit, as of a baſiliſk, an unicorn, a centaur, a Briareus, an Hydra, or the like, that therefore he muſt needs be thought to affirm the matter thereof poſitively to be true. To conclude therefore, theſe two interpretations, the one by reduction or ænigmatical, the other philoſophical or phyſical, which have been received and purſued in imitation of the rabbins and cabaliſts, are to be confined with a *noli altum ſapere, ſed time.*

But the two latter points, known to God, and unknown to man, touching the ſecrets of the heart, and the ſucceſſions of time, do make a juſt and ſound difference between the manner of the expoſition of the Scriptures, and all other books. For it is an excellent obſervation which hath been made upon the anſwers of our Saviour Chriſt to many of the queſtions which were propounded to him, how that they are impertinent to the ſtate of the queſtion demanded; the reaſon whereof is, becauſe not being like man, which knows man's thoughts by his words, but knowing man's thoughts immediately, he never anſwered their words, but their thoughts: much in the like manner it is with the Scriptures, which being written to the thoughts of men, and to the ſucceſſion of all ages, with a foreſight of all hereſies, contradictions, differing eſtates of the church, yea and particularly of the elect, are not to be interpreted only according to the latitude of the proper ſenſe of the place, and reſpectively towards that preſent occaſion, whereupon the words were uttered, or in preciſe congruity or contexture with the words before or after, or in contemplation of the principal ſcope of the place; but have in themſelves, not only totally or collectively, but diſtributively in clauſes and words, infinite ſprings and ſtreams of doctrine to water the church in every part: and therefore as the literal ſenſe is, as it were, the main ſtream or river, ſo the moral ſenſe chiefly, and ſometimes the allegorical or typical, are they whereof the church hath moſt uſe: not that I wiſh men to be bold in allegories, or indulgent or light in alluſions; but that I do much condemn that interpretation of the Scripture, which is only after the manner as men uſe to interpret a profane book.

In this part, touching the expoſition of the Scriptures, I can report no deficience; but by way of remembrance this I will add, in peruſing books of divinity, I find many books of controverſies, and many of common places, and treatiſes, a maſs of poſitive divinity as it is made an art; a number of ſermons and lectures, and many prolix commentaries upon the Scriptures, with harmonies and concordances: but that form of writing in divinity, which in my judgment is of all others moſt rich and precious, is poſitive divinity collected upon particular texts of Scriptures in brief obſervations, not dilated into common places; not chaſing after controverſies, not reduced into method of art; a thing abounding in ſermons, which will vaniſh, but defective in books which will remain, and a thing wherein this age excelleth. For I am perſuaded, and I may ſpeak it with an *Abſit invidia verbo*, and no ways in derogation of antiquity, but as in a good emulation between the vine and the olive, that if the choice and beſt of thoſe obſervations upon texts of Scriptures,

tures, which have been made diſperſedly in ſermons within this your majeſty's iſland of Britain, by the ſpace of theſe forty years and more, leaving out the largeneſs of exhortations and applications thereupon, had been ſet down in a continuance, it had been the beſt work in divinity, which had been written ſince the apoſtles times.

The matter informed by divinity is of two kinds; matter of belief, and truth of opinion; and matter of ſervice and adoration; which is alſo judged and directed by the former; the one being as the internal ſoul of religion, and the other as the external body thereof. And therefore the heathen religion was not only a worſhip of idols, but the whole religion was an idol in itſelf, for it had no ſoul; that is, no certainty of belief or confeſſion; as a man may well think, conſidering the chief doctors of their church were the poets: and the reaſon was, becauſe the heathen gods were no jealous gods, but were glad to be admitted into part, as they had reaſon. Neither did they reſpect the pureneſs of heart, ſo they might have external honour and rites.

But out of theſe two do reſult and iſſue four main branches of divinity; faith, manners, liturgy, and government. Faith containeth the doctrine of the nature of God, of the attributes of God, and of the works of God. The nature of God conſiſteth of three perſons in unity of Godhead. The attributes of God are either common to the Deity, or reſpective to the perſons. The works of God ſummary are two, that of the creation, and that of the redemption; and both theſe works, as in total they appertain to the unity of the Godhead, ſo in their parts they refer to the three perſons: that of the creation, in the maſs of the matter, to the Father; in the diſpoſition of the form, to the Son; and in the continuance and conſervation of the being, to the Holy Spirit; ſo that of the redemption, in the election and counſel, to the Father; in the whole act and conſummation to the Son; and in the application, to the Holy Spirit: for by the Holy Ghoſt was Chriſt conceived in fleſh, and by the Holy Ghoſt are the elect regenerated in ſpirit. This work likewiſe we conſider either effectually, in the elect; or privately, in the reprobate; or according to appearance, in the viſible church.

For manners, the doctrine thereof is contained in the law, which diſcloſeth ſin. The law itſelf is divided, according to the edition thereof, into the law of nature, the law moral, and the law poſitive; and, according to the ſtile, into negative and affirmative, prohibitions and commandments. Sin, in the matter and ſubject thereof, is divided according to the commandments; in the form thereof, it referreth to the three perſons in Deity. Sins of infirmity againſt the Father, whoſe more ſpecial attribute is power; ſins of ignorance againſt the Son, whoſe attribute is wiſdom; and ſins of malice againſt the Holy Ghoſt, whoſe attribute is grace or love. In the motions of it, it either moveth to the right hand or to the left, either to blind devotion, or to profane and libertine tranſgreſſion; either in impoſing reſtraint where God granteth liberty, or in taking liberty where God impoſeth reſtraint. In the degrees and progreſs of it, it divideth itſelf into thought, word, or act. And in this part I commend much the deducing of the law of God to caſes of conſcience, for that I take indeed to be a breaking, and not exhibiting whole of the bread of life. But that which quickneth both theſe doctrines of faith and manners, is the elevation and conſent of the heart; whereunto appertain books of exhortation, holy meditation, chriſtian reſolution, and the like.

For the liturgy or ſervice, it conſiſteth of the reciprocal acts between God and man; which, on the part of God, are the preaching of the word, and the ſacraments,

which are ſeals to the covenant, or as the viſible word; and on the part of man, invocation of the name of God; and, under the law, ſacrifices; which were as viſible prayers or confeſſions; but now the adoration being *in ſpiritu et veritate*, there remaineth only *vituli labiorum*, although the uſe of holy vows of thankfulneſs and retribution may be accounted alſo as ſealed petitions.

And for the government of the church, it conſiſteth of the patrimony of the church, the franchiſes of the church, and the offices and juriſdictions of the church, and the laws of the church directing the whole; all which have two conſiderations, the one in themſelves, the other how they ſtand compatible and agreeable to the civil eſtate.

This matter of divinity is handled either in form of inſtruction of truth, or in form of confutation of falſhood. The declinations from religion, beſides the primitive, which is atheiſm, and the branches thereof, are three; hereſies, idolatry, and witchcraft: hereſies, when we ſerve the true God with a falſe worſhip; idolatry, when we worſhip falſe gods, ſuppoſing them to be true; and witchcraft, when we adore falſe gods, knowing them to be wicked and falſe. For ſo your majeſty doth excellently well obſerve, that witchcraft is the height of idolatry. And yet we ſee though theſe be true degrees, Samuel teacheth us that they are all of a nature, when there is once a receding from the word of God; for ſo he ſaith, *Quaſi peccatum ariolandi eſt repugnare, et quaſi ſcelus idolatriae nolle acquieſcere.*

Theſe things I have paſſed over ſo briefly, becauſe I can report no deficiency concerning them: for I can find no ſpace or ground that lieth vacant and unſown in the matter of divinity; ſo diligent have men been, either in ſowing of good ſeed, or in ſowing of tares.

Thus have I made as it were a ſmall globe of the intellectual world, as truly and faithfully as I could diſcover, with a note and deſcription of thoſe parts which ſeem to me not conſtantly occupate, or not well converted by the labour of man. In which, if I have in any point receded from that which is commonly received, it hath been with a purpoſe of proceeding *in melius*, and not *in aliud:* a mind of amendment and proficience, and not of change and difference. For I could not be true and conſtant to the argument I handle, if I were not willing to go beyond others, but yet not more willing than to have others go beyond me again; which may the better appear by this, that I have propounded my opinions naked and unarmed, not ſeeking to preoccupate the liberty of mens judgments by confutations. For in any thing which is well ſet down, I am in good hope, that if the firſt reading move an objection, the ſecond reading will make an anſwer. And in thoſe things wherein I have erred, I am ſure, I have not prejudiced the right by litigious arguments, which certainly have this contrary effect and operation, that they add authority to error, and deſtroy the authority of that which is well invented. For queſtion is an honour and preferment to falſhood, as on the other ſide it is a repulſe to truth. But the errors I claim and challenge to myſelf as my own. The good, if any be, is due *tanquam adeps ſacrificii*, to be incenſed to the honour firſt of the Divine Majeſty, and next of your majeſty, to whom on earth I am moſt bounden.

MAGNALIA NATURAE,

PRAECIPUE QUOAD USUS HUMANOS.

THE prolongation of life: the reſtitution of youth in ſome degree: the retardation of age: the curing of diſeaſes counted incurable: the mitigation of pain: more eaſy and leſs lothſome purgings: the increaſing of ſtrength and activity: the increaſing of ability to ſuffer torture or pain: the altering of complexions, and fatneſs and leanneſs: the altering of ſtatures: the altering of features: the increaſing and exalting of the intellectual parts: verſions 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 puting them in good diſpoſition: force of the imagination, either upon another body, or upon the body itſelf: acceleration of time in maturations: acceleration of time in clarifications: acceleration of putrefaction: acceleration of decoction: acceleration of germination: making rich compoſts for the earth: impreſſions of the air, and raiſing of tempeſts: great alteration; as in induration, emollition, *etc.* turning crude and watry ſubſtances into oily and unctuous ſubſtances: drawing of new foods out of ſubſtances not now in uſe: making new threads for apparel; and new ſtuffs, ſuch as paper, glaſs, *etc.* natural divinations: deceptions of the ſenſes: greater pleaſures of the ſenſes: artificial minerals and cements.

SYLVA SYLVARUM:

OR, A

NATURAL HISTORY.

IN

TEN CENTURIES.

TO THE

READER.

HAving had the honour to be continually with my lord, in compiling of this work, and to be employed therein, I have thought it not amiſs, with his lordſhip's good leave and liking, for the better ſatisfaction of thoſe that ſhall read it, to make known ſomewhat of his lordſhip's intentions touching the ordering, and publiſhing of the ſame. I have heard his lordſhip often ſay, that, if he ſhould have ſerved the glory of his own name, he had been better not to have publiſhed this Natural Hiſtory: for it may ſeem an indigeſted heap of particulars, and cannot have that luſtre, which books caſt into methods have; but that he reſolved to prefer the good of men, and that which might beſt ſecure it, before any thing that might have relation to himſelf. And he knew well, that there was no other way open to unlooſe mens 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 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 all 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 he deſerveth to be an architect in this building, ſhould be forced to be a workman, and a labourer, and to dig the clay, and burn the brick; and, more than 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;*

ments; as long as they be God's works, they are honourable enough. And for the vulgarneſs of them, true axioms muſt be drawn from plain experience, and not from doubtful; and his lordſhip's courſe is to make wonders plain, and not plain things wonders; and that experience likewiſe muſt be broken and grinded, and not whole, or as it groweth. And for uſe; his lordſhip hath often in his mouth the two kinds of experiments; experimenta fructifera, *and* experimenta lucifera: *experiments of uſe, and experiments of light: and he reporteth himſelf, whether he were not a ſtrange man, that ſhould think that light hath no uſe becauſe it hath no matter. Further, his lordſhip thought good alſo to add unto many of the experiments themſelves ſome gloſs of the cauſes; that in the ſucceeding work of interpreting nature, and framing axioms, all things may be in more readineſs. And for the cauſes herein by him aſſigned; his lordſhip perſuadeth himſelf, they are far more certain than thoſe that are rendred by others; not for any excellency of his own wit, as his lordſhip is wont to ſay, but in reſpect of his continual converſation with nature and experience. He did conſider likewiſe, that by this addition of cauſes, mens minds, which make ſo much haſte to find 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 find that they have a ſecret order, was, becauſe he conceived that other men would now think that they could do the like; and ſo go on with a further collection: which, if the method had been exact, many would have deſpaired to attain by imitation. As for his lordſhip's love of order, I can refer any man to his lordſhip's latin book,* De Augmentis Scientiarum; *which, if my judgment be any thing, is written in the exacteſt order that I know any writing to be. I will conclude with an uſual ſpeech of his lordſhip's: 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 of imagination.*

W. RAWLEY.

This epiſtle is the ſame, that ſhould have been prefixed to this book, if his lordſhip had lived.

NATURAL HISTORY.

CENTURY I.

Experiments in conſort, touching the ſtraining and paſſing of bodies one through another; which they call Percolation.

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 miſtook 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.

2. I REMEMBER to have read, that trial hath been made of ſalt-water paſſed through earth, through ten veſſels, one within another; and yet it hath not loſt its ſaltneſs, as to become potable: but the ſame man ſaith, that, by the relation of another, ſalt-water drained through twenty veſſels hath become freſh. This experiment ſeemeth to croſs that other of pits made by the ſea-ſide; and yet but in part, if it be true that twenty repetitions do the effect. But it is worth the note, how poor the imitations of nature are in common courſe of experiments, except they be led by great judgment, and ſome good light of axioms. For firſt, there is no ſmall difference between a paſſage of water through twenty ſmall veſſels, and through ſuch a diſtance, as between the low-water and high-water mark. Secondly, there is a great difference between earth and ſand; for all earth hath in it a kind of nitrous ſalt, from which ſand is more free; and beſides, earth doth not ſtrain the water ſo finely, as ſand doth. But there is a third point, that I ſuſpect as much or more than the other two; and that is, that in the experiment of tranſmiſſion of the ſea-water into the pits, the water riſeth; but in the experiment of tranſmiſſion of the water through the veſſels, it falleth. Now certain it is, that the ſalter part of water, once ſalted throughout, goeth to the bottom. And therefore no marvel, if the draining of water by deſcent doth not make it freſh: beſides, I do ſomewhat doubt, that the very daſhing of the water, that cometh from the ſea, is more proper to ſtrike off the ſalt part, than where the water ſlideth of its own motion.

3. IT ſeemeth percolation, or tranſmiſſion, which is commonly called ſtraining, is a good kind of ſeparation, not only of thick from thin, and groſs from fine, but of more ſubtile natures; and varieth according to the body through which the tranſmiſſion is made: as if through a woollen bag, the liquor leaveth the fatneſs; if through ſand, the ſaltneſs, etc. They ſpeak of ſevering wine from water, paſſing it through ivy wood, or through other the like porous body; but *non conſtat*.

4. THE gum of trees, which we ſee to be commonly ſhining and clear, is but a fine paſſage or ſtraining of the juice of the tree through the wood and bark. And in like manner, Corniſh diamonds, and rock rubies, which are yet more reſplendent than gums, are the fine exudations of ſtone.

5. ARISTOTLE giveth the cauſe, vainly, why the feathers of birds are of more lively colours, than the hairs of beaſts; for no beaſt hath any fine azure, or carnation, or green hair. He ſaith, it is becauſe birds are more in the beams of the ſun than beaſts; but that is manifeſtly untrue; for cattle are more in the ſun than birds, that live commonly in the woods, or in ſome covert. The true cauſe is, that the 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.

6. THE clarifying of liquors by adheſion, is an inward percolation; and is effected, when ſome cleaving body is mixed and agitated with the liquors; whereby the groſſer part of the liquor ſticks to that cleaving body; and ſo the finer parts are freed from the groſſer. So the apothecaries clarify their ſyrups by whites of eggs, beaten with the juices which they would clarify; which whites of eggs gather all the dregs and groſſer 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 hippocras is clarified by mixing with milk, and ſtirring it about, and then paſſing it through a woollen bag, which they call Hippocrates's Sleeve, and the cleaving nature of the milk draweth the powder of the ſpices, and groſſer parts of the liquor to it; and in the paſſage they ſtick upon the woollen bag.

7. THE clarifying of water is an experiment tending to health; beſides the pleaſure of the eye, when water is cryſtalline. It is effected by caſting in and placing pebbles at the head of a current, that the water may ſtrain through them.

8. IT may be, percolation doth not only cauſe clearneſs and ſplendor, but ſweetneſs of ſavour; for that alſo followeth as well as clearneſs, when the finer parts are ſevered from the groſſer. So it is found, that the ſweats of men, that have much heat, and exerciſe much, and have clean bodies, and fine ſkins, do ſmell ſweet; as was ſaid of Alexander; and we ſee that commonly gums have ſweet odours.

Experiments in conſort, touching Motion of bodies upon their preſſure.

9. TAKE a glaſs, and put water into it, and wet your finger, and draw it round about the lip of the glaſs, preſſing it ſomewhat hard; and after you have drawn it ſome few times about, it will make the water friſk and ſprinkle up in a fine dew. This inſtance doth excellently demonſtrate the force of compreſſion in a ſolid body: for whenſoever a ſolid body, as wood, ſtone, metal, *etc.* 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 inquired; 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 itſelf; 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 daſh; but in ſolids, which break not, it is ſo ſubtile, as it is inviſible; but nevertheleſs bewrayeth itſelf by many effects; as in this inſtance whereof we ſpeak. For the

the preſſure of the finger, furthered by the wetting, becauſe it ſticketh ſo much the better unto the lip of the glaſs, after ſome continuance, putteth all the ſmall parts of the glaſs into work; that they ſtrike the water ſharply; from which percuſſion that ſprinkling cometh.

10. IF you ſtrike or pierce a ſolid body that is brittle, as glaſs, or ſugar, it breaketh not only where the immediate force is; but breaketh all about into ſhivers and fitters; the motion, upon the preſſure, ſearching all ways, and breaking where it findeth the body weakeſt.

11. 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.

12. THIS motion upon preſſure, and the reciprocal thereof, which is motion upon tenſure, we uſe to call by one common name, motion of liberty; which is, when any body, being forced to a 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.

13. 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 ſtring, as ſoon as the quill of the jack falleth from it, ſtoppeth. For theſe ſounds are produced by the ſubtile percuſſion of the minute parts of the bell, or ſtring, upon the air; all one, as the water is cauſed to leap by the ſubtile percuſſion of the minute parts of the glaſs, upon the water, whereof we ſpake a little before in the ninth experiment. For you muſt not take it to be the local ſhaking of the bell, or ſtring, that doth it: as we ſhall fully declare, when we come hereafter to handle ſounds.

Experiments in conſort, touching ſeparations of bodies by weight.

14. TAKE a glaſs with a belly and a long neb; fill the belly, in part, with water: take alſo another glaſs, whereinto put claret wine and water mingled; reverſe the firſt glaſs, with the belly upwards, ſtopping the neb with your finger; then dip the mouth of it within the ſecond glaſs, and remove your finger: continue it in that poſture for a time; and it will 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 ſhall ſee the wine, as it were, in a ſmall vein, riſing through the water. For handſomeneſs ſake, becauſe the working requireth ſome ſmall time, it were good you hang the upper glaſs upon a nail. But as ſoon as there is gathered ſo much pure and unmixed water in the bottom of the lower glaſs, as that the mouth of the upper glaſs dippeth into it, the motion ceaſeth.

15. LET the upper glaſs be wine, and the lower water; there followeth no motion at all. Let the upper glaſs be water pure, the lower water coloured, or contrariwiſe, there followeth no motion at all. But it hath been tried, that though the mixture of wine and water, in the lower glaſs, be three parts water and but one wine, yet it doth not dead the motion. This ſeparation of water and wine appeareth to be made by weight; for it muſt be of bodies of 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 penſile, and there being a great weight of water in the belly of the glaſs, ſuſtained by a ſmall pillar of water in the neck of the glaſs, it is that which ſetteth the motion on work: for water and wine in one glaſs, with long ſtanding, will hardly ſever.

16. THIS experiment would be extended from mixtures of ſeveral liquors, to ſimple bodies which conſiſt of ſeveral ſimilar parts: try it therefore with brine 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 ſugared, and pure water; and ſee whether the water, which cometh above, will loſe its ſweetneſs: for which purpoſe it were good there were a little cock made in the belly of the upper glaſs.

Experiments in conſort, touching judicious and accurate infuſions, both in liquors and air.

17. IN bodies containing fine ſpirits, which do eaſily diſſipate, when you make infuſions, the rule is; a ſhort ſtay of the body in the liquor, receiveth the ſpirit; and a longer ſtay, confoundeth it; becauſe it draweth forth the earthy part withal, which embaſeth the finer. And therefore it is an error in phyſicians, to reſt ſimply upon the length of ſtay for increaſing the virtue. But if you will have the infuſion ſtrong, in thoſe kinds of bodies which have fine ſpirits, your way is not to give longer time, but to repeat the infuſion of the body oftner. Take violets, and infuſe a good pugil of them in a quart of vinegar; let them ſtay three quarters of an hour, and take them forth, and refreſh the infuſion with like quantity of new violets, ſeven times; and it will make a vinegar ſo freſh of the flower, as if, a twelvemonth after, it be brought you in a ſaucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the flower a good while after, than at firſt.

18. THIS rule, which we have given, is of ſingular uſe for the preparations of medicines, and other infuſions. As for example: the leaf of burrage hath an excellent ſpirit to repreſs the fuliginous vapour of duſky melancholy, and ſo to cure madneſs: but nevertheleſs if the leaf be infuſed long it yieldeth forth but a raw ſubſtance, of no virtue: therefore I ſuppoſe, that if in the muſt of wine, or wort of beer, while it worketh, before it be tunned, the burrage ſtay a ſmall time, and be often changed with freſh; it will make a ſovereign drink for melancholy paſſions. And the like I conceive of orange flowers.

19. RHUBARB hath manifeſtly in it parts of contrary operations: parts that purge; and parts that bind the body: and the firſt lie looſer, and the latter lie deeper: ſo that if you infuſe rhubarb for an hour, and cruſh it well, it will purge better, and bind the body leſs after the purging, than if it had ſtood twenty four hours; this is tried: but I conceive likewiſe, that by repeating the infuſion of rhubarb, ſeveral times, as was ſaid of violets, letting each ſtay in but a ſmall time; you may make it as ſtrong a purging medicine as ſcammony. And it is not a ſmall thing won in phyſic, if you can make rhubarb, and other medicines that are benedict, as ſtrong purgers as thoſe that are not, without ſome malignity.

20. PURGING medicines, for the moſt part, have their purgative virtue in a fine ſpirit; as appeareth by that they endure not boiling without much loſs of virtue. And therefore it is of good uſe in phyſic, if you can retain the purging virtue, and take away the unpleaſant taſte of the purger; which it is like you may do, by this courſe

courſe of infuſing oft, with little ſtay. For it is probable, that the horrible and odious taſte is in the groſſer part.

21. GENERALLY, the working by infuſions is groſs and blind, except you firſt try the iſſuing of the ſeveral parts of the body, which of them iſſue more ſpeedily, and which more ſlowly; and ſo by apportioning the time, can take and leave that quality which you deſire. This to know there are two ways; the one to try what long ſtay, and what ſhort ſtay worketh, as hath been ſaid; the other to try in order the ſucceeding infuſions of one and the ſame body, ſucceſſively, in ſeveral liquors. As for example; take orange pills, or roſemary, or cinnamon, or what you will; and let them infuſe half an hour in water: then take them out, and infuſe them again in other water; and ſo the third time: and then taſte and conſider the firſt water, the ſecond, and the third: and you will find them differing, not only in ſtrength and weakneſs, but otherwiſe in taſte or odour; for it may be the firſt water will have more of the ſcent, as more fragrant; and the ſecond more of the taſte, as more bitter or biting, *etc.*

22. INFUSIONS in air, for ſo we may well call odours, have the ſame diverſities with infuſions in water; in that the ſeveral odours, which are in one flower, or other body, iſſue at ſeveral times; ſome earlier, ſome later: ſo we find that violets, woodbines, ſtrawberries, yield a pleaſing ſcent, that cometh forth firſt; but ſoon after an ill ſcent quite differing from the former. Which is cauſed, not ſo much by mellowing, as by the late iſſuing of the groſſer ſpirit.

23. As we may deſire to extract the fineſt ſpirits in ſome caſes; ſo we may deſire alſo to diſcharge them, as hurtful, in ſome other. So wine burnt, by reaſon of the evaporating of the finer ſpirit, inflameth leſs, and is beſt in agues: opium loſeth ſome of his poiſonous quality, if it be vapoured out, mingled with ſpirit of wine, or the like: ſena loſeth ſomewhat of its windineſs by decocting; and, generally, ſubtile or windy ſpirits are taken off by incenſion or evaporation. And even in infuſions in things that are of too high a ſpirit, you were better pour off the firſt infuſion, after a ſmall time, and uſe the latter.

Experiment ſolitary touching the appetite of continuation in liquids.

24. BUBBLES are in the form of an hemiſphere; air within and a little ſkin of water without: and it ſeemeth ſomewhat ſtrange, that the air ſhould riſe ſo ſwiftly, while it is in the water; and when it cometh to the top, ſhould be ſtayed by ſo weak a cover as that of the bubble is. But as for the ſwift aſcent of the air, while it is under the water, that is a motion of percuſſion from the water; which itſelf deſcending driveth up the air; and no motion of levity in the air. And this Democritus called *motus plagae.* In this common experiment, the cauſe of the incloſure of the bubble is, for that the appetite to reſiſt ſeparation, or diſcontinuance, which in ſolid bodies is ſtrong, is alſo in liquors, though fainter and weaker; as we ſee in this of the bubble: we ſee it alſo in little glaſſes of ſpittle that children make of ruſhes; and in caſtles of bubbles, which they make by blowing into water, having obtained a little degree of tenacity by mixture of ſoap: we ſee it alſo in the ſtillicides of water, which if there be water enough to follow, will draw themſelves into a ſmall thread, becauſe they will not diſcontinue; but if there be no remedy, then they caſt themſelves into round drops; which is the figure that ſaveth the body moſt from diſcontinuance: the ſame reaſon is of the roundneſs of the bubble, as well for the ſkin of

of water, as for the air within: for the air likewiſe avoideth diſcontinuance; and therefore caſteth itſelf into a round figure. And for the ſtop and arreſt of the air a little while, it ſheweth that the air of itſelf hath little or no appetite of aſcending.

Experiment ſolitary touching the making of artificial ſprings.

25. THE rejection, which I continually uſe, of experiments, though it appeareth not, is infinite; but yet if an experiment be probable in the work, and of great uſe, I receive it, but deliver it as doubtful. It was reported by a ſober man, that an artificial ſpring may be made thus: Find out a hanging ground, where there is a good quick fall of rain-water. Lay a half-trough of ſtone, of a good length, three or four foot deep within the ſame ground; with one end upon the high ground, the other upon the low. Cover the trough with brakes a good thickneſs, and caſt ſand upon the top of the brakes: you ſhall ſee, ſaith he, that after ſome ſhowers are paſt, the lower end of the trough will run like a ſpring of water: which is no marvel, if it hold while the rain-water laſteth; but he ſaid it would continue long time after the rain is paſt: as if the water did multiply itſelf upon the air, by the help of the coldneſs and condenſation of the earth, and the conſort of the firſt water.

Experiment ſolitary touching the venomous quality of man's fleſh.

26. THE French, who put off the name of the French diſeaſe unto the name of the diſeaſe of Naples, do report, that at the ſiege of Naples, there were certain wicked merchants that barrelled up man's 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 canibals in the Weſt-Indies eat man's fleſh; and the Weſt-Indies were full of the pox when they were firſt diſcovered: and at this day the mortaleſt poiſons, practiſed by the Weſt-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 man's fleſh, to aid, as it ſeemeth, their imagination, with high and foul vapours.

Experiment ſolitary touching the verſion and tranſmutation of air into water.

27. IT ſeemeth that there be theſe ways, in likelihood, of verſion of vapours or air, into water and moiſture. The firſt is cold; which doth manifeſtly condenſe; as we ſee in the contracting of the air in the weather-glaſs; whereby it is a degree nearer to water. We ſee it alſo in the generation of ſprings, which the ancients thought, very probably, to be made by the verſion of air into water, holpen by the reſt, which the air hath in thoſe parts; whereby it cannot diſſipate. And by the coldneſs of rocks; for there 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 dews 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 vapour is turned back upon itſelf, 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 wainſcot. But this is like to do no great effect; except it be upon vapours, and groſs air, that are already very near in degree to water. The third is that, which may be ſearched into, but doth not yet appear; which is, by mingling of moiſt vapours

pours 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 water into the bottom of a ſtillatory, with the neb ſtopped; weigh the water firſt; hang in the middle of the ſtillatory a large ſpunge; and ſee what quantity of water you can cruſh out of it; and what it is more or leſs, compared with the water ſpent; for you muſt underſtand, that if any verſion can be wrought, it will be eaſlieſt 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 eaſy for verſion; and tangible bodies have no pleaſure in the conſort of air, but endeavour to ſubact it into a more denſe body: but in intire bodies it is checked; becauſe if the air ſhould condenſe, there is nothing to ſucceed: therefore it muſt be in looſe bodies, as ſand, and powder; which, we ſee, if they lie cloſe, of themſelves gather moiſture.

Experiment ſolitary touching helps towards the beauty and good features of perſons.

28. IT is reported by ſome of the ancients; that whelps, or other creatures, if they be put young into ſuch a cage or 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 ſo preſſed and ſtraitened, doth not thereupon die; it is a means to produce dwarf creatures, and in a very ſtrange figure. This is certain, and noted long ſince; that the preſſure or forming of the parts of creatures, when they are very young, doth alter the ſhape not a little; as the ſtroking 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 kinds, more comely and better featured than otherwiſe they would be; by the forming and ſhaping of them in their infancy: as by ſtroking up the calves of the legs, to keep them from falling down too low; and by ſtroking up the forehead, to keep them from being low-foreheaded. And it is a common practice to ſwathe infants, that they may grow more ſtraight and better ſhaped: and we ſee young women, by wearing ſtrait bodice, keep themſelves from being groſs and corpulent.

Experiment ſolitary touching the condenſing of air in ſuch ſort as it may put on weight, and yield nouriſhment.

29. ONIONS, as they hang, will many of them ſhoot forth; and ſo will penny-royal; and ſo will an herb called orpin; with which they uſe in the country to trim their houſes, binding it to a lath or ſtick, and ſetting it againſt a wall. We ſee it likewiſe, more eſpecially, in the greater ſemper-vive, which will put out branches, two or three years: but it is true, that commonly they wrap the root in a cloth beſmeared with oil, and renew it once in half a 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

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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 loſe in ſome other part: but if they gather weight, then it is *magnale 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 ſemper-vive, muſt be made without oiling the cloth; for elſe, it may be, the plant receiveth nouriſhment from the oil.

Experiment ſolitary touching the commixture of flame and air, and the great force thereof.

30. FLAME and air do not mingle, except it be in an inſtant; or in the vital ſpirits of vegetables and living creatures. In gun-powder, the force of it hath been aſcribed to rarefaction of the earthy 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, leſt two bodies ſhould be in one place, there muſt needs alſo follow an expulſion of the pellet; or blowing up of the mine. But theſe are crude and ignorant ſpeculations. For flame, if there were nothing elſe, except it were in very great quantity, will be ſuffocate with any hard body, ſuch as a pellet is; or the barrel of a gun; ſo as the flame would not expel the hard body; but the hard body would kill the flame, and not ſuffer it to kindle or ſpread. But the cauſe of this ſo potent a motion, is the nitre, which we call otherwiſe ſalt-petre, which having in it a notable crude and windy ſpirit, firſt by the heat of the fire ſuddenly dilateth itſelf; and we know that ſimple air, being preternaturally attenuated by heat, will make itſelf room, and break and blow up that which reſiſteth it; and ſecondly, when the nitre hath dilated itſelf, it bloweth abroad the flame, as an inward bellows. And therefore we ſee that brimſtone, pitch, camphire, wild-fire, and divers other inflammable matters, though they burn cruelly, and are hard to quench, yet they make no ſuch fiery wind as gun-powder 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 gun-powder. 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 oil; for they likewiſe will not well mingle of themſelves; but in the bodies of plants, and living creatures, they will. It is no marvel therefore, that a ſmall quantity of ſpirits, in the cells of the brain and canals of the ſinews, are able to move the 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.

Experiment

Experiment ſolitary touching the ſecret nature of flame.

31. 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 itſelf, and become four or five times bigger than otherwiſe it would have been; and appear in figure globular, and not in pyramis. You ſhall ſee alſo, that the inward flame of the candle keepeth colour, and doth not wax any whit blue 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 greatneſs, 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 only remaineth contiguous; as it cometh to paſs betwixt conſiſting bodies. It appeareth alſo, that the form of a pyramis in flame, which we uſually ſee, is merely by accident, and that the air about, by quenching the ſides of the flame, cruſheth it, and extenuateth it into that form; for of itſelf it would be round; and therefore ſmoke is in the figure of a pyramis reverſed; for the air quencheth the flame, and receiveth the ſmoke. Note alſo, that the flame of the candle, within the flame of the ſpirit of wine, is troubled; and doth not only open and move upwards, but moveth waving to and fro; as if flame of its 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 Stoics 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 conſiſtent, and in its natural place; but with us it is a ſtranger, and momentary, and impure; like Vulcan that halted with his fall.

Experiment ſolitary touching the different force of flame in the midſt and on the ſides.

32. TAKE an arrow, and hold it in flame for the ſpace of ten pulſes, and when it cometh forth, you ſhall find thoſe parts of the arrow which were on the outſides of the flame more burned, blacked, and turned almoſt into a coal, whereas that in the midſt of the flame will be as if the fire had ſcarce touched it. This is an inſtance of great conſequence for the diſcovery of the nature of flame; and ſheweth manifeſtly, that flame burneth more violently towards the ſides than in the midſt: and, which is more, that heat or fire is not violent or furious, but where it is checked and pent up. And therefore the Peripatetics, howſoever their opinion of an element of fire above the air is juſtly exploded, in that point they acquit themſelves well: for being oppoſed, that if there were a ſphere of fire, that encompaſſed the earth ſo near hand, it were impoſſible but all things ſhould be burnt up; they anſwer, that the pure elemental fire, in its own place, and not irritated, is but of a moderate heat.

Experiment ſolitary touching the decreaſe of the natural motion of gravity, in great diſtance from the earth; or within ſome depth of the earth.

33. IT is affirmed conſtantly by many, as an uſual experiment; that a lump of ore, in the bottom of a mine, will be tumbled and ſtirred by two mens ſtrength;

which if you bring it to the top of the earth, will aſk ſix mens ſtrength at the leaſt to ſtir it. It is a noble inſtance, and is fit to be tried to the full; for it is very probable, that the motion of gravity worketh weakly, both far from the earth, and alſo within the earth: the former, becauſe the appetite of union of denſe bodies with the earth, in reſpect of the diſtance, is more dull; the latter becauſe the body hath in part attained its nature when it is ſome depth in the earth. For as for the moving to a point or place, which was the opinion of the ancients, it is a mere vanity.

Experiment ſolitary touching the contraction of bodies in bulk, by the mixture of the more liquid body with the more ſolid.

34. IT is ſtrange how the ancients took up experiments upon credit, and yet did build great matters upon them. The obſervation of ſome of the beſt of them, delivered confidently, is, that a veſſel filled with aſhes will receive the like quantity of water, that it would have done if it had been empty. But this is utterly untrue, for the water will not go in by a fifth part. And I ſuppoſe, that that fifth part is the difference of the lying cloſe, or open, of the aſhes; as we ſee that aſhes alone, if they be hard preſſed, will lie in leſs room: and ſo the aſhes with air between, lie looſer; and with water, cloſer. For I have not yet found certainly, that the water itſelf, by mixture of aſhes or duſt, will ſhrink or draw into leſs room.

Experiment ſolitary touching the making vines more fruitful.

35. 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 proſper better. It may be tried with other kernels, laid about the root of a plant of the ſame kind; as figs, kernels of apples, *etc.* The cauſe may be, for that the kernels draw out of the earth juice fit to nouriſh the tree, as thoſe that would be trees of themſelves, though there were no root; but the root being of greater ſtrength, robbeth and devoureth the nouriſhment, when they have drawn it: as great fiſhes devour little.

Experiments in conſort touching purging medicines.

36. THE operation of purging medicines, and the cauſes thereof, have been thought to be a great ſecret, and ſo according to the ſlothful manner of men, it is referred to a hidden propriety, a ſpecifical virtue, and a fourth quality, and the like ſhifts of ignorance. The cauſes of purging are divers: all plain and perſpicuous; and throughly maintained by experience. The firſt is, that whatſoever cannot be overcome and digeſted by the ſtomach, is by the ſtomach either put up by vomit, or put down to the guts; and by that motion of expulſion in the ſtomach and guts, other parts of the body, as the orifices of the veins, and the like, are moved to expel by conſent. For nothing is more frequent than motion of conſent in the body of man. This ſurcharge of the ſtomach is cauſed either by the quality of the medicine, or by the quantity. The qualities are three: extreme bitter, as in aloes, coloquintida, *etc.* lothſome and of horrible taſte, as in agaric, black hellebore, *etc.* and of ſecret malignity, and diſagreement towards man's body, many times not appearing much in the taſte, as in ſcammony, mechoachan, antimony, *etc.* And note well, that if there be any medicine that purgeth, and hath neither of the firſt two manifeſt qualities, it is to be held ſuſpected as a kind of poiſon; for that it worketh either by corroſion, or by a ſecret malignity, and enmity

enmity to nature: and therefore ſuch medicines are warily to be prepared and uſed. The quantity of that which is taken doth alſo cauſe purging; as we ſee in a great quantity of new milk from the cow; yea and a great quantity of meat; for ſurfeits 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 ſtomach firſt maketh a proof, whether it can concoct them. And the like happeneth after ſurfeits, or milk in too great quantity.

37. A SECOND cauſe is mordication of the orifices of the parts; eſpecially of the meſentery veins; as it is ſeen, that ſalt, or any ſuch thing that is ſharp and biting, put into the fundament, doth provoke the part to expel; and muſtard provoketh ſneezing: and any ſharp thing to the eyes provoketh tears. And therefore we ſee that almoſt all purgers have a kind of twitching and vellication, beſides the griping which cometh of wind. And if this mordication be in an over-high degree, it is little better than the corroſion of poiſon; as it cometh to paſs ſometimes in antimony, eſpecially if it be given to bodies not replete with humours; for where humours abound, the humours ſave the parts.

38. 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 ſage or betony bruiſed, ſneezing powder, and other powders or liquors, which the phyſicians call *errhines*, put into the noſe, draw phlegm and water from the head; and ſo it is in apophlegmatiſms and gargariſms, that draw the rheum down by the palate. And by this virtue, no doubt, ſome purgers draw more one humour, and ſome another, according to the opinion received: as rhubarb draweth choler; ſena melancholy; agaric phlegm, *etc.* but yet, more or leſs, they draw promiſcuouſly. And note alſo, that beſides ſympathy between the purger and the humour, there is alſo another cauſe, why ſome medicines draw ſome humour more than another. And it is, for that ſome medicines work quicker than others: they that draw quick, draw only the lighter and more fluid humours; and they that draw ſlow, work upon the more tough and viſcous humours. And therefore men muſt beware how they take rhubarb, and the like, alone familiarly; for it taketh only the lighteſt part of the humour away, and leaveth the maſs of humours more obſtinate. And the like may be ſaid of wormwood, which is ſo much magnified.

39. THE fourth cauſe is flatuoſity; for wind ſtirred moveth to expel: and we find that in effect all purgers have in them a raw ſpirit or wind; which is the principal cauſe of tortion in the ſtomach and belly. And therefore purgers loſe, moſt of them, the virtue, by decoction upon the fire; and for that cauſe are given chiefly in infuſion, juice, or powder.

40. THE fifth cauſe is compreſſion or cruſhing: as when water is cruſhed out of a ſponge: ſo we ſee that taking cold moveth looſeneſs by contraction of the ſkin and outward parts; and ſo doth cold likewiſe cauſe rheums and defluxions from the head; and ſome aſtringent plaiſters cruſh out purulent matter. This kind of operation is not found in many medicines; myrobalanes have it; and it may be the barks of peaches; for this virtue requireth an aſtriction; but ſuch an aſtriction as is not grateful to the body; for a pleaſing aſtriction doth rather bind in the humours than expel them: and therefore, ſuch aſtriction is found in things of an harſh taſte.

41. THE ſixth cauſe is lubrefaction and relaxation. As we ſee in medicines emollient; ſuch as are milk, honey, mallows, lettice, mercurial, pellitory of the wall, and others. There is alſo a ſecret virtue of relaxation in cold: for the heat of the body bindeth the parts and humours together, which cold relaxeth: as it is ſeen in urine, blood, pottage, or the like; which, if they be cold, break and diſſolve. And by this kind of relaxation, fear looſeneth the belly; becauſe the heat retiring inwards towards the heart, the guts and other parts are relaxed; in the ſame manner as fear alſo cauſeth trembling in the ſinews. And of this kind of purgers are ſome medicines made of mercury.

42. THE ſeventh cauſe is abſterſion: which is plainly a ſcouring off, or inciſion of the more viſcous humours, and making the humours more fluid; and cutting between them and the part; as is found in nitrous water, which ſcoureth linen cloth ſpeedily from the foulneſs. But this inciſion muſt be by a ſharpneſs, without aſtriction: which we find in ſalt, wormwood, oxymel, and the like.

43. 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 ſtomach, and therefore move immediately downwards to the guts; or elſe are afterwards rejected by the meſentery veins; and ſo turn likewiſe downwards to the guts; and of theſe two kinds are moſt purgers. But thoſe that move urine, are ſuch as are well digeſted of the ſtomach, and well received alſo of the meſentery veins; ſo they come as far as the liver, which ſendeth urine to the bladder, as the whey of blood: and thoſe medicines being opening and piercing, do fortify the operation of the liver, in ſending down the wheyey part of the blood to the reins. For medicines urinative do not work by rejection and indigeſtion, as ſolutive do.

44. THERE be divers medicines, which in greater quantity move ſtool, and in ſmaller urine: and ſo contrariwiſe, ſome that in greater quantity move urine, and in ſmaller ſtools. Of the former ſort is rhubarb, and ſome others. The cauſe is, for that rhubarb is a medicine which the ſtomach in a ſmall quantity doth digeſt and overcome, being not flatuous nor lothſome, and ſo ſendeth it to the meſentery veins; and ſo being opening, it helpeth down urine: but in a greater quantity, the ſtomach 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 ſtomach and guts, and ſo expelleth by ſtool; but being in greater quantity, diſſipateth the wind; and itſelf getteth to the meſentery veins, and ſo to the liver and reins; where, by heating and opening, it ſendeth down urine more plentifully.

Experiments in conſort touching meats and drinks that are moſt nouriſhing.

45. WE have ſpoken of evacuating of the body; we will now ſpeak ſomething of the filling of it by reſtoratives in conſumptions and emaciating diſeaſes. In vegetables, there is one part that is more nouriſhing than another; as grains and roots nouriſh more than the leaves; inſomuch as the order of the Foliatanes was put down by the pope, as finding leaves unable to nouriſh man's body. Whether there be that difference in the fleſh of living creatures, is not well inquired: as whether livers and other entrails, be not more nouriſhing than the outward fleſh. We find that amongſt the Romans, a gooſe's liver was a great delicacy; inſomuch as they had

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 ſinews, ſtamped and well ſtrained, would be a very nouriſhing broth: we find alſo that Scotch ſkinck, which is a pottage of ſtrong nouriſhment, is made with the knees and ſinews of beef, but long boiled: jelly alſo, which they uſe for a reſtorative, is chiefly made of knuckles of veal. The pulp that is within the crawfiſh or crab, which they ſpice and butter, is more nouriſhing than the fleſh of the crab or crawfiſh. The 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 nouriſhment. It ſeemeth for the nouriſhing of aged men, or men in conſumptions, ſome ſuch thing ſhould be deviſed, as ſhould be half chylus, before it be put into the ſtomach.

46. TAKE two large capons; parboil them upon a ſoft fire, by the ſpace of an hour or more, till in effect all the blood be gone. Add in the decoction the peel of a ſweet lemon, or a good part of the peel of a citron, and a little mace. Cut off the ſhanks, and throw them away. Then with a good ſtrong chopping-knife mince the two capons, bones and all, as ſmall as ordinary minced meat; put them into a large neat boulter; then take a kilderkin, ſweet and well ſeaſoned, of four gallons of beer, of 8 s. ſtrength, new as it cometh from the tunning; make in the kilderkin a great bung-hole of purpoſe: then thruſt into it the boulter, in which the capons are, drawn out in length; let it ſteep in it three 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, flowereth and mantleth exceedingly; it drinketh not newiſh at all; it is an excellent drink for a conſumption, to be drunk either alone, or carded with ſome other beer. It quencheth thirſt, and hath no whit of windineſs. Note, that it is not poſſible, that meat and bread, either in broths or taken with drink, as is uſed, ſhould get forth into the veins and outward parts, ſo finely and eaſily, as when it is thus incorporate, and made almoſt a chylus aforehand.

47. TRIAL would be made of the like brew with potato roots, or burr roots, or the pith of artichokes, which are nouriſhing meats: it may be tried alſo with other fleſh; as pheaſant, partridge, young pork, pig, veniſon, eſpecially of young deer, *etc.*

48. A MORTRESS made with the brawn of capons, ſtamped and ſtrained, and mingled, after it is made, with like quantity, at the leaſt, of almond butter, is an excellent meat to nouriſh thoſe that are weak; better than blackmanger, or jelly: and ſo is the cullice of cocks, boiled thick with the like mixture of almond butter: for the mortreſs or cullice, of itſelf, is more ſavoury and ſtrong, and not ſo fit for nouriſhing of weak bodies; but the almonds, that are not of ſo high a taſte as fleſh, do excellently qualify it.

49. INDIAN maiz hath, of certain, an excellent ſpirit of nouriſhment; but it muſt be thoroughly boiled, and made into a maiz-cream like a barley-cream. I judge the ſame of rice, made into a cream; for rice is in Turky, and other countries of the eaſt, moſt fed upon; but it muſt be thoroughly boiled in reſpect of the hardneſs of it, and alſo becauſe otherwiſe it bindeth the body too much.

50. PISTACHOES,

50. PISTACHOES, ſo they be good, and not muſty, joined with almonds in almond milk; or made into a milk of themſelves, like unto almond milk, but more green, are an excellent nouriſher: but you ſhall do well, to add a little ginger, ſcraped, becauſe they are not without ſome ſubtile windineſs.

51. MILK warm from the cow, is found to be a great nouriſher, and a good remedy in conſumptions: but then you muſt put into it, when you milk the cow, two little bags; the one of powder of mint, the other of powder of red roſes; for they keep the milk ſomewhat from turning or curdling in the ſtomach; and put in ſugar alſo, for the ſame cauſe, and partly for the taſte's ſake; but you muſt drink a good draught, that it may ſtay leſs time in the ſtomach, leſt it curdle: 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 aſs 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 lenifyings. Woman's milk likewiſe is preſcribed, when all fail; but I commend it not, as being a little too near the juice of man's body, to be a good nouriſher; except it be in infants, to whom it is natural.

52. OIL of ſweet almonds, newly drawn, with ſugar, and a little ſpice, ſpread upon bread toaſted, is an excellent nouriſher: but then to keep the oil from frying in the ſtomach, you muſt drink a good draught of mild beer after it; and to keep it from relaxing the ſtomach too much, you muſt put in a little powder of cinnamon.

53. THE yolks of eggs are of themſelves ſo well prepared by nature for nouriſhment, as, ſo they be poached, or rare boiled, 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 eryngium roots, and a little ambergrice; for by this means, beſides the immediate faculty of nouriſhment, ſuch drink will ſtrengthen the back, ſo that it will not draw down the urine too faſt; for too much urine doth always hinder nouriſhment.

54. MINCING of meat, as in pies, and buttered minced meat, ſaveth the grinding of the teeth; and therefore, no doubt, it is more nouriſhing, eſpecially in age, or to them that have weak teeth; but the butter is not ſo proper for weak bodies; and therefore it were good to moiſten it with a little claret wine, peel of lemon or orange, cut ſmall, ſugar, and a very little cinnamon or nutmeg. As for chuets, which are likewiſe minced meat, inſtead of butter and fat, it were good to moiſten them, partly with cream, or almond, or piſtacho milk; or barley, or maiz cream; adding a little coriander ſeed and caraway ſeed, and a very little ſaffron. The more full handling of alimentation we reſerve to the due place.

WE have hitherto handled the particulars which yield beſt, and eaſieſt, and plentifulleſt nouriſhment; and now we will ſpeak of the beſt means of conveying and converting the nouriſhment.

55. THE firſt means is to procure that the nouriſhment may not be robbed and drawn away; wherein that which we have already ſaid 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 roſcid juice of the body, and inter-common with the ſpirits of the body, and ſo deceive and rob them of their nouriſhment. And therefore if the conſumption, growing from the weakneſs of the ſtomach, do force

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 the nouriſhment, by exhaling and ſweating: and therefore if the patient be apt to ſweat, it muſt be gently reſtrained. But chiefly Hippocrates's rule is to be followed, who adviſeth quite contrary to that which is in uſe: namely, that the linen or garment next the fleſh, be in winter, dry and oft changed; and in ſummer ſeldom changed, and ſmeared over with oil; for certain it is, that any ſubſtance that is fat, doth a little fill the pores of the body, and ſtay ſweat in ſome degree: but the more cleanly way is, to have the linen ſmeared lightly over with oil of ſweet almonds; and not to forbear ſhifting as oft as is fit.

56. THE ſecond means is, to ſend forth the nouriſhment into the parts more ſtrongly; for which the working muſt be by ſtrengthening of the ſtomach; and in this, becauſe the ſtomach is chiefly comforted by wine and hot things, which otherwiſe hurt; it is good to reſort to outward applications to the ſtomach: Wherein it hath been tried, that the quilts of roſes, ſpices, maſtic, wormwood, mint, *etc.* are nothing ſo helpful, as to take a cake of new bread, and to bedew it with a little ſack, or Alicant; and to dry it; and after it be dried a little before the fire, to put it within a clean napkin, and to lay it to the ſtomach; for it is certain, that all flour hath a potent virtue of aſtriction; in ſo much as it hardeneth a piece of fleſh, or a flower, that is laid in it: and therefore a bag quilted with bran is likewiſe very good; but it drieth ſomewhat too much, and therefore it muſt not lie long.

57. THE third means, which may be a branch of the former, is to ſend forth the nouriſhment the better by ſleep. For we ſee, that bears, and other creatures that ſleep in the winter, wax exceeding fat: and certain it is, as it is commonly believed, that ſleep doth nouriſh much; both for that the ſpirits do leſs ſpend the nouriſhment in ſleep, than when living creatures are awake: and becauſe, that which is to the preſent purpoſe, it helpeth to thruſt out the nouriſhment into the parts. Therefore in aged men, and weak bodies, and ſuch as abound not with choler, a ſhort ſleep after dinner doth help to nouriſh; for in ſuch bodies there is no fear of an over-haſty digeſtion, which is the inconvenience of poſtmeridian ſleeps. Sleep alſo in the morning, after the taking of ſomewhat of eaſy digeſtion, as milk from the cow, nouriſhing broth, or the like, doth further nouriſhment: but this ſhould be done ſitting upright, that the milk or broth may paſs the more ſpeedily to the bottom of the ſtomach.

58. THE fourth means is, to provide that the parts themſelves may draw to them the nouriſhment ſtrongly. There is an excellent obſervation of Ariſtotle; that a great reaſon, why plants, ſome of them, are of greater age than living creatures, is, for that they yearly put forth new leaves and boughs: whereas living creatures put forth, after their period of growth, nothing that is young, but hair and nails, which are excrements, and no parts. And it is moſt certain, that whatſoever is young, doth draw nouriſhment better than that which is old; and then, that which is the myſtery of that obſervation, young boughs, and leaves, calling the ſap up to them, the ſame nouriſheth the body in the paſſage. And this we ſee notably proved alſo, in that the oft cutting, or polling of hedges, trees, and herbs, doth conduce 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; reſtoration of ſome degree of youth; and

and inteneration of the parts: for certain it is, that there are in living creatures parts that nouriſh and repair eaſily, and parts that nouriſh and repair hardly: and you muſt refreſh and renew thoſe that are eaſy to nouriſh, that the other may be refreſhed, and, as it were, drink in nouriſhment in the paſſage. Now we ſee that draught oxen, put into good paſture, recover the fleſh of young beef; and men after long emaciating diets wax plump and fat, and almoſt new: ſo that you may ſurely conclude, that the frequent and wiſe uſe of thoſe emaciating diets, and of purgings, and perhaps of ſome kind of bleeding, is a principal means of prolongation of life, and reſtoring ſome degree of youth: for as we have often ſaid, death cometh upon living creatures like the torment of Mezentius:

Mortua quin etiam jungebat corpora vivis,
Componens manibuſque manus, atque oribus ora. Æn. viii. 485.

For the parts in man's body eaſily reparable, as ſpirits, blood, and fleſh, die in the embracement of the parts hardly reparable, as bones, nerves, and membranes; and likewiſe ſome entrails, which they reckon amongſt the ſpermatical parts, are hard to repair: though that diviſion of ſpermatical and menſtrual parts be but a conceit. And this ſame obſervation 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 nouriſhment 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 oil of almonds, mingled with a ſmall quantity of bay-ſalt, or ſaffron; we ſee that the very currying of horſes doth make them fat, and in good liking.

59. THE fifth means is, to further the very act of aſſimilation of nouriſhment; which is done by ſome outward emollients, that make the parts more apt to aſſimilate. For which I have compounded an ointment of excellent odour, which I call Roman ointment; *vide* the receipt. The uſe of it would be between ſleeps; for in the latter ſleep the parts aſſimilate chiefly.

Experiment ſolitary touching Filum medicinale.

60. THERE be many medicines, which by themſelves would do no cure, but perhaps hurt; but being applied in a certain order, one after another, do great cures. I have tried, myſelf, a remedy for the gout, which hath ſeldom failed, but driven it away in twenty four hours ſpace: it is firſt to apply a poultis, of which *vide* the receipt, and then a bath or fomentation, of which *vide* the receipt; and then a plaiſter, *vide* the receipt. The poultis relaxeth the pores, and maketh the humour apt to exhale. The fomentation calleth forth the humour by vapours; but yet in regard of the way made by the poultis, draweth gently; and therefore draweth the humour out, and doth not draw more to it; for it is a gentle fomentation, and hath withal a mixture, though very little, of ſome ſtupefactive. The plaiſter is a moderate aſtringent plaiſter, which repelleth new humours from falling. The poultis alone would make the part more ſoft and weak, and apter to take the defluxion and impreſſion of the humour. The fomentation alone, if it were too weak, without way made by the poultis, would draw forth little; if too ſtrong, it would draw to the part, as well as draw from it. The plaiſter alone would pen the humour already contained in the part, and ſo exaſperate it, as well as forbid new humour. Therefore they muſt be all taken in order, as is ſaid. The poultis 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

ſeven or eight times repeated: the plaiſter to continue on ſtill, till the part be well confirmed.

Experiment ſolitary touching cure by cuſtom.

61. THERE is a ſecret way of cure, unpractiſed, by aſſuetude 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 eaſy: the brooking of enormous quantity of meats, and ſo of wine or ſtrong drink, hath been, by cuſtom, made to be without ſurfeit or drunkenneſs. And generally diſeaſes that are chronical, as coughs, phthiſics, ſome kinds of palſies, lunacies, *etc.* 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 find it to be ſuch, let him reſort to palliation; and alleviate the ſymptom, without buſying himſelf too much with the perfect cure: and many times, if the patient be indeed patient, that courſe will exceed all expectation. Likewiſe the patient himſelf may ſtrive, by little and little, to overcome the ſymptom in the exacerbation, and ſo by time, turn ſuffering into nature.

Experiment ſolitary touching cure by exceſs.

62. DIVERS diſeaſes, eſpecially chronical, ſuch as quartan agues, are ſometimes cured by ſurfeit and exceſſes: as exceſs of meat, exceſs of drink, extraordinary faſting, extraordinary ſtirring or laſſitude, and the like. The cauſe is, for that diſeaſes of continuance get an adventitious ſtrength from cuſtom, beſides their material cauſe from the humours: ſo that the breaking of the cuſtom doth leave them only to their firſt cauſe; which if it be any thing weak will fall off. Beſides, ſuch exceſſes do excite and ſpur nature, which thereupon riſes more forcibly againſt the diſeaſe.

Experiment ſolitary touching cure by motion of conſent.

63. THERE is in the body of man a great conſent in the motion of the ſeveral parts. We ſee, it is childrens ſport, to prove whether they can rub upon their breaſt with one hand, and pat upon their forehead with another; and ſtraightways they ſhall ſometimes rub with both hands, or pat with both hands. We ſee, that when the ſpirits that come to the noſtrils expel a bad ſcent, the ſtomach is ready to expel by vomit. We find that in conſumptions of the lungs, when nature cannot expel by cough, men fall into fluxes of the belly, and then they die. So in peſtilent diſeaſes, if they cannot be expelled by ſweat, they fall likewiſe into looſeneſs; and that is commonly mortal. Therefore phyſicians ſhould ingeniouſly contrive, how by emotions that are in their power, they may excite inward motions that are not in their power, by conſent: as by the ſtench of feathers, or the like, they cure the riſing of the mother.

Experiment ſolitary touching cure of diſeaſes which are contrary to prediſpoſition.

64. HIPPOCRATES' aphoriſm, in *morbis minus*, is a good profound aphoriſm. It importeth, that diſeaſes, contrary to the complexion, age, ſex, ſeaſon of the year, diet, *etc.* are more dangerous than thoſe that are concurrent. A man would think it ſhould be otherwiſe; for that, when the accident of ſickneſs, and the natural

diſpoſition, do ſecond the one the other, the diſeaſe ſhould be more forcible: and ſo, no doubt, it is, if you ſuppoſe 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 kind, let the phyſician apply himſelf more to purgation than to alteration; becauſe the offence is in the quantity; and the qualities are rectified of themſelves.

Experiment ſolitary touching preparations before purging, and ſettling of the body afterwards.

65. PHYSICIANS do wiſely preſcribe, that there be preparatives uſed before juſt purgations; for certain it is, that purgers do many times great hurt, if the body be not accommodated, both before and after the purging. The hurt that they do, for want of preparation before purging, is by the ſticking of the humours, and their not coming fair away; which cauſeth in the body great perturbations and ill accidents during the purging; and alſo the diminiſhing and dulling of the working of the medicine itſelf, that it purgeth not ſufficiently: therefore the work of preparation is double; to make the humours fluid and mature, and to make the paſſages more open: for both thoſe help to make the humours paſs readily. And for the former of theſe, ſyrups are moſt profitable; and for the latter, apozemes, or preparing broths; clyſters alſo help, leſt the medicine ſtop in the guts, and work gripingly. But it is true, that bodies abounding with humours, and fat bodies, and open weather, are preparatives in themſelves; becauſe they make the humours more fluid. But let a phyſician beware, how he purge after hard froſty weather, and in a lean body, without preparation. For the hurt that they may do after purging, it is cauſed by the lodging of ſome humours in ill places: for it is certain, that there be humours, which ſomewhere placed in the body, are quiet, and do little hurt; in other places, eſpecially paſſages, do much miſchief. Therefore it is good, after purging, to uſe apozemes and broths, not ſo much opening as thoſe uſed before purging; but abſterſive and mundifying clyſters alſo are good to conclude with, to draw away the reliques of the humours, that may have deſcended to the lower region of the body.

Experiments ſolitary touching ſtanching of blood.

66. BLOOD is ſtanched divers ways. Firſt, by aſtringents, and repercuſſive medicines. Secondly, by drawing of the ſpirits and blood inwards; which is done by cold; as iron or a ſtone laid to the neck doth ſtanch the bleeding at the noſe; alſo it hath been tried, that the teſticles being put into ſharp vinegar, hath made a ſudden receſs of the ſpirits, and ſtanched blood. Thirdly, by the receſs of the blood by ſympathy. So it hath been tried, that the part that bleedeth, being thruſt into the body of a capon or ſheep, new ript and bleeding, hath ſtanched blood; the blood, as it ſeemeth, ſucking and drawing up, by ſimilitude of ſubſtance, the blood it meeteth with, and ſo itſelf going back. Fourthly, by cuſtom and time; ſo the Prince of Orange, in his firſt hurt by the Spaniſh boy, could find no means to ſtanch the blood, either by medicine or ligament; but was fain to have the orifice of the wound ſtopped by mens thumbs, ſucceeding one another, for the ſpace at the leaſt of two days; and at the laſt the blood by cuſtom only retired. There is a fifth way alſo in uſe, to let blood in an adverſe part, for a revulſion.

Experiment

Experiment ſolitary touching change of aliments and medicines.

67. IT helpeth, both in medicine and aliment, to change and not to continue the ſame medicine 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 aſſuetude of things hurtful doth make them loſe their force to hurt; as poiſon, which with uſe ſome have brought themſelves to brook. And therefore it is no marvel, though things helpful by cuſtom loſe their force to help: I count intermiſſion almoſt the ſame thing with change; for that that hath been intermitted, is after a ſort new.

Experiment ſolitary touching diets.

68. IT is found by experience, that in diets of guaiacum, ſarza, and the like, eſpecially if they be ſtrict, the patient is more troubled in the beginning than after continuance; which hath made ſome of the more delicate ſort of patients give them over in the midſt; ſuppoſing that if thoſe diets trouble them ſo much at firſt, they ſhall not be able to endure them to the end. But the cauſe is, for that all thoſe diets do dry up humours, rheums, and the like; and they cannot dry up until they have firſt attenuated; and while the humour is attenuated, it is more fluid than it was before, and troubleth the body a great deal more, until it be dried up and conſumed. And therefore patients muſt expect a due time, and not keck at them at the firſt.

Experiments in conſort, touching the production of cold.

THE producing of cold is a thing very worthy the inquiſition; both for uſe and diſcloſure of cauſes. For heat and cold are nature's two hands, whereby ſhe chiefly worketh; and heat we have in readineſs, in reſpect of the fire; but for cold we muſt ſtay till it cometh, or ſeek it in deep caves, or high mountains: and when all is done, we cannot obtain it in any great degree: for furnaces of fire are far hotter than a ſummer's ſun; but vaults or hills are not much colder than a winter's froſt.

69. THE firſt means of producing cold, is that which nature preſenteth us withal; namely, the expiring of cold out of the inward parts of the earth in winter, when the ſun hath no power to overcome it; the earth being, as hath been noted by ſome, *primum frigidum*. This hath been aſſerted, as well by ancient as by modern philoſophers: it was the tenet of Parmenides. It was the opinion of the author of the diſcourſe in Plutarch, for I take it that book was not Plutarch's own, *De primo frigido*. It was the opinion of Teleſius, who hath renewed the philoſophy of Parmenides, and is the beſt of the noveliſts.

70. THE ſecond cauſe of cold is the contact of cold bodies; for cold is active and tranſitive into bodies adjacent, as well as heat: which is ſeen in thoſe things that are touched with ſnow or cold water. And therefore, whoſoever will be an inquirer into nature, let him reſort to a conſervatory of ſnow and ice; ſuch as they uſe for 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.

71. THE third cauſe is the primary nature of all tangible bodies: for it is well to be noted, that all things whatſoever, tangible, are of themſelves cold; except they have an acceſſory heat by fire, life, or motion: for even the ſpirit of wine, or chemical oils, which are ſo hot in operation, are to the firſt touch cold; and air itſelf compreſſed, and condenſed a little by blowing, is cold.

72. THE fourth cauſe is the denſity of the body; for all denſe bodies are colder than moſt other bodies; as metals, ſtone, glaſs; and they are longer in heating than ſofter bodies. And it is certain, that earth, denſe, tangible, hold all of the nature of cold. The cauſe is, for that all matters tangible being cold, it muſt needs follow, that where the matter is moſt congregate, the cold is the greater.

73. 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 nitre, which hath a quick ſpirit, is cold; more cold to the tongue than a ſtone; ſo water is colder than oil, becauſe it hath a quicker ſpirit; for all oil, though it hath the tangible parts better digeſted than water, yet hath it a duller ſpirit: ſo ſnow is colder than water, becauſe it hath more ſpirit within it: ſo we ſee that ſalt put to ice, as in the producing of the artificial ice, increaſeth the activity of cold: ſo ſome *inſecta* which have ſpirit of life, as ſnakes and ſilk-worms, are to the touch cold: ſo quickſilver is the coldeſt of metals, becauſe it is fulleſt of ſpirit.

74. THE ſixth cauſe of cold is the chaſing and driving away of ſpirits, ſuch as have ſome degree of heat: for the baniſhing of the heat muſt needs leave any body cold. This we ſee in the operation of opium and ſtupefactives upon the ſpirits of living creatures: and it were not amiſs to try opium, by laying it upon the top of a weather-glaſs, to ſee whether it will contract the air: but I doubt it will not ſucceed; for beſides that the virtue of opium will hardly penetrate through ſuch a body as glaſs, I conceive that opium, and the like, make the ſpirits fly rather by malignity, than by cold.

75. SEVENTHLY, the ſame effect muſt follow upon the exhaling or drawing out of the warm ſpirits, that doth upon the flight of the ſpirits. There is an opinion, that the moon is magnetical of heat, as the ſun is of cold and moiſture: it were not amiſs therefore to try it, with warm waters; the one expoſed to the beams of the moon, the other with ſome ſkreen betwixt the beams of the moon and the water, as we uſe to the ſun for ſhade; and to ſee whether the former will cool ſooner. And it were alſo good to inquire, 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.

Experiments in conſort, touching the verſion and tranſmutation of air into water.

WE have formerly ſet down the means of turning air into water, in the experiment 27. But becauſe it is *magnale naturae*, and tendeth to the ſubduing of a very great effect, and is alſo of manifold uſe, we will add ſome inſtances in conſort that give light thereunto.

76. IT is reported by ſome of the ancients, that ſailors have uſed, every night, to hang fleeces of wool on the ſides of their ſhips, the wool towards the water; and that they have cruſhed freſh water out of them, in the morning, for their uſe. And thus much we have tried, that a quantity of wool tied looſe 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.

77. 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 bones

bones were found; and ſome veſſels which they had carried with them; and the veſſels full of water; and that water thicker, and more towards ice, than common water: which is a notable inſtance of condenſation and induration by burial under earth, in caves, for long time; and of verſion alſo as it ſhould ſeem of air into water; if any of thoſe veſſels were empty. Try therefore a ſmall bladder hung in ſnow, and the like in nitre, and the like in quickſilver: and if you find the bladders fallen or ſhrunk, you may be ſure the air is condenſed by the cold of thoſe bodies, as it would be in a cave under earth.

78. 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 diſtance from the cloves. In the country, they uſe many times, in deceit, when their wool is new ſhorn, to ſet ſome pails of water by in the ſame room, to increaſe the weight of the wool. But it may be, that the heat of the wool, remaining from the body of the ſheep, or the heat gathered by the lying cloſe of the wool, helpeth to draw the watry vapour; but that is nothing to the verſion.

79. IT is reported alſo credibly, that wool new ſhorn, being laid caſually upon a veſſel of verjuice, after ſome time, had drunk up a great part of the verjuice, 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 ſuing of the verjuice through the wood; for verjuice of itſelf would never have paſſed through the wood: ſo as, it ſeemeth, it muſt be firſt in a kind of vapour, before it paſs.

80. 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 find any liquid body that is more denſe near them, they will draw it: and after they have drawn it, they will condenſe it more, and in effect incorporate it; for we ſee that a ſpunge, or wool, or ſugar, or a woolen cloth, being put but in part in water or wine, will draw the liquor higher, and beyond the place where the water or wine cometh. We ſee alſo, that wood, lute ſtrings, and the like, do ſwell in moiſt ſeaſons: as appeareth by the breaking of the ſtrings, the hard turning of the pegs, and the hard drawing forth of boxes, and opening of wainſcot doors; which is a kind of infuſion: and is much like to an infuſion in water, which will make wood to ſwell: as we ſee in the filling of the chops of bowls, by laying them in water. But for that part of theſe experiments which concerneth attraction, we will reſerve it to the proper title of attraction.

81. THERE is alſo a verſion of air into water ſeen in the ſweating of marbles and other ſtones; and of wainſcot before and in moiſt weather. This muſt be, either by ſome moiſture the body 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 oil colour, will ſooner gather drops in a moiſt night, than wood alone; which is cauſed by the ſmoothneſs and cloſeneſs; which letteth in no part of the vapour, and ſo turneth it back, and thickneth it into dew. We ſee alſo, that breathing upon a glaſs, or ſmooth body, giveth a dew; and in froſty mornings, ſuch as we call rime froſts, you ſhall find drops of dew upon the inſide of glaſs windows; and the froſt itſelf upon the ground is but a verſion or condenſation of the moiſt vapours of the night, into a watry ſubſtance: dews likewiſe, and rain, are but the returns of moiſt vapours condenſed; the dew, by the cold only of the ſun's departure, which is the gentler

gentler cold; rains, by the cold of that which they call the middle region of the air; which is the more violent cold.

82. IT is very probable, as hath been touched, that that which will turn water into ice, will likewiſe turn air ſome degree nearer unto water. Therefore try the experiment of the artificial turning water into ice, whereof we ſhall ſpeak in another place, with air in place of water, and the ice about it. And although it be a greater alteration to turn air into water, than water into ice; yet there is this hope, that by continuing the air longer time, the effect will follow: for that artificial converſion of water into ice, is the work of a few hours; and this of air may be tried by a month's ſpace, or the like.

Experiments in conſort touching induration of bodies.

INDURATION, or lapidification of ſubſtances more ſoft, is likewiſe another degree of condenſation; and is a great alteration in nature. The effecting and accelerating thereof is very worthy to be inquired. It is effected by three means. The firſt is by cold; whoſe property is to condenſe and conſtipate, as hath been ſaid. The ſecond is by heat; which is not proper but by conſequence; for the heat doth attenuate; and by attenuation doth ſend forth the ſpirit and moiſter part of a body; and upon that, the more groſs of the tangible parts do contract and ſerre themſelves together; both to avoid *vacuum*, as they call it, and alſo to munite themſelves againſt the force of the fire, which they have ſuffered. And the third is by aſſimilation; when a hard body aſſimilateth a ſoft, being contiguous to it.

The examples of induration, taking them promiſcuouſly, are many: as the generation of ſtones within the earth, which at the firſt are but rude earth or clay: and ſo of minerals, which come, no doubt, at firſt of juices concrete, which afterwards indurate: and ſo of porcellane, which is an artificial cement, buried in the earth a long time; and ſo the making of brick and tile: alſo the making of glaſs of a certain ſand and brake-roots, and ſome other matters; alſo the 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.

83. FOR indurations by cold, there be few trials of it; for we have no ſtrong or intenſe cold here on the ſurface of the earth, ſo near the 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 conſerving pit of ſnow and ice, adding ſome quantity of ſalt and nitre, a piece of wood, or a piece of tough clay, and let it lie a month or more.

84. ANOTHER trial is by metalline waters, which have virtual cold in them. Put therefore wood or clay into ſmiths water, or other metalline water, and try whether it will not harden in ſome reaſonable time. But I underſtand it of metalline waters that come by waſhing or quenching; and not of ſtrong waters that come by diſſolution; for they are too corroſive to conſolidate.

85. 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

would be more particular inquiry made of them. It is certain, that an egg was found, having lain many years in the bottom of a mote, where the earth had ſomewhat overgrown it; and this egg was come to the hardneſs of a ſtone, and had the colours of the white and yolk perfect, and the ſhell ſhining in ſmall grains like ſugar or alabaſter.

86. 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.

87. 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, *etc.* or if the heat be more fierce, maketh the groſſer part itſelf run and melt; as in the making of ordinary glaſs; and in the vitrification of earth, as we ſee in the inner parts of furnaces, and in the vitrification of brick, and of metals. And in the former of theſe, which is the hardening by baking without melting, the heat hath theſe degrees; firſt, it indurateth, and then maketh fragile; and laſtly it doth incinerate and calcinate.

88. BUT if you deſire to make an induration with toughneſs, and leſs fragility, a middle way ſhould be taken; which is that which Ariſtotle hath well noted; but ſhould 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 ſeething will rather ſoften than indurate them; as hath been tried in eggs, *etc.* therefore ſofter bodies muſt be put into bottles, and the bottles hung into water ſeething, with the mouths open above the water, that no water may get in; for by this means the virtual heat of the water will enter; and ſuch a heat, as will not make the body aduſt or fragile; but the ſubſtance of the water will be ſhut out. This experiment we made; and it ſorted thus. It was tried with a piece of free-ſtone, and with pewter, put into the water at large. The free-ſtone we found received in ſome water; for it was ſofter and eaſier to ſcrape than a piece of the ſame ſtone kept dry. But the pewter into which no water could enter, became more white and liker to ſilver, and leſs flexible by much. There were alſo put into an earthen bottle, placed as before, a good pellet of clay, a piece of cheeſe, a piece of chalk, and a piece of free-ſtone. The clay came forth almoſt of the hardneſs of ſtone; the cheeſe likewiſe very hard, and not well to be cut; the chalk and free-ſtone much harder than they were. The colour of the clay inclined not a whit to the colour of brick, but rather to white, as in ordinary drying by the ſun. Note, that all the former trials were made by a boiling upon a good hot fire, renewing the water as it conſumed, 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.

89. 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 trial 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 old walls, eſpecially towards the bottom, the mortar will become as hard

hard as the brick: we ſee alſo, that the wood on the ſides of veſſels of wine, gathereth a cruſt of tartar, harder than the wood itſelf; and ſcales likewiſe grow to the teeth, harder than the teeth themſelves.

90. MOST of all, induration by aſſimilation appeareth in the bodies of trees and living creatures: for no nouriſhment that the tree receiveth, or that the living creature receiveth, is ſo hard as wood, bone, or horn, *etc.* but is indurated after by aſſimilation.

Experiment ſolitary touching the verſion of water into air.

91. 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 depredation of air upon watry moiſture, and verſion of the ſame into air, appeareth in nothing more viſible, than in the ſudden diſcharge or vaniſhing of a little cloud of breath or vapour from glaſs, or the blade of a ſword, or any ſuch poliſhed body, ſuch as doth not at all detain or imbibe the moiſture; for the miſtineſs ſcattereth and breaketh up ſuddenly. But the like cloud, if it were oily or fatty, will not diſcharge; not becauſe it ſticketh faſter; but becauſe air preyeth upon water; and flame and fire upon oil; and therefore to take out a ſpot of greaſe, they uſe a coal upon brown paper; becauſe fire worketh upon greaſe or oil, as air doth upon water. And we ſee paper oiled, or wood oiled, or the like, laſt long moiſt; but wet with water, dry or putrify ſooner. The cauſe is, for that air meddleth little with the moiſture of oil.

Experiment ſolitary touching the force of union.

92. THERE is an admirable demonſtration in the ſame trifling inſtance of the little cloud upon glaſs, or gems, or blades of ſwords, of the force of union, even in the leaſt quantities and weakeſt bodies, how much it conduceth to preſervation of the preſent form, and the reſiſting of a new. For mark well the diſcharge of that cloud; and you ſhall ſee it ever break up, firſt in the ſkirts and laſt in the midſt. We ſee likewiſe, that much water draweth forth the juice of the body infuſed; but little water is imbibed by the body: and this is a 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 more any alteration of form, and requireth far greater ſtrength in the active body that ſhould ſubdue it.

Experiment ſolitary touching the producing of feathers and hairs of divers colours.

93. WE have ſpoken before, in the fifth inſtance, of the cauſe of orient colours in birds; which is by the fineneſs of the ſtrainer; we will now endeavour to reduce the ſame axiom to a work. For this writing of our *Sylva Sylvarum* is, to ſpeak properly not natural hiſtory, but a high kind of natural magic. 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 ſtick very cloſe; and ſee whether it will not alter the colours of the feathers or hair. It is received, that the pulling off the firſt feathers of birds clean, will make the new come

come forth white: and it is certain that white is a penurious colour, and where moiſture is ſcant. So blue violets, and other flowers, if they be ſtarved, turn pale and white; birds and horſes, by age or ſcars, 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 bird, for that the ſkin is more porous; but when the ſkin is more ſhut and cloſe, the feathers will come white. This is a good experiment, not only for the producing of birds and beaſts of ſtrange colours; but alſo for the diſcloſure of the nature of colours themſelves; which of them require a finer poroſity, and which a groſſer.

Experiment ſolitary touching the nouriſhment of living creatures before they be brought forth.

94. 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 find much of the yolk remaining. And it is needful, that birds that are ſhaped without the female's womb have in the egg, as well matter of nouriſhment, as matter of generation for the body. For after the egg is laid, and ſevered from the body of the hen, it hath no more nouriſhment from the hen, but only a quickning heat when ſhe ſitteth. But beaſts and men need not the matter of nouriſhment within themſelves, becauſe they are ſhaped within the womb of the female, and are nouriſhed continually from her body.

Experiments in conſort touching ſympathy and antipathy for medicinal uſe.

95. IT is an inveterate and received opinion, that cantharides applied to any part of the body, touch the bladder and exulcerate it, if they ſtay on long. It is likewiſe received, that a kind of ſtone, which they bring out of the Weſt-Indies, hath a peculiar force to move gravel, and to diſſolve the ſtone; inſomuch, as laid but to the wriſt, it hath ſo forcibly ſent down gravel, as men have been glad to remove it, it was ſo violent.

96. IT is received, and confirmed by daily experience, that the ſoles of the feet have great affinity with the head and the mouth of the ſtomach: as we ſee, going wet-ſhod, to thoſe that uſe it not, affecteth both: applications of hot powders to the feet attenuate firſt, and after dry the rheum: and therefore a phyſician that would be myſtical, preſcribeth for the cure of the rheum, that a man ſhould walk continually upon a camomile-alley; meaning, that he ſhould put camomile within his ſocks. Likewiſe pigeons bleeding, applied to the ſoles of the feet, eaſe the head: and ſoporiferous medicines applied unto them, provoke ſleep.

97. IT ſeemeth, that as the feet have a ſympathy with the head, ſo the wriſts and hands have a ſympathy with the heart; we ſee the affections and paſſions of the heart and ſpirits are notably diſcloſed by the pulſe: and it is often tried, that juices of ſtock-gilly-flowers, roſe-campian, garlick, and other things, applied to the wriſts, 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.

Experiment ſolitary touching the ſecret proceſſes of nature.

98. 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 ſmallneſs of the parts, or of the ſubtilty of the motion, is little inquired. And yet theſe be the things that govern nature principally; and without which you cannot make any true analyſis and indication of the proceedings of nature. The ſpirits or pneumaticals, that are in all tangible bodies, are ſcarce known. Sometimes they take them for *vacuum*; whereas they are the moſt active of bodies. Sometimes they take them for air; from which they differ exceedingly, as much as wine from water; and as wood from earth. Sometimes they will have them to be natural heat, or a portion of the element of fire; whereas ſome of them are crude and cold. And ſometimes they will have them to be the virtues and qualities of the tangible parts which they ſee; whereas they are things by themſelves. And then, when they come to plants and living creatures, they call them ſouls. And ſuch ſuperficial ſpeculations they have; like proſpectives, that ſhew things inward, when they are but paintings. Neither is this a queſtion of words, but infinitely material in nature. For ſpirits are nothing elſe but a natural body, rarified to a proportion, and included in the tangible parts of bodies, as in an integument. And they be no leſs differing one from the other, than the denſe or tangible parts; and they are in all tangible bodies whatſoever more or leſs; and they are never almoſt at reſt: and from them, and their motions, principally proceed arefaction, colliquation, concoction, maturation, putrefaction, vivification, and moſt of the effects of nature: for, as we have figured them in our *Sapientia veterum*, in the fable of Proſerpina, you ſhall in the infernal regiment hear little doings of Pluto, but moſt of Proſerpina: for tangible parts in bodies are ſtupid things; and the ſpirits do in effect all. As for the differences of tangible parts in bodies, the induſtry of the chemiſts hath given ſome light, in diſcerning by their ſeparations the oily, crude, pure, impure, fine, groſs parts of bodies, and the like. And the phyſicians are content to acknowledge, that herbs and drugs have divers parts; as that opium hath a ſtupefactive part and a heating part; the one moving ſleep, the other a ſweat following; and that rhubarb hath purging parts and aſtringent parts, *etc.* But this whole inquiſition is weakly and negligently handled. And for the more ſubtle differences of the minute parts, and the poſture of them in the body, which alſo hath great effects, they are not at all touched: as for the motions of the minute parts of bodies, which do ſo great effects, they have not been obſerved at all; becauſe they are inviſible, and occur 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 motes, as were ſeen in the ſun; *Atomus*, ſaith he, *neceſſitate rationis et experientiae eſſe convincitur*; *atomum enim nemo unquam vidit.* And therefore the tumult in the parts of ſolid bodies, when they are compreſſed, which is the cauſe of all flight of bodies through the air, and of other mechanical motions, as hath been partly touched before, and ſhall be throughly handled in due place, is not ſeen at all. But nevertheleſs, if you know it not, or inquire it not attentively and diligently, you ſhall never be able to diſcern, and much leſs to produce a number of mechanical motions. Again, as to the motions corporal, within the incloſures of bodies, whereby the effects, which were mentioned before, paſs between the ſpirits and the tangible parts, which are arefaction, colliquation, concoction,

coction, maturation, *etc.* they are not at all handled. But they are put off by the names of virtues, and natures, and actions, and paſſions, and ſuch other logical words.

Experiment ſolitary touching the power of heat.

99. IT is certain, that of all powers in nature heat is the chief; both in the frame of nature, and in the works of art. Certain it is likewiſe, that the effects of heat are moſt advanced, when it worketh upon a body without loſs or diſſipation of the matter; for that ever betrayeth the account. And therefore it is true, that the power of heat is beſt perceived in diſtillations which are performed in cloſe veſſels and receptacles. But yet there is a higher degree; for howſoever diſtillations do keep the body in cells and cloiſters, without going abroad, yet they give ſpace unto bodies to turn into vapour; 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 ultime operations of heat are not attained. But if bodies may be altered by heat, and yet no ſuch reciprocation of rarefaction, and of condenſation, and of ſeparation, admitted; then it is like that this Proteus of matter, being held by the ſleeves, will turn and change into many metamorphoſes. Take therefore a ſquare veſſel of iron, in form of a cube, and let it have good thick and ſtrong ſides. Put into it 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 turned upon itſelf, that one of theſe two effects will follow: either that the body of the wood will be turned into a kind of *amalgama*, as the chemiſts call it, or that the finer part will be turned into air, and the groſſer ſtick as it were baked, and incruſtate upon the ſides of the veſſel, being become of a denſer matter than the wood itſelf crude. And for another trial, take alſo water, and put it in the like veſſel, ſtopped as before; but uſe a gentler heat, and remove the veſſel ſometimes from the fire; and again, after ſome ſmall time, when it is cold, renew the heating of it; and repeat this alteration ſome few times: and if you can once bring to paſs, that the water, which is one of the ſimpleſt of bodies, be changed in colour, odour, or taſte, after the manner of compound bodies, you may be ſure that there is a great work wrought in nature, and a notable entrance made into ſtrange changes of bodies and productions; and alſo a way made to do that by fire, in ſmall time, which the ſun and age do in long time. But of the admirable effects of this diſtillation in cloſe, for ſo we will call it, which is like the wombs and matrices of living creatures, where nothing expireth nor ſeparateth, we will ſpeak fully, in the due place; not that we aim at the making of Paracelſus' pygmies, or any ſuch prodigious follies; but that we know the effects of heat will be ſuch, as will ſcarce fall under the conceit of man, if the force of it be altogether kept in.

Experiment ſolitary touching the impoſſibility of annihilation.

100. THERE is nothing more certain in nature than that it is impoſſible for any body to be utterly annihilated; but that, as it was the work of the omnipotency

of God to make ſomewhat of nothing, ſo it requireth the like omnipotency to turn ſomewhat into nothing. And therefore it is well ſaid by an obſcure writer of the ſect of the chemiſts; that there is no ſuch way to effect the ſtrange tranſmutations of bodies, as to endeavour and urge by all means the reducing of them to nothing. And herein is contained alſo a great ſecret of preſervation of bodies from change; for if you can prohibit, that they neither turn into air becauſe no air cometh to them; nor go into the bodies adjacent, becauſe they are utterly 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 quickſilver. 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.

NATURAL HISTORY.

CENTURY II.

Experiments in conſort touching muſic.

MUSIC, 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 practic, very weakly; being reduced into certain myſtical ſubtilties of no uſe and not much truth. We ſhall therefore, after our manner, join the contemplative and active part together.

101. 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, *etc.* or immuſical 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.

102. 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 fillipping of a drinking glaſs; of air, as in mens voices whilſt they ſing, in pipes, whiſtles, organs, ſtringed inſtruments, *etc.* and of water, as in the nightingale pipes of regals, or organs, and other hydraulics; 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 tones; percuſſions of metals, comprehending glaſs and the like, percuſſions of air, and percuſſions of water.

103. THE diapaſon or eight in muſic is the ſweeteſt concord, in ſo much as it is in effect an uniſon; as we ſee in lutes that are ſtrung in the baſe ſtrings with two ſtrings, one an eight above another; which make but as one ſound. And every eighth note in aſcent, as from eight to fifteen, from fifteen to twenty two, and ſo *in infinitum*, are but ſcales of diapaſon. The cauſe is dark, and hath not been rendred by any; and therefore would be better contemplated. It ſeemeth that air, which is the ſubject of ſounds, in ſounds that are not tones, which are all unequal, as hath been ſaid, admitteth 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 itſelf into any ſuch variety; but is forced to recur

recur into one and the ſame poſture or figure, only differing in greatneſs and ſmallneſs. So we ſee figures may be made of lines, crooked and ſtraight, in infinite variety, where there is inequality; but circles, or ſquares, or triangles equilateral, which are all figures of equal lines, can differ but in greater or leſſer.

104. IT is to be noted, the rather leſt any man ſhould think, that there is any thing in this number of eight, to create the diapaſon, that this computation of eight is a thing rather received, than any true computation. For a true computation ought ever to be by diſtribution into equal portions. Now there be intervenient in the riſe of eight, in tones, two beemolls, or half notes: ſo as if you divide the tones equally, the eight is but ſeven whole and equal notes; and if you ſubdivide that into half-notes, as it is in the ſtops of a lute, it maketh the number of thirteen.

105. YET this is true; that in the ordinary riſes and falls of the voice of man, not meaſuring the tone by whole notes, and half-notes, which is the equal meaſure, there fall out to be two beemolls, as hath been ſaid, between the uniſon and the diapaſon: and this varying is natural. For if a man would endeavour to raiſe or fall his voice, ſtill by half-notes, like the ſtops of a lute; or by whole notes alone without halfs, as far as an eight; he will not be able to frame his voice unto it. Which ſheweth, that after every three whole notes, nature requireth, for all harmonical uſe, one half-note to be interpoſed.

106. IT is to be conſidered, that whatſoever virtue is in numbers, for conducing to concent of notes, is rather to be aſcribed to the ante-number, than to the entire number; as namely, that the ſound returneth after ſix or after twelve; ſo that the ſeventh or the thirteenth is not the matter, but the ſixth or the twelfth; and the ſeventh and the thirteenth are but the limits and boundaries of the return.

107. THE concords in muſic which are perfect or ſemiperfect, between the uniſon and the diapaſon, are the fifth, which is the moſt perfect; the third next; and the ſixth, which is more harſh: and, as the ancients eſteemed, and ſo do myſelf and ſome other yet, the fourth which they call diateſſaron. As for the tenth, twelfth, thirteenth, and ſo *in infinitum*; they be but recurrences of the former, *viz.* of the third, the fifth, and the ſixth; being an eight reſpectively from them.

108. FOR diſcords, the ſecond and the ſeventh are of all others the moſt odious, in harmony, to the ſenſe; whereof the one is next above the uniſon, the other next under the diapaſon: which may ſhew, that harmony requireth a competent diſtance of notes.

109. IN harmony, if there be not a diſcord to the baſe, it doth not 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 concent of four parts conſiſteth of an eight, a fifth, and a third to the baſe; but that fifth is a fourth to the treble, and the third is a ſixth. And the cauſe is, for that the baſe ſtriking more air, doth overcome and drown the treble, unleſs the diſcord be very odious; and ſo hideth a ſmall imperfection. For we ſee, that in one of the lower ſtrings of a lute, there ſoundeth not the ſound of the treble, nor any mixt ſound, but only the ſound of the baſe.

110. WE have no muſic of quarter-notes; and it may be they are not capable of harmony; for we ſee the half-notes themſelves do but interpoſe ſometimes. Nevertheleſs we have ſome ſlides or reliſhes of the voice or ſtrings, as it were continued without notes, from one tone to another, riſing or falling, which are delightful.

111. THE

111. THE cauſes of that which is pleaſing or ingrate to the hearing, may receive light by that which is pleaſing or ingrate to the ſight. There be two things pleaſing to the ſight, leaving pictures and ſhapes aſide, which are but ſecondary objects; and pleaſe or diſpleaſe but in memory; theſe two are colours and order. The pleaſing of colour ſymbolizeth with the pleaſing of any ſingle tone to the ear; but the pleaſing of order doth ſymbolize with harmony. And therefore we ſee in garden-knots, and the frets of houſes, and all equal and well anſwering figures, as globes, pyramids, cones, cylinders, *etc.* 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 proportion of that correſpondence, is more abſtruſe; whereof notwithſtanding we ſhall ſpeak ſomewhat, when we handle tones in the general enquiry of ſounds.

112. TONES are not ſo apt altogether to procure ſleep, as ſome other ſounds; as the wind, the purling of water, humming of bees, a ſweet voice of one that readeth, *etc.* 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.

113. THERE be in muſic certain figures or tropes, almoſt agreeing with the figures of rhetoric, and with the affections of the mind, and other ſenſes. Firſt, the diviſion and quavering, which pleaſe ſo much in muſic, have an agreement with the glittering of light; as the moon-beams playing upon a wave. Again, the falling from a diſcord to a concord, which maketh great ſweetneſs in muſic, hath an agreement with the affections, which are reintegrated to the better, after ſome diſlikes: it agreeth alſo with the taſte, which is ſoon glutted with that which is ſweet alone. The ſliding from the cloſe or cadence, hath an agreement with the figure in rhetoric, which they call *praeter expectatum*; for there is a pleaſure even in being deceived. The reports, and fuges, have an agreement with the figures in rhetoric, of repetition and traduction. The triplas, and changing of times, have an agreement with the changes of motions; as when galliard time, and meaſure time, are in the medley of one dance.

114. IT hath been anciently held and obſerved, that the ſenſe of hearing, and the kinds of muſic, 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, *etc.* The cauſe is, for that the ſenſe of hearing ſtriketh the ſpirits more immediately, than the other ſenſes; and more incorporeally than the ſmelling; for the ſight, taſte, and feeling, have their organs not of ſo preſent and immediate acceſs to the ſpirits, as the hearing hath. And as for the ſmelling, which indeed worketh alſo immediately upon the ſpirits, and is forcible while the object remaineth, it is with a communication of the breath or vapour of the object odorate; but harmony entring 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, doleful tunes, ſolemn tunes; tunes inclining mens minds to pity; warlike tunes. *etc.* 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,

noted, that though this variety of tunes doth diſpoſe the ſpirits to variety of paſſions, conform unto them, yet generally muſic 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.

Experiments in conſort touching ſounds; and firſt touching the nullity and entity of ſounds.

PERSPECTIVE hath been with ſome diligence enquired; and ſo hath the nature of ſounds, in ſome ſort, as far as concerneth muſic: but the nature of ſounds in general hath been ſuperficially obſerved. It is one of the ſubtileſt pieces of nature. And beſides, I practiſe, as I do adviſe; which is, after long inquiry of things immerſed in matter, to interpoſe ſome ſubject which is immateriate, or leſs materiate; ſuch as this of ſounds; to the end, that the intellect may be rectified, and become not partial.

115. 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 muſic. So the motions of the comets, and fiery meteors, as *ſtella cadens, etc.* 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 coruſcations, 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 rack, and are not perceived below, paſs without noiſe. The lower winds in a plain, except they be ſtrong, make no noiſe; but amongſt trees, the noiſe of ſuch winds will be perceived. And the winds, generally, when they make a noiſe, do ever make it unequally, riſing and falling, and ſometimes, when they are vehement, trembling at the height of their blaſt. Rain or hail falling, though vehemently, yieldeth no noiſe in paſſing through the air, till it fall upon the ground, water, houſes, or the like. Water in a river, though a ſwift ſtream, is not heard in the channel, but runneth in ſilence, if it be of any depth; but the very ſtream upon ſhallows, of gravel, or pebble, will be heard. And waters, when they beat upon the ſhore, or are ſtraitned, as in the falls of bridges, or are daſhed againſt themſelves, by winds, give a roaring noiſe. Any piece of timber, or hard body, being thruſt forwards by another body contiguous, without knocking, giveth no noiſe. And ſo bodies in weighing one upon another, though the upper body preſs the lower body down, make no noiſe. So the motion in the minute parts of any ſolid body, which is the principal cauſe of violent motion, though unobſerved, paſſeth without ſound; for that ſound that is heard ſometimes, is produced only by the breaking of the air; and not by the impulſion of the parts. So it is manifeſt, that where the anterior body giveth way, as faſt as the poſterior cometh on, it maketh no noiſe, be the motion never ſo great or ſwift.

116. AIR open, and at large, maketh no noiſe, except it be ſharply percuſſed; as in the ſound of a ſtring, where air is percuſſed by a hard and ſtiff body, and with a ſharp looſe: for if the ſtring be not ſtrained, it maketh no noiſe. But where the air is pent and ſtraitned, there breath or other blowing, which carry but a gentle percuſſion, ſuffice to create ſound; as in pipes and wind-inſtruments. But then you muſt note, that in recorders, which go with a gentle breath, the concave of the pipe, were it not for the ſipple that ſtraitneth the air, much more than the ſimple concave, would

would yield no ſound. For as for other wind-inſtruments, they require a forcible breath; as trumpets, cornets, hunters-horns, *etc.* which appeareth by the blown cheeks of him that windeth them. Organs alſo are blown with a ſtrong wind by the bellows. And note again, that ſome kind of wind-inſtruments are blown at a ſmall hole in the ſide, which ſtraitneth the breath at the firſt entrance; the rather, in reſpect of their traverſe and ſtop above the hole, which performeth the fipples part; as it is ſeen in flutes and fifes, which will not give ſound by a blaſt at the end, as recorders, *etc.* do. Likewiſe in all whiſtling, you contract the mouth; and to make it more ſharp, men ſometimes uſe their finger. But in open air, if you throw a ſtone or a dart, they give no ſound: no more do bullets, except they happen to be a little hollowed in the caſting; which hollowneſs penneth the air: nor yet arrows, except they be ruffled in their feathers, which likewiſe penneth the air. As for ſmall whiſtles or ſhepherds oaten pipes, they give a ſound becauſe of their extreme ſlenderneſs, whereby the air is more pent, than in a wider pipe. Again, the voices of men and living creatures paſs through the throat, which penneth the breath. As for the Jews-harp, it is a ſharp percuſſion; and, beſides, hath the advantage of penning the air in the mouth.

117. SOLID bodies, if they be very ſoftly percuſſed, give no ſound; as when a man treadeth very ſoftly upon boards. So cheſts or doors in fair weather, when they open eaſily, give no ſound. And cart-wheels ſqueak not when they are liquored.

118. THE flame of tapers or candles, though it be a ſwift motion and breaketh the air, yet paſſeth without ſound. Air in ovens, though, no doubt, it doth, as it were, boil and dilate itſelf, and is repercuſſed; yet it is without noiſe.

119. FLAME percuſſed by air, giveth a noiſe; as in blowing of the fire by bellows; greater than if the bellows ſhould blow upon the air itſelf. And ſo likewiſe flame percuſſing the air ſtrongly, as when flame ſuddenly taketh and openeth, giveth a noiſe; ſo great flames, while the one impelleth the other, give a bellowing ſound.

120. 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 murders. But it ſeemeth to me impoſſible; for, if the air pent be driven forth and ſtrike the air open, it will certainly make a noiſe. As for the white powder, if any ſuch thing be, that may extinguiſh or deaden the noiſe, it is like to be a mixture of petre and ſulphur, without coal. For petre alone will not take fire. And if any man think, that the ſound may be extinguiſhed or deadned by diſcharging the pent air, before it cometh to the mouth of the piece 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 through the barrel of a piece, it may be it would give ſeveral ſounds, both at the noſe and at the ſides. But I conceive, that if it were poſſible to bring to paſs, that there ſhould be no air pent at the mouth of the piece, the bullet might fly with ſmall or no noiſe. For firſt it is certain, there is no noiſe in the percuſſion of the flame upon the bullet. Next the bullet, in piercing through the air, maketh no noiſe; as hath been ſaid. And then, if there be no pent air that ſtriketh upon open air, there is no cauſe of noiſe; and yet the flying of the bullet will not be ſtayed. For that motion, as hath been oft ſaid, is in the parts of the bullet, and not in the air. So as trial muſt be made by taking ſome ſmall concave of metal, no more than you mean to fill with powder, and laying the bullet in the mouth of it, half out into the open air.

121. I HEARD it affirmed by a man that was a great dealer in ſecrets, but he was but vain, that there was a conſpiracy, which himſelf hindred, to have killed queen Mary, ſiſter to queen Elizabeth, by a burning-glaſs, when ſhe walked in Saint James's park, from the leads of the houſe. But thus much, no doubt, is true; that if burning-glaſſes could be brought to a great ſtrength, as they talk generally of burning-glaſſes that are able to burn a navy, the percuſſion of the air alone, by ſuch a burning-glaſs, would make no noiſe; no more than is found in coruſcations and lightnings without thunders.

122. I SUPPOSE, that impreſſion of the air with ſounds aſketh a time to be conveyed to the ſenſe, as well as the impreſſing of ſpecies viſible; or elſe they will not be heard. And therefore, as the bullet moveth ſo ſwift that it is inviſible; ſo the ſame ſwiftneſs of motion maketh it inaudible: for we ſee, that the apprehenſion of the eye is quicker than that of the ear.

123. ALL eruptions of air, though ſmall and ſlight, give an entity of ſound, which we call crackling, puffing, ſpitting, *etc.* as in bay-ſalt, and bay-leaves, caſt into the fire; ſo in cheſtnuts, when they leap forth of the aſhes; ſo in green wood laid upon the fire, eſpecially roots; ſo in candles, that ſpit flame if they be wet; ſo in raſping, ſneezing, *etc.* ſo in a roſe leaf gathered together into the faſhion of a purſe, and broken upon the forehead, or back of the hand, as children uſe.

Experiments in conſort touching production, conſervation, and dilation of ſounds; and the office of the air therein.

124. THE cauſe given of ſound, that it ſhould be an eliſion of the air, whereby, if they mean any thing, they mean a cutting or dividing, or elſe an attenuating of the air, is but a term of ignorance; and the notion 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, continueth melting ſome time after the percuſſion; but ceaſeth ſtraightways, if the bell, or ſtring, be touched and ſtayed: whereas, if it were the eliſion of the air that made the ſound, it could not be that the touch of the bell or ſtring ſhould extinguiſh ſo ſuddenly that motion cauſed by the eliſion of the air. This appeareth 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 echoes, whereof ſome are as loud as the original voice, there is no new eliſion, but a repercuſſion only. But that which convinceth it moſt of all is, that ſounds are generated where there is no air at all. But theſe and the like conceits, when men have cleared their underſtanding by the light of experience, will ſcatter and break up like a miſt.

125. IT is certain, that ſound 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 percuſſed. For if there be a mere yielding or ceſſion, it produceth no ſound; as hath been ſaid. And therein ſounds differ from light and colours,

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 cauſae*, a carrier of the ſounds, and the ſounds themſelves, conveyed in the air. For as to the former, we ſee manifeſtly, that no ſound is produced, no not by air itſelf againſt other air, as in organs, *etc.* 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 intenſion or remiſſion of the wind. But for the impreſſion of the ſound, it is quite another thing, and is utterly without any 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 the ſound goeth along; 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 figurations of the air, in variety of words. And if a man ſpeak a good loudneſs againſt the flame of a candle, it will not make it tremble much; though moſt when thoſe letters are pronounced which contract the mouth; as *F*, *S*, *V*, and ſome others. But gentle breathing, or blowing without ſpeaking, will move the candle far more. And it is the more probable, that ſound is without any local motion of the air, becauſe as it differeth from the ſight, in that it needeth a local motion of the air at firſt; ſo it paralleleth in ſo many other things with the ſight, and radiation of things viſible; which, without all queſtion, induce no local motion in the air, as hath been ſaid.

126. NEVERTHELESS it is true, that upon the noiſe of thunder, and great ordnance, glaſs windows will ſhake; and fiſhes are thought to be frightned with 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.

127. IT hath been anciently reported, and is ſtill received, that extreme applauſes and ſhouting of people aſſembled in great multitudes, have ſo rarified and broken the air, that birds flying over have fallen down, the air being not able to ſupport them. And it is believed by ſome, that great ringing of bells in populous cities hath chaſed away thunder; and alſo diſſipated peſtilent air: all which may be alſo from the concuſſion of the air, and not from the ſound.

128. A VERY great ſound, near hand, hath ſtrucken many deaf; and at the inſtant they have found, as it were, the breaking of a ſkin or parchment in their ear: and myſelf ſtanding near one that lured loud and ſhrill, had ſuddenly an offence, as if ſomewhat had broken or been diſlocated in my ear; and immediately after a loud ringing, not an ordinary ſinging or hiſſing, but far louder and differing, ſo as I feared ſome deafneſs But after ſome half quarter of an hour it vaniſhed. This effect may be truly referred unto the ſound: for, as is commonly received, an over-potent object doth deſtroy the ſenſe; and ſpiritual ſpecies, both viſible and audible, will work upon the ſenſories, though they move not any other body.

129. IN dilation of ſounds, the incloſure of them preſerveth them, and cauſeth them to be heard further. And we find in rolls of parchment or trunks, the mouth being laid to the one end of the roll of parchment or trunk, and the ear to the other, the ſound is heard much farther than in the open air. The cauſe is, for that the

ſound ſpendeth, and is diſſipated in the open air; but in ſuch concaves it is conſerved and contracted. So alſo in a piece of ordnance, if you ſpeak in the touch-hole, and another lay his ear to the mouth of the piece, the ſound paſſeth and is far better heard than in the open air.

130. IT is further to be conſidered, how it proveth and worketh when the ſound is not incloſed all the length of his way, but paſſeth 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 handful 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.

131. As the incloſure that is round about and intire, preſerveth the ſound; ſo doth a ſemi-concave, though in a leſs 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 maſt of a ſhip, or a long pole, or a piece of ordnance, though one ſpeak upon the ſurface of the ordnance, and not at any of the bores, the voice will be heard farther than in the air at large.

132. IT would be tried, how, and with what proportion of diſadvantage the voice will be carried in an horn, which is a line arched; or in a trumpet, which is a line retorted; or in ſome pipe that were ſinuous.

133. IT is certain, howſoever it croſs the received opinion, that ſounds may be created without air, though air be the moſt favourable deferent of ſounds. Take a veſſel of water, and knap a pair of tongs ſome depth within the water, and you ſhall hear the ſound of the tongs well, and not much diminiſhed; and yet there is no air at all preſent.

134. 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 find the ſound much more reſounding from the veſſel of ſilver, than from that of wood: and yet if there be no water in the veſſel, ſo that you knap the tongs in the air, you ſhall find no difference between the ſilver and the wooden veſſel. Whereby, beſide the main point of creating ſound without air, you may collect two things: the one, that the ſound communicateth with the bottom of the veſſel; the other, that ſuch a communication paſſeth far better through water than air.

135. 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.

136. THE pneumatical part which is in all tangible bodies, and hath ſome affinity with the air, performeth, in ſome degree, the part of the air; as when you knock upon an empty barrel, the ſound is in part created by the air on the outſide; and in part by the air in the inſide: for the ſound will be greater or leſſer, as the barrel is more empty or more full; but yet the ſound participateth alſo with the ſpirit in the wood through which it paſſeth, from the outſide to the inſide: and ſo it cometh to paſs in the chiming of bells on the outſide; where alſo the ſound paſſeth to the inſide: and a number of other like inſtances, whereof we ſhall ſpeak more when we handle the communication of ſounds.

137. IT were extreme groſſneſs to think, as we have partly touched before, that the

the ſound in ſtrings is made or produced between the hand and the ſtring, or the quill and the ſtring, or the bow and the ſtring, for thoſe are but *vehicula motus*, paſſages to the creation of the ſound, the ſound being produced between the ſtring and the air; and that not by any impulſion of the air from the firſt motion of the ſtring; but by the return or reſult of the ſtring, which was ſtrained by the touch, to his former place: which motion of reſult is quick and ſharp; whereas the firſt motion is ſoft and dull. So the bow tortureth the ſtring continually, and thereby holdeth it in a continual trepidation.

Experiments in conſort touching the magnitude and exility and damps of ſounds.

138. TAKE a trunk, and let one whiſtle at the one end, and hold your ear at the other, and you ſhall find the ſound ſtrike ſo ſharp as you can ſcarce endure it. The cauſe is, for that ſound diffuſeth itſelf in round, and ſo ſpendeth itſelf; but if the ſound, which would ſcatter in open air, be made to go all into a canal, it muſt needs give greater force to the ſound. And ſo you may note, that incloſures do not only preſerve ſound, but alſo increaſe and ſharpen it.

139. A HUNTER'S horn being greater at one end than at the other, doth increaſe the ſound more than if the horn were all of an equal bore. The cauſe is, for that the air and ſound being firſt contracted at the leſſer end, and afterwards having more room to ſpread at the greater end, do dilate themſelves; and in coming out ſtrike more air; whereby the ſound is the greater and baſer. And even hunters horns, which are ſometimes made ſtraight, and not oblique, are ever greater at the lower end. It would be tried alſo in pipes, being made far larger at the lower end; or being made with a belly towards the lower end, and then iſſuing into a ſtraight concave again.

140. THERE is in Saint James's fields a conduit of brick, unto which joineth a low vault; and at the end of that a round houſe of ſtone: and in the brick conduit there is a window; and in the round houſe a ſlit or rift of ſome little breadth: if you cry out in the rift, it will make a fearful roaring at the window. The cauſe is the ſame with the former; for that all concaves, that proceed from more narrow to more broad, do amplify the ſound at the coming out.

141. HAWKS bells, that have holes in the ſides, give a greater ring, than if the pellet did ſtrike upon braſs in the open air. The cauſe is the ſame with the firſt inſtance of the trunk; namely, for that the ſound incloſed with the ſides of the bell cometh forth at the holes unſpent and more ſtrong.

142. IN drums, the cloſeneſs round about, that preſerveth the ſound from diſperſing, maketh the noiſe come forth at the drum-hole far more loud and ſtrong than if you ſhould ſtrike upon the like ſkin extended in the open air. The cauſe is the ſame with the two precedent.

143. SOUNDS are better heard, and farther off, in an evening or in the night, than at the noon or in the day. The cauſe is, for that in the day, when the air is more thin, no doubt, the ſound pierceth better; but when the air is more thick, as in the night, the ſound ſpendeth and ſpreadeth abroad leſs: and ſo it is a degree of incloſure. As for the night, it is true alſo that the general ſilence helpeth.

144. THERE be two kinds of reflexions of ſounds; the one at diſtance, which is the echo; wherein the original is heard diſtinctly, and the reflexion alſo diſtinctly; of which we ſhall ſpeak hereafter: the other in concurrence; when the ſound reflecting, the reflexion being near at hand, returneth immediately upon the original, and

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ſo iterateth it not, but amplifieth it. Therefore we ſee, that muſic upon the water ſoundeth more; and ſo likewiſe muſic is better in chambers wainſcotted than hanged.

145. THE ſtrings of a lute, or viol, or virginals, do give a far greater ſound, by reaſon of the knot, and board, and concave underneath, than if there were nothing but only the 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 expence or diſperſing.

146. AN Iriſh harp hath open air on both ſides of the ſtrings: and it hath the concave or belly not along the ſtrings, but at the end of the ſtrings. It maketh a more reſounding ſound than a bandora, orpharion, or cittern, which have likewiſe wire-ſtrings. I judge the cauſe to be, for that open air on both ſides helpeth, ſo that there be a concave; which is therefore beſt placed at the end.

147. IN a 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.

148. 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 at hand. Inquire more particularly of the frame of that place. I ſuppoſe there is ſome vault, or hollow, or iſle, behind the wall, and ſome paſſage to it towards the farther end of that wall againſt which you ſpeak; ſo as the voice of him that ſpeaketh ſlideth along the wall, and then entreth 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.

149. 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 ſenſory, by reaſon of the cloſe holding, is percuſſed before the air diſperſeth. The like is, if you hold the horn betwixt your teeth: but that is a plain dilation of the ſound from the teeth to the inſtrument of hearing; for there is a great intercourſe between thoſe two parts; as appeareth by this, that a harſh grating tune ſetteth the teeth on edge. The like falleth out, if the horn of the bow be put upon the temples; but that is but the ſlide of the ſound from thence to the ear.

150. 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, made not ſo contiguous to the ear. By which, and by ſome other inſtances that have been partly touched, it ſhould appear, that ſounds do not only ſlide upon the ſurface of a ſmooth body, but do alſo communicate with the ſpirits, that are in the pores of the body.

151. I REMEMBER in Trinity College in Cambridge, there was an upper chamber, which being thought weak in the roof of it, was ſupported by a pillar of iron of the bigneſs of one's arm in the midſt of the chamber; which if you had ſtruck, it would make a little flat noiſe in the room where it was ſtruck, but it would make a great bomb in the chamber beneath.

152. THE ſound which is made by buckets in a well, when they touch upon the water, or when they ſtrike upon the ſide of the well, or when two buckets daſh the one againſt the other, theſe ſounds are deeper and fuller than if the like percuſſion were

were made in the open air. The cauſe is the penning and incloſure of the air in the concave of the well.

153. 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: incloſure ſimple; incloſure with dilatation; communication; reflexion concurrent; and approach to the ſenſory.

154. FOR exility of the voice or other ſounds; it is certain that the voice doth paſs through ſolid and hard bodies if they be not too thick: and through water, which is likewiſe a very cloſe body, and ſuch an one as letteth not in air. But then the voice, or other ſound, is reduced by ſuch paſſage to a great weakneſs or exility. If therefore you ſtop the holes of a hawk's bell, it will make no ring, but a flat noiſe or rattle. And ſo doth the *aëtites* or eagle-ſtone, which hath a little ſtone within it.

155. AND as for water, it is a certain trial: 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 preſs it down under the water ſome handful and an half, ſtill keeping it even, that it may not tilt on either ſide, and ſo the air get out: then let him that is in the bath dive with his head ſo far under water, as he may put his head into the pail, and there will come as much air bubbling forth, as will make room for his head. Then let him ſpeak, and any that ſhall ſtand without ſhall hear his voice plainly; but yet made extreme ſharp and exile, like the voice of puppets: but yet the articulate ſounds of the words will not be confounded. Note, that it may be much more handſomely done, if the pail be put over the man's head above water, and then he cowr down, and the pail be preſſed down with him. Note, that a man muſt kneel or ſit, that he may be lower than the water. A man would think that the Sicilian poet had knowledge of this experiment; for he ſaith, that Hercules's page, Hylas, went with a water-pot to fill it at a pleaſant fountain that was near the ſhore, and that the nymphs of the fountain fell in love with the boy, and pulled him under water, keeping him alive; and that Hercules miſſing his page, called him by his name aloud, that all the ſhore rang of it; and that Hylas from within the water anſwered his maſter, but, that which is to the preſent purpoſe, with ſo ſmall and exile a voice, as Hercules thought he had been three miles off, when the fountain, indeed, was faſt by.

156. IN lutes and inſtruments of ſtrings, if you ſtop a ſtring high, whereby it hath leſs ſcope to tremble, the ſound is more treble, but yet more dead.

157. TAKE two ſaucers, and ſtrike the edge of the one againſt the bottom of the other, within a pail of water; and you ſhall find, that as you put the ſaucers lower and lower, the ſound groweth more flat; even while part of the ſaucer is above the water; but that flatneſs of ſound is joined with a harſhneſs of ſound; which no doubt is cauſed by the inequality of the ſound which cometh from the part of the ſaucer under the water and from the part above. But when the ſaucer is wholly under the water the ſound becometh more clear, but far more low, and as if the ſound came from afar off.

158. A SOFT body dampeth the ſound much more than a hard; as if a bell hath cloth or ſilk wrapped about it, it deadneth the ſound more than if it were wood. And therefore in clericals the keys are lined; and in colleges they uſe to line the tablemen.

159. TRIAL

159. TRIAL 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; ſet againſt a damaſk cuſhion; thruſt into ſand; into aſhes; into water, half an inch under the water; cloſe to the bottom of a ſilver baſon; and ſtill the tone remained: but the bottom of it was ſet againſt a woollen carpet; a lining of pluſh; a lock of wool, though looſely put in; againſt ſnow; and the ſound of it was quite deadned, and but breath.

160. IRON hot produceth not ſo full a ſound as when it is cold; for while it is hot, it appeareth to be more ſoft and leſs reſounding. So likewiſe warm water, when it falleth, maketh not ſo full a ſound as cold: and I conceive it is ſofter, and nearer the nature of oil; for it is more ſlippery, as may be perceived in that it ſcowreth better.

161. LET there be a recorder made with two ſipples, at each end one; the trunk of it of the length of two recorders, and the holes anſwerable towards each end; and let two play the ſame leſſon upon it at an uniſon; and let it be noted whether the ſound be confounded, or amplified, or dulled. So likewiſe let a croſs be made of two trunks hollow throughout; 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.

162. A BELLOWS blown in at the hole of a drum, and the drum then ſtrucken, maketh the ſound a little flatter, but no other apparent alteration. The cauſe is manifeſt; partly for that it hindereth the iſſue of the ſound; and partly for that it maketh the air, being blown together, leſs moveable.

Experiments in conſort touching the loudneſs or ſoftneſs of ſounds, and their carriage at longer or ſhorter diſtance.

163. THE loudneſs and ſoftneſs of ſounds is a thing diſtinct from the magnitude and exility of ſounds; for a baſe ſtring, though ſoftly ſtrucken, giveth the greater ſound; but a treble ſtring, if hard ſtrucken, will be heard much farther off. And the cauſe is, for that the baſe ſtring ſtriketh more air, and the treble leſs air, but with a ſharper percuſſion.

164. 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 a hand-bell harder or ſofter, *etc.* 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 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 ſtopped, or with powder alone rammed in hard, maketh no great difference in the loudneſs of the report.

165. THE ſharpneſs or quickneſs of the percuſſion, is a great cauſe of the loudneſs, as well as the ſtrength; as in a whip or wand, if you ſtrike the air with it; the ſharper and quicker you ſtrike it, the louder ſound it giveth. And in playing upon the lute or virginals, the quick ſtroke or touch is a great life to the ſound. The cauſe

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is, for that the quick ſtriking cutteth the air ſpeedily; whereas the ſoft ſtriking doth rather beat than cut.

Experiments in conſort touching the communication of ſounds.

THE communication of ſounds, as in bellies of lutes, empty veſſels, *etc.* hath been touched *obiter* in the majoration of ſounds; but it is fit alſo to make a title of it apart.

166. THE experiment for greateſt demonſtration of communication of ſounds, is the chiming of bells; where if you ſtrike with a hammer upon the upper part, and then upon the midſt, and then upon the lower, you ſhall find the ſound to be more treble and more baſe, according to the concave on the inſide, though the percuſſion be only on the outſide.

167. WHEN the ſound is created between the blaſt of the mouth and the air of the pipe, it hath nevertheleſs ſome communication with the matter of the ſides of the pipe, and the ſpirits in them contained; for in a pipe, or trumpet, of wood, and braſs, the ſound will be diverſe; ſo if the pipe be covered with cloth or ſilk, it will give a diverſe ſound from what it would do of itſelf; ſo if the pipe be a little wet on the inſide, it will make a differing ſound from the ſame pipe dry.

168. THAT ſound made within water doth communicate better with a hard body through water, than made in air it doth with air, *vide experimentum* 134.

Experiments in conſort touching equality and inequality of ſounds.

WE have ſpoken before, in the inquiſition touching muſic, of muſical ſounds, whereunto there may be a concord or diſcord in two parts; which ſounds we call tones: and likewiſe of immuſical 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 percutient, or from the trepidation of the motion.

169. A BELL, if it have a riſt 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 weaſand groweth rugged, and, as we call it, furred, becometh hoarſe. And in theſe two inſtances the ſounds are ingrate, becauſe they are merely unequal: but if they be unequal in equality, then the ſound is grateful, but purling.

170. ALL inſtruments that have either returns, as trumpets; or flexions, as corners; or are drawn up, and put from, as ſackbuts; have a purling ſound: but the recorder, or flute, that has none of theſe inequalities, gives a clear ſound. Nevertheleſs, the recorder itſelf, or pipe, moiſtened a little in the inſide, ſoundeth more ſolemnly, and with a little purling or hiſſing. Again, a wreathed ſtring, ſuch as are in the baſe ſtrings of bandoras, giveth alſo a purling ſound.

171. BUT a lute-ſtring, if it be merely unequal in its parts, giveth a harſh and untuneable ſound; which ſtrings we call falſe, being bigger in one place than in another; and therefore wire ſtrings are never falſe. We ſee alſo, that when we try a falſe lute-ſtring, we uſe to extend it hard between the fingers, and to fillip it; and if it giveth a double ſpecies, it is true; but if it giveth a treble, or more, it is falſe.

172. WATERS, in the noiſe they make as they run, repreſent to the ear a trembling noiſe; and in regals, where they have a pipe they call the nightingale-pipe, which containeth water, the ſound hath a continual trembling: and children have alſo little things they call cocks, which have water in them; and when they blow or whiſtle in them, they yield a trembling noiſe; which trembling of water hath an affinity with the letter *L*. All which inequalities of trepidation are rather pleaſant than otherwiſe.

173. ALL baſe notes, or very treble notes, give an aſper ſound; for that the baſe ſtriketh more air, than it can well ſtrike equally: and the treble cutteth the air ſo ſharp, as it returneth too ſwift to make the ſound equal: and therefore a mean or tenor is the ſweeteſt part.

174. 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 weaſand or wind-pipe, which we call *aſpera arteria*, which being well extended, gathereth equality; as a bladder that is wrinkled, if it be extended, becometh ſmooth. The extenſion is 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 labour of the throat, than in ſpeaking; as appeareth in the thruſting out or drawing in of the chin, when we ſing.

175. THE humming of bees is an unequal buzzing, and is conceived by ſome of the ancients not to come forth at their mouth, but to be an inward ſound; but, it may be, it is neither; but from the motion of their wings; for it is not heard but when they ſtir.

176. ALL metals quenched in water give a ſibilation or hiſſing ſound, which hath an affinity with the letter *Z*, notwithſtanding the ſound be created between the water or vapour, and the air. Seething alſo, if there be but ſmall ſtore of water in a veſſel, giveth a hiſſing ſound; but boiling in a full veſſel giveth a bubbling ſound, drawing ſomewhat near to the cocks uſed by children.

177. TRIAL ſhould be made, whether the inequality or interchange of the medium will not produce an inequality of ſound; as if three bells were made one within another, and air betwixt each; and then the outermoſt bell were chimed with a hammer, how the ſound would differ from a ſimple bell. So likewiſe take a plate of braſs, and a plank of wood, and 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 hogſhead, with holes or knots in them; and mark the difference of their ſound from the ſound of an hogſhead without ſuch partitions.

Experiments in conſort touching the more treble, and the more baſe tones, or muſical ſounds.

178. IT is evident, that the percuſſion of the greater quantity of air cauſeth the baſer ſound; and the leſs quantity the more treble ſound. The percuſſion of the greater quantity of air is produced by the greatneſs of the body percuſſing; by the latitude of the concave by which the ſound paſſeth; and by the longitude of the ſame concave. Therefore we ſee that a baſe ſtring is greater than a treble; a baſe pipe hath a greater bore than a treble; and in pipes, and the like, the lower the note-holes be, and the further off from the mouth of the pipe, the more baſe ſound they yield; and the nearer the mouth, the more treble. Nay more, if you ſtrike an entire body, as

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an andiron of braſs, at the top, it maketh a more treble ſound; and at the bottom a baſer.

179. IT is alſo evident, that the ſharper or quicker percuſſion of air cauſeth the more treble ſound; and the ſlower or heavier, the more baſe ſound. So we ſee in ſtrings; the more they are wound up and ſtrained, and thereby give a more quick ſtart-back, the more treble is the ſound; and the ſlacker they are, or leſs wound up, the baſer is the ſound. And therefore a bigger ſtring more ſtrained, and a leſſer ſtring leſs ſtrained, may fall into the ſame tone.

180. CHILDREN, women, eunuchs, have more ſmall and ſhrill voices than men. The reaſon is, not for that men have greater heat, which may make the voice ſtronger, for the ſtrength of a voice or ſound doth make a difference in the loudneſs or ſoftneſs, but not in the tone, but from the dilatation of the organ; which, it is true, is likewiſe cauſed by heat. But the cauſe of changing the voice at the years of puberty, is more obſcure. It ſeemeth to be, for that when much of the moiſture of the body, which did before irrigate the parts, is drawn down to the 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, *etc.*

181. THE induſtry of the muſician 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, *etc.* The other is the ſhortneſs of the ſtring, as in harps, virginals, *etc.* Both theſe have one and the ſame reaſon; for they cauſe the ſtring to give a quicker ſtart.

182. IN the ſtraining of a ſtring, the further it is ſtrained, the leſs ſuperſtraining goeth to a note; for it requireth good winding of a ſtring before it will make any note at all: and in the ſtops of lutes, *etc.* the higher they go, the leſs diſtance is between the frets.

183. IF you fill a drinking-glaſs with water, eſpecially one ſharp below, and wide above, and fillip upon the brim or outſide; and after empty part of the water, and ſo more and more, and ſtill try the tone by filliping; you ſhall find the tone fall and be more baſe, as the glaſs is more empty.

Experiments in conſort touching the proportion of treble and baſe tones.

THE juſt and meaſured proportion of the air percuſſed, towards the baſeneſs or trebleneſs of tones, is one of the greateſt ſecrets in the contemplation of ſounds. For it diſcovereth the true coincidence of tones into diapaſons; which is the return of the ſame ſound. And ſo of the concords and diſcords between the uniſon and diapaſon, which we have touched before in the experiments of 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, *etc.* but moſt commodiouſly in the laſt of theſe.

184. TRY therefore the winding of a ſtring once about, as ſoon as it is brought to that extenſion as will give a tone; and then of twice about, and thrice about, *etc.* and mark the ſcale or difference of the riſe of the tone: whereby you ſhall diſcover, in one, two effects; both the proportion of the ſound towards the dimenſion of the winding; and the proportion likewiſe of the ſound towards the ſtring, as it is more

or leſs ſtrained. But note that to meaſure this, the way will be, to take the length in a right line of the ſtring, upon any winding about of the peg.

185. As for the ſtops, you are to take the number of frets; and principally the length of the line, from the firſt ſtop of the ſtring, unto ſuch a ſtop as ſhall produce a diapaſon to the former ſtop upon the ſame ſtring.

186. BUT it will beſt, as it is ſaid, appear in the bores of wind-inſtruments: and therefore cauſe ſome half dozen pipes to be made, in length and all things elſe alike, with a ſingle, double, and ſo on to a ſextuple bore; and ſo mark what fall of tone every one giveth. But ſtill in theſe three laſt inſtances, you muſt diligently obſerve, what length of ſtring, or diſtance of ſtop, or concave of air, maketh what riſe of ſound. As in the laſt of theſe, which, as we ſaid, is that which giveth the apteſt demonſtration, you muſt ſet down what 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 unlike that thoſe that make recorders, *etc.* know this already: for that they make them in ſets: and likewiſe bell-founders, in fitting the tune of their bells. So that inquiry 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.

187. THERE is required ſome ſenſible difference in the proportion of creating a note, towards the ſound itſelf, which is the paſſive: and that it be not too near, but at a diſtance. For in a recorder, the three uppermoſt holes yield one tone; which is a note lower than the tone of the firſt three. And the like, no doubt, is required in the winding or ſtopping of ſtrings.

Experiments in conſort touching exterior and interior ſounds.

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 concuſſion of the air, than an eliſion or ſection of the ſame: ſo as the percuſſion of the one towards the other differeth as a blow differeth from a cut.

188. IN ſpeech of man, the whiſpering, which they call *ſuſurrus* in latin, whether it be louder or ſofter, is an interior ſound; but the ſpeaking out is an exterior ſound; and therefore you can never make a tone, nor ſing in whiſpering; but in ſpeech you may: ſo breathing, or blowing by the mouth, bellows, or wind, though loud, is an interior ſound; but the blowing through a pipe or concave, though ſoft, is an exterior. So likewiſe the greateſt winds, if they have no coarctation, or blow not hollow, give an interior ſound; the whiſtling or hollow wind yieldeth a ſinging, or exterior ſound; the former being pent by ſome other body; the latter being pent in by its own denſity: and therefore we ſee, that when the wind bloweth hollow, it is a ſign of rain. The flame, as it moveth within itſelf or is blown by a bellows, giveth a murmur or interior ſound.

189. 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

may induce a nullity of ſound; but never an interior ſound; as when one treadeth ſo ſoftly that he is not heard.

190. WHERE the air is the percutient, pent or not pent, againſt a hard body, it never giveth an exterior ſound; as if you blow ſtrongly with a bellows againſt a wall.

191. SOUNDS, both exterior and interior, may be made as well by ſuction as by emiſſion of the breath: as in whiſtling or breathing.

Experiments in conſort touching articulation of ſounds.

192. IT is evident, and it is one of the ſtrangeſt ſecrets in ſounds, that the whole ſound is not in the whole air only; but the whole ſound is alſo in every ſmall part of the air. So that all the curious diverſity of articulate ſounds, of the voice of man or birds, will enter at a ſmall cranny inconfuſed.

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

194. OVER-GREAT diſtance confoundeth the articulation of ſounds; as we ſee, that you may hear the ſound of a preacher's voice, or the like, when you cannot diſtinguiſh what he ſaith. And one articulate ſound will confound another, as when many ſpeak at once.

195. IN the experiment of ſpeaking under water, when the voice is reduced to ſuch an extreme exility, yet the articulate ſounds, which are the words, are not confounded, as hath been ſaid.

196. I CONCEIVE, that an extreme ſmall or an extreme great ſound cannot be articulate; but that the articulation requireth a mediocrity of ſound: for that the extreme ſmall ſound confoundeth the articulation by contracting; and the great ſound by diſperſing: and although, as was formerly ſaid, a ſound articulate, already created, will be contracted into a ſmall cranny; yet the firſt articulation requireth more dimenſion.

197. IT hath been obſerved, that in a room, or in a chapel, 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 groſs of the ſound be greater.

188. THE motions of the tongue, lips, throat, palate, *etc.* 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 ſubtle, 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 aſſigned which letters are labial, which dental, which guttural, *etc.* As for the Latins and Grecians, they have diſtinguiſhed between ſemi-vowels and mutes; and in mutes, between *mutae tenues*, *mediae*, and *aſpiratae*; not amiſs, but yet not diligently enough. For the ſpecial ſtrokes and motions that create thoſe ſounds, they have little inquired: as, that the letters *B*, *P*, *F*, *M*, are not expreſſed, but with the contracting or ſhutting of the mouth; that the letters *N* and *B*, cannot be pronounced but that the letter *N* will turn into *M*. As *hecatonba* will be *hecatomba*. That *M* and *T* cannot be pronounced together, but *P* will come between; as *emtus* is pronounced *emptus*; and a number of the like.

So

So that if you inquire to the full, you will find, that to the making of the whole alphabet there will be fewer ſimple motions required than there are letters.

199. THE lungs are the moſt ſpungy part of the body; and therefore ableſt to contract and dilate itſelf; and where it contracteth itſelf, it expelleth the air; which through the artery, 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.

200. 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 ſcreech-owls with the letter *Sh*; voice of cats with the diphthong *Eu*; voice of cuckows with the diphthong *Ou*; ſounds of ſtrings with the letter *Ng*: ſo that if a man, for curioſity or ſtrangeneſs ſake, would make a puppet or other dead body to pronounce a word, let him conſider, on the one part, the motion of the inſtruments of voice; and on the other part, the like ſounds made in inanimate bodies; and what conformity there is that cauſeth the ſimilitude of ſounds; and by that he may miniſter light to that effect.

NATURAL HISTORY.

CENTURY III.

Experiments in conſort touching the motions of ſounds, in what lines they are circular, oblique, ſtraight, upwards, downwards, forwards, backwards.

201. ALL ſounds whatſoever move round; that is to ſay, on all ſides; upwards, downwards, forwards, and backwards. This appeareth in all inſtances.

202. SOUNDS do not require to be conveyed to the ſenſe in a right line, as viſibles do, but may be arched; though it be true, they move ſtrongeſt in a right line; which nevertheleſs is not cauſed by the rightneſs of the line, but by the ſhortneſs of the diſtance; *linea recta breviſſima*. And therefore we ſee if a wall be between, and you ſpeak on the one ſide, you hear it on the other; which is not becauſe the ſound paſſeth through the wall, but archeth over the wall.

203. IF the ſound be ſtopped and repercuſſed, it cometh about on the other ſide in an oblique line. So, if in a coach one ſide of the boot be down, and the other up, and a beggar beg on the cloſe ſide; you will think that he were on the open ſide. So likewiſe, if a bell or clock be, for example, on the north ſide of a chamber, and the window of that chamber be upon the ſouth; he that is in the chamber will think the ſound came from the ſouth.

204. SOUNDS, though they ſpread round, ſo that there is an orb or ſpherical area of the ſound, yet they move ſtrongeſt and go fartheſt in the fore-lines, from the firſt local impulſion of the air. And therefore in preaching, you ſhall hear the preacher's voice better before the pulpit, than behind it, or on the ſides, though it ſtand open. So a harquebuſs, or ordnance, will be farther heard forwards from the mouth of the piece, than backwards or on the ſides.

205. IT may be doubted, that ſounds do move better downwards than upwards. Pulpits are placed high above the people. And when the ancient generals ſpake to their armies, they had ever a mount of turf caſt up, whereupon they ſtood; but this may be imputed to the ſtops and obſtacles which the voice meeteth with, when one ſpeaketh upon the level. But there ſeemeth to be more in it; for it may be that ſpiritual ſpecies, both of things viſible and ſounds, do move better downwards than upwards. It is a ſtrange thing, that to men ſtanding below on the ground, thoſe that be on the top of Paul's ſeem much leſs than they are, and cannot be known; but to men above, thoſe below ſeem nothing ſo much leſſened, and may be known: yet it is true, that all things to them above ſeem alſo ſomewhat contracted, and better collected into figure: as knots in gardens ſhew beſt from an upper window or terras.

206. BUT to make an exact trial of it, let a man ſtand in a chamber not much above the ground, and ſpeak out at the window, through a trunk, to one ſtanding on the ground, as ſoftly as he can, the other laying his ear cloſe to the trunk: then

via

via verſa, let the other ſpeak below, keeping the ſame proportion of ſoftneſs; and let him in the chamber lay his ear to the trunk: and this may be the apteſt means to make a judgment, whether ſounds deſcend or aſcend better.

Experiments in conſort touching the laſting and periſhing of ſounds; and touching the time they require to their generation or dilation.

207. AFTER that ſound is created, which is in a moment, we find it continueth ſome ſmall time, melting by little and little. In this there is a wonderful error amongſt men, who take this to be a continuance of the firſt ſound; whereas, in truth, it is a renovation, and not a continuance: for the body percuſſed hath, by reaſon of the percuſſion, a trepidation wrought in the minute parts, and ſo reneweth the percuſſion of the air. This appeareth manifeſtly, becauſe that the melting ſound of a bell, or of a ſtring ſtrucken, which is thought to be a continuance, ceaſeth as ſoon as the bell or ſtring is touched. As in a virginal, as ſoon as ever the jack falleth, and toucheth the ſtring, the ſound ceaſeth; and in a bell, after you have chimed upon it, if you touch the bell the ſound ceaſeth. And in this you muſt diſtinguiſh that there are two trepidations: the one manifeſt and local; as of the bell when it is penſile: the other ſecret, of the minute parts; ſuch as is deſcribed in the ninth inſtance. But it is true, that the local helpeth the ſecret greatly. We ſee likewiſe that in pipes, and other wind-inſtruments, the ſound laſteth no longer than the breath bloweth. It is true, that in organs there is a confuſed murmur for a while after you have played; but that is but while the bellows are in falling.

208. IT is certain, that in the noiſe of great ordnance, where many are ſhot off together, the ſound will be carried, at the leaſt, twenty miles upon the land, and much farther upon the water. But then it will come to the ear, not in the inſtant of the ſhooting off, but it will come an hour or more later. This muſt needs be a continuance of the firſt ſound; for there is no trepidation which ſhould renew it. And the touching of the ordnance would not extinguiſh the ſound the ſooner: ſo that in great ſounds the continuance is more than momentary.

209. TO try exactly the time wherein ſound is dilated, let a man ſtand in a ſteeple, and have with him a taper; and let ſome vail be put before the taper; and let another man ſtand in the field a mile off. Then let him in the ſteeple ſtrike the bell; and in the ſame inſtant withdraw the vail; and ſo let him in the field tell by his pulſe what diſtance of time there is between the light ſeen, and the ſound heard: for it is certain that the dilation of light is in an inſtant. This may be tried in far greater diſtances, allowing greater lights and ſounds.

210. IT is generally known and obſerved that light, and the object of ſight, move ſwifter than ſound; for we ſee the flaſh of a piece is ſeen ſooner than the noiſe is heard. And in hewing wood, if one be ſome diſtance off, he ſhall ſee the arm lifted up for a ſecond ſtroke, before he hears 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.

211. 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;

denly; for in every ſuction or impulſion of the air, the air doth ſuddenly reſtore and reunite itſelf; which the water alſo doth, but nothing ſo ſwiftly.

Experiments in conſort touching the paſſage and interception of ſounds.

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 through a body; and therefore you muſt make the intercepting body very cloſe; for ſound will paſs through a ſmall chink.

212. WHERE ſound paſſeth through a hard or cloſe body, as through water; through a wall; through metal, as in hawks bells ſtopped, *etc.* the hard or cloſe body muſt be but thin and ſmall; for elſe it deadneth and extinguiſheth the ſound utterly. And therefore in the experiment of ſpeaking in air under water, the voice muſt not be very deep within the water: for then the ſound pierceth not. So if you ſpeak on the farther ſide of a cloſe wall, if the wall be very thick you ſhall not be heard: and if there were an hogſhead empty, whereof the ſides were ſome two foot thick, and the bunghole ſtopped; I conceive the reſounding 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.

213. IT is certain, that in the paſſage of ſounds through hard bodies the ſpirit or pneumatical part of the hard body itſelf doth co-operate; but much better when the ſides of that hard body are ſtruck, than when the percuſſion is only within, without touch of the ſides. Take therefore a hawk's bell, the holes ſtopped up, and hang it by a thread within a bottle glaſs, and ſtop the mouth of the glaſs very cloſe with wax; and then ſhake the glaſs, and ſee whether the bell give any ſound at all, or how weak: but note, that you muſt inſtead of the thread take a wire; or elſe let the glaſs have a great belly; leſt when you ſhake the bell, it daſh upon the ſides of the glaſs.

214. IT is plain, that a very long and downright 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.

215. SOFT and foraminous bodies, in the firſt creation of the ſound, will deaden it; for the ſtriking againſt cloth or furr will make little ſound; as hath been ſaid: but in the paſſage of the ſound, they will admit it better than harder bodies; as we ſee, that curtains and hangings will not ſtay the ſound much; but glaſs-windows, if they be very cloſe, will check a ſound more than the like thickneſs of cloth. We ſee alſo in the rumbling of the belly, how eaſily the ſound paſſeth through the guts and ſkin.

216. IT is worthy the inquiry, whether great ſounds, as of ordnance or bells, become not more weak and exile when they paſs through ſmall crannies. For the ſubtilties of articulate ſounds, it may be, may paſs through ſmall crannies not confuſed; but the magnitude of the ſound, perhaps, not ſo well.

Experiments in conſort touching the medium of ſounds.

217. THE medium of ſounds is air; ſoft and porous bodies; alſo water. And hard bodies refuſe not altogether to be mediums of ſounds. But all of them are dull and unapt deferents, except the air.

218. IN air, the thinner or drier air carrieth not the ſound ſo well as the more denſe; as appeareth in night ſounds and evening ſounds, and ſounds in moiſt weather and ſouthern winds. The reaſon is already mentioned in the title of majoration of ſounds; being for that thin air is better pierced; but thick air preſerveth the ſound better from waſte: let further trial be made by hollowing in miſts and gentle ſhowers; for, it may be, that will ſomewhat deaden the ſound.

219. How far forth flame may be a medium of ſounds, eſpecially of ſuch ſounds as are created by air, and not betwixt hard bodies, let it be tried in ſpeaking where a bonfire is between; but then you muſt allow for ſome diſturbance the noiſe that the flame itſelf maketh.

220. WHETHER any other liquors, being made mediums, cauſe a diverſity of ſound from water, it may be tried: as by the knapping of the tongs; or ſtriking of the bottom of a veſſel, filled either with milk, or with oil; which though they be more light, yet are they more unequal bodies than air.

Of the natures of the mediums we have now ſpoken; as for the diſpoſition of the ſaid mediums, it doth conſiſt in the penning, or not penning of the air; of which we have ſpoken before in the title of dilation of ſounds: it conſiſteth alſo in the figure of the concave through which it paſſeth; of which we will ſpeak next.

Experiments in conſort, what the figures of the pipes, or concaves, or the bodies deferent, conduce to the ſounds.

How the figures of pipes, or concaves, through which ſounds paſs, or of other bodies deferent, conduce to the variety and alteration of the ſounds; either in reſpect of the greater quantity, or leſs quantity of air, which the concaves receive; or in reſpect of the carrying of ſounds longer and 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 the ſound paſſeth; as ſtraight, crooked, angular, circular, *etc.*

221. THE figure of a bell partaketh of the pyramis, but yet coming off and dilating more ſuddenly. The figure of a hunter's horn and cornet, is oblique; yet they have likewiſe ſtraight horns; which if they be of the ſame bore with the oblique, differ little in ſound, ſave that the ſtraight require ſomewhat a ſtronger blaſt. The figures 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, *etc.* Generally the ſtraight line hath the cleaneſt and roundeſt ſound, and the crooked, the more hoarſe and jarring.

222. OF a ſinuous pipe that may have ſome four flexions, trial ſhould be made. Likewiſe of a pipe made like a croſs, open in the midſt. And ſo 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 perfectly round, and make a hole whereinto 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, *etc.* and their combinations, as flat againſt flat, and convex againſt convex, and convex againſt flat, *etc.* and mark well the diverſities of the ſounds. Try alſo the difference in ſound of ſeveral craſſitudes of hard bodies percuſſed; and take knowledge of the diverſities of the ſounds. I myſelf have tried, that a bell of gold yieldeth an excellent ſound, not inferior to that of ſilver or braſs,

braſs, but rather better: yet we ſee that a piece of money of gold ſoundeth far more flat than a piece of money of ſilver.

223. THE harp hath the concave not along the ſtrings, but acroſs the ſtrings; and no inſtrument hath the ſound ſo melting and prolonged, as the Iriſh harp. So as I ſuppoſe, that if a 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 wiſe, at one end of the ſtrings; or laſtly, with a double concave, at each end of the ſtrings one.

Experiments in conſort touching the mixture of ſounds.

224. 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 came from ſeveral parts, one of them would utterly confound the other. So we ſee, that voices or conſorts of muſic do make an 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 glow-worm; as well as a great ſound drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two lanthorns of glaſs, the one a crimſon, and the other an azure, and a candle within either of them, thoſe coloured lights would mingle, and caſt upon a white paper a purple colour. And even in colours, they yield a faint and weak mixture: for white walls make rooms more lightſome than black, *etc.* but the cauſe of the confuſion in ſounds, and the inconfuſion in ſpecies viſible, is, for that the ſight worketh in right lines, and maketh ſeveral cones; and ſo there can be no coincidence in the eye or viſual point: but ſounds, that move in oblique and arcuate lines, muſt needs encounter and diſturb the one the other.

225. The ſweeteſt and beſt 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 ſmells of ſeveral flowers in the air.

226. 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 ſtirring, except it be with noiſe, ſweet-ſmelling, or ſtinking, or the like; it importeth not much: ſome petty alteration or difference it may make.

227. BUT ſounds do diſturb and alter the one the other: ſometimes the one drowning the other, and making it not heard; ſometimes the one jarring and diſcording with the other, and making a confuſion; ſometimes the one mingling and compounding with the other, and making an harmony.

228. Two voices of like loudneſs will not be heard twice as far as one of them alone; and two candles of like light, will not make things ſeen twice as far off as one. The cauſe is profound; but it ſeemeth that the impreſſions from the objects of the ſenſes do mingle reſpectively, every one with his kind; but not in proportion, as is before demonſtrated: and the reaſon may be, becauſe the firſt impreſſion, which is from privative to active, as from ſilence to noiſe, or from darkneſs to light, is a greater degree, than from leſs noiſe to more noiſe, or from leſs light to more light. And the reaſon of that again may be, for that the air, after it hath received a charge, doth not

receive a ſurcharge, or greater charge, with like appetite as it doth the firſt charge. As for the increaſe of virtue, generally, what proportion it beareth to the increaſe of the matter, it is a large field, and to be handled by itſelf.

Experiments in conſort touching melioration of ſounds.

229. ALL reflexions concurrent to make ſounds greater; but if the body that createth either the original ſound, or the reflexion, be clean and ſmooth, it maketh them ſweeter. Trial 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 reflexion water excelleth; as in muſic near the water, or in echos.

230. IT hath been tried, that a pipe a little moiſten'd on the inſide, but yet ſo as there be no drops left, maketh a more ſolemn ſound, than if the pipe were dry: but yet with a ſweet degree of ſibilation or purling; as we touched it before in the title of equality. The cauſe is, for that all things porous being ſuperficially wet, and, as it were, between dry and wet, become a little more even and ſmooth; but the purling, which muſt needs proceed of inequality, I take to be bred between the ſmoothneſs of the inward ſurface of the pipe, which is wet, and the reſt of the wood of the pipe unto which the wet cometh not, but it remaineth dry.

231. IN froſty weather muſic within doors ſoundeth better. Which may be by reaſon not of the diſpoſition of the air, but of the wood or ſtring of the inſtrument, which is made more criſp, and ſo more porous and hollow: and we ſee that old lutes ſound better than new for the ſame reaſon. And ſo do lute-ſtrings that have been kept long.

232. SOUND is likewiſe meliorated by the mingling of open air with pent air; therefore trial may be made of a lute or viol with a double belly; making another belly with a knot over the ſtrings; yet ſo, as there be room enough for the ſtrings, and room enough to play below that belly. Trial may be made alſo of an Iriſh harp, with a concave on both ſides; whereas it uſeth to have it but on one ſide. The doubt may be, leſt it ſhould make too much reſounding; whereby one note would overtake another.

233. IF you ſing in the hole of a drum, it maketh the ſinging more ſweet. And ſo I conceive it would, if it were a ſong in parts ſung into ſeveral drums; and for handſomeneſs and ſtrangeneſs ſake, it would not be amiſs to have a curtain between the place where the drums are and the hearers.

234. WHEN a ſound is created in a wind-inſtrument between the breath and the air, yet if the ſound be communicated with a more equal body of the pipe, it melioraeth the ſound. For, no doubt, there would be a differing ſound in a trumpet or pipe of wood; and again in a trumpet or pipe of braſs. It were good to try recorders and hunters horns of braſs, what the ſound would be.

235. SOUNDS are meliorated by the intenſion of the ſenſe, where the common ſenſe is collected moſt to the particular ſenſe of hearing, and the ſight ſuſpended: and therefore ſounds are ſweeter, as well as greater, in the night than in the day; and I ſuppoſe they are ſweeter to blind men than to others: and it is manifeſt that between ſleeping and waking, when all the ſenſes are bound and ſuſpended, muſic is far ſweeter than when one is fully waking.

Experiments

Experiments in conſort touching the imitation of ſounds.

236. IT is a thing ſtrange in nature when it is attentively conſidered, how children, and ſome birds, learn to imitate ſpeech. They take no mark at all of the motion of the mouth of him that ſpeaketh, for birds are as well taught in the dark as by light. The ſounds of ſpeech are very curious and exquiſite: ſo one would think it were a leſſon hard to learn. It is true that it is done with time, and by little and little, and with many eſſays and profers: but all this diſchargeth not the wonder. It would make a man think, though this which we ſhall ſay may ſeem exceeding ſtrange, that there is ſome tranſmiſſion of ſpirits; and that the ſpirits of the teacher put in motion, ſhould work with the ſpirits of the learner a pre-diſpoſition to offer to imitate; and ſo to perfect the imitation by degrees. But touching operations by tranſmiſſions of ſpirits, which is one of the higheſt ſecrets in nature, we ſhall ſpeak in due place; chiefly when we come to inquire of imagination. But as for imitation, it is certain that there is in men and other creatures a pre-diſpoſition to imitate. We ſee how ready apes and monkeys are to imitate all motions of man; and in the catching of dottrels, we ſee how the fooliſh bird playeth the ape in geſtures: and no man, in effect, doth accompany with others, but he learneth, ere he is aware, ſome geſture, or voice or faſhion of the other.

237. IN imitation of ſounds, that man ſhould be the teacher is no part of the matter; for birds will 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.

238. No beaſt can imitate the ſpeech of man but birds only; for the ape itſelf, that is ſo ready to imitate otherwiſe, attaineth not any degree of imitation of ſpeech.

It is true, that I have known a dog, that if one howled in his ear, he would fall a howling a great while. What ſhould be the aptneſs of birds in compariſon of beaſts, to imitate the ſpeech of man, may be further inquired. We ſee that beaſts have thoſe parts which they count the inſtruments of ſpeech, as lips, teeth, *etc.* liker unto man than birds. As for the neck, by which the throat paſſeth, we ſee many beaſts have it for the length as much as birds. What better gorge or artery birds have, may be farther inquired. The birds that are known to be ſpeakers, are parrots, pies, jays, daws, and ravens. Of which parrots have an adunque bill, but the reſt not.

239. 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 than beaſts; becauſe naturally they are more delighted with them, and practiſe them more, as appeareth in their ſinging. We ſee alſo that thoſe that teach birds to ſing, do keep them waking to 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.

240. LABOUR and intention to imitate voices, doth conduce much to imitation: and therefore we ſee that there be certain *pantomimi*, that will repreſent the voices of players of interludes ſo to the life, as if you ſee them not you would think they were thoſe players themſelves; and ſo the voices of other men that they hear.

241. THERE have been ſome that could counterfeit the diſtance of voices, which is a ſecondary object of hearing, in ſuch ſort, as when they ſtand faſt by you, you would

would think the ſpeech came from afar off, in a fearful manner. How this is done may be further inquired. But I ſee no great uſe of it but for impoſture, in counterfeiting ghoſts or ſpirits.

Experiments in conſort touching the reflexion of ſounds.

THERE be three kinds of reflexions of ſounds; a reflexion concurrent, a reflexion iterant, which we call echo; and a ſuper-reflexion, or an echo of an echo; whereof the firſt hath been handled in the title of magnitude of ſounds: the latter two we will now ſpeak of.

242. THE reflexion of ſpecies viſible by mirrors you may command; becauſe paſſing in right lines they may be guided to any point: but the reflexion of ſounds is hard to maſter; becauſe the ſound filling great ſpaces in arched lines, cannot be ſo guided: and therefore we ſee there hath not been practiſed any means to make artificial echos. And no echo already known returneth in a very narrow room.

243. THE natural echos are made upon walls, woods, rocks, hills, and banks; as for waters, being near, they make a concurrent echo; but being farther off, as upon a large river, they make an iterant echo: for there is no difference between the concurrent echo and the iterant, but the quickneſs or ſlowneſs of the return. But there is no doubt but water doth help the dilation of echo; as well as it helpeth the dilation of original ſounds.

244. IT is certain, as hath been formerly touched, that if you ſpeak through a trunk ſtopped at the farther end, you ſhall find a blaſt return upon your mouth, but no ſound at all. The cauſe is, for that the cloſeneſs which preſerveth the original, is not able to preſerve the reflected ſound: beſides that echos are ſeldom created but by loud ſounds. And therefore there is leſs hope of artificial echos 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 ſoft as a whiſper, the water returned a good audible echo. It ſhould be tried, whether ſpeaking in caves, where there is no iſſue ſave where you ſpeak, will not yield echos as wells do.

245. THE echo cometh as the original ſound doth, in a round orb of air: it were good to try the creating of the echo where the body repercuſſing maketh an angle: as againſt the return of a wall, *etc.* 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 there be any ſuch reſilience in echos, that is, whether a man ſhall hear better if he ſtand aſide the body repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right line between, may be tried. Trial likewiſe ſhould be made, by ſtanding nearer the place of repercuſſing than he that ſpeaketh; and again by ſtanding farther off than he that ſpeaketh; and ſo knowledge would be taken, whether echos, as well as original ſounds, be not ſtrongeſt near hand.

246. THERE be many places where you ſhall hear a number of echos one after another: and it is when there is variety of hills or woods, ſome nearer, ſome farther off: ſo that the return from the farther, being laſt created, will be likewiſe laſt heard.

247. As the voice goeth round, as well towards the back, as towards the front of him that ſpeaketh; ſo likewiſe doth the echo: for you have many back echos to the place where you ſtand.

248. To

248. To make an echo that will report three, or four, or five words diſtinctly, it is requiſite that the body repercuſſing be a good diſtance off: for if it be near, and yet not ſo near as to make a concurrent echo, it choppeth with you upon the ſudden. It is requiſite likewiſe that the air be not much pent: for air at a great diſtance pent, worketh the ſame effect with air at large in a ſmall diſtance. And therefore in the trial of ſpeaking in the well, though the well was deep, the voice came back ſuddenly, and would bear the report but of two words.

249. FOR echos upon echos, there is a rare inſtance thereof in a place which I will now exactly deſcribe. It is ſome three or four miles from Paris, near a town called Pont-Charenton; and ſome bird-bolt ſhot or more from the river of Sein. The room is a chapel 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 man's height; which the watermen that bring wood down the Sein in ſtacks, and not in boats, laid there, as it ſeemeth for their eaſe. Speaking at the one end, I did hear it return the voice thirteen 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 echos are, in the evening. It is manifeſt that it is not echos from ſeveral places, but a toſſing of the voice, as a ball, to and fro; like to reflexions in looking-glaſſes, where if you place one glaſs before; and another behind, you ſhall ſee the glaſs behind with the image, within the glaſs before; and again, the glaſs before in that; and divers ſuch ſuper-reflexions, till the *ſpecies ſpeciei* at laſt die. For it is every return weaker and more ſhady. In like manner the voice in that chapel createth *ſpeciem ſpeciei*, and maketh ſucceeding ſuper-reflexions; for it melteth by degrees, and every reflexion is weaker than the former: ſo that if you ſpeak three words, it will, perhaps, ſome three times report you the whole three words; and then the two latter words for ſome times; and then the laſt word alone for ſome times; ſtill fading and growing weaker. And whereas in echos of one return, it is much to hear four or five words; in this echo of ſo many returns upon the matter, you hear above twenty words for three.

250. THE like echo upon echo, but only with two reports, hath been obſerved to be, if you ſtand between a houſe and a hill, and lure towards the hill. For the houſe will give a back echo; one taking it from the other, and the latter the weaker.

251. THERE are certain letters that an echo will hardly expreſs; as S for one, eſpecially being principial in a word. I remember well, that when I went to the echo at Pont-Charenton, there was an old Pariſian, that took it to be the work of ſpirits, and of good ſpirits. For, ſaid he, call *Satan*, and the echo will not deliver back the devil's name; but will ſay *va t'en*; which is as much in French as *apage*, or void. And thereby I did hap to find, that an echo would not return S, being but a hiſſing and an interior ſound.

252. ECHOS are ſome more ſudden, and chop again as ſoon as the voice is delivered; as hath been partly ſaid: others are more deliberate, that is, give more ſpace between the voice and the echo; which is cauſed by the local nearneſs or diſtance: ſome will report a longer train of words, and ſome a ſhorter: ſome more loud, full as loud as the original, and ſometimes more loud, and ſome weaker and fainter.

253. WHERE echos come from ſeveral parts at the ſame diſtance, they muſt needs make, as it were, a choir of echos, and ſo make the report greater, and even a continued

tinued echo; which you ſhall find in ſome hills that ſtand encompaſſed theatre-like.

254. IT doth not yet appear that there is refraction in ſounds, as well as in ſpecies viſible. For I do not think, that if a ſound ſhould paſs through divers mediums, as air, cloth, wood, it would deliver the ſound in a different place from that unto which it is deferred; which is the proper effect of refraction. But majoration, which is alſo the work of refraction, appeareth plainly in ſounds, as hath been handled at full, but it is not by diverſity of mediums.

Experiments in conſort touching the conſent and diſſent between viſibles and audibles.

WE have *obiter*, for demonſtration's ſake, uſed in divers inſtances the examples of the ſight and things viſible, to illuſtrate the nature of ſounds: but we think good now to proſecute that compariſon more fully.

Conſent of viſibles and audibles.

255. BOTH of them ſpread themſelves in round, and fill a whole floor 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 ſenſories.

256. BOTH of them have the whole ſpecies in every ſmall portion of the air or medium, ſo as the ſpecies do paſs through ſmall crannies without confuſion: as we ſee ordinarily in levels, as to the eye; and in crannies or chinks, as to the ſound.

257. BOTH of them are of a ſudden and eaſy generation and dilation; and likewiſe periſh ſwiftly and ſuddenly; as if you remove the light, or touch the bodies that give the ſound.

258. 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.

259. BOTH of them, in their virtue and working, do not appear to emit any corporal ſubſtance into their mediums, or the orb of their virtue; neither again to raiſe or ſtir any evident local motion in their mediums as they paſs; but only to carry certain ſpiritual ſpecies; the perfect knowledge of the cauſe whereof, being hitherto ſcarcely attained, we ſhall ſearch and handle in due place.

260. 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.

261. BUT both of them in their own proper action do work three manifeſt effects. The firſt, in that the ſtronger ſpecies drowneth the leſſer; as the light of the ſun, the light of a glow-worm; 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 echos.

262. NEITHER of them doth deſtroy or hinder the ſpecies of the other, although they encounter in the ſame medium; as light or colour hinder not ſound, nor *è contra*.

263. 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

of the two ſenſes: as viſibles work upon a looking-glaſs, which is like the pupil of the eye; and audibles upon the places of echo, which reſemble in ſome ſort the cavern and ſtructure of the ear.

264. BOTH of them do diverſly work, as they have their medium diverſly diſpoſed. So a trembling medium, as ſmoke, maketh the object ſeem to tremble; and a riſing and falling medium, as winds, maketh the ſounds to riſe or fall.

265. To both, the medium, which is the moſt propitious and conducible, is air; for glaſs or water, *etc.* are not comparable.

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

267. THE beams of light, when they are multiplied and conglomerate, generate heat; which is a different action from the action of ſight: and the multiplication and conglomeration of ſounds doth generate an extreme rarefaction of the air; which is an action materiate, differing from the action of ſound; if it be true, which is anciently reported, that birds with great ſhouts have fallen down.

Diſſents of viſibles and audibles.

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

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

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

271. VISIBLES are ſeen farther off than ſounds are heard; allowing nevertheleſs the rate of their bigneſs; for otherwiſe a great ſound will be heard farther off than a ſmall body ſeen.

272. VISIBLES require, generally, ſome diſtance between the object and the eye, to be better ſeen; whereas in audibles, the nearer the approach of the ſound is to the ſenſe, the better. But in this there may be a double error. The one becauſe to ſeeing there is required light; and any thing that toucheth the pupil of the eye all over excludeth

excludeth the light. For I have heard of a perſon very credible, who himſelf was cured of a cataract in one of his eyes, that while the ſilver needle did work upon the ſight of his eye, to remove the film of the cataract, he never ſaw any thing more clear or perfect than that white needle: which, no doubt, was, becauſe the needle was leſſer 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.

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

274. I conceive alſo, that the ſpecies of audibles do hang longer in the air than thoſe of viſibles: for although even thoſe of viſibles do hang ſome time, as we ſee in rings turned, that ſhew like ſpheres; in lute-ſtrings ſillipped; a fire-brand carried along, which leaveth a train of light behind it; and in the twilight; and the like: yet I conceive that ſounds ſtay longer, becauſe they are carried up and down with the wind; and becauſe of the diſtance of the time in ordnance diſcharged, and heard twenty miles off.

275. IN viſibles there are not found objects ſo odious and ingrate to the ſenſe as in audibles. For foul ſights do rather diſpleaſe, in that they excite the memory of foul things, than in the immediate objects. And therefore in pictures, thoſe foul ſights do not much offend; but in audibles, the grating of a ſaw, when it is ſharpened, doth offend ſo much, as it ſetteth the teeth on edge. And any of the harſh diſcords in muſic the ear doth ſtraightways refuſe.

276. IN viſibles, after great light, if you come ſuddenly into the dark, or contrariwiſe, out of the dark into a glaring light, the eye is dazled for a time, and the ſight confuſed; but whether any ſuch effect be after great ſounds, or after a deep ſilence, may be better inquired. It is an old tradition, that thoſe that dwell near the cataracts of Nilus, are ſtruck deaf: but we find no ſuch effect in cannoniers, nor millers, nor thoſe that dwell upon bridges.

277. 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 corradiation 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 is in colours, ſo otherwiſe it is in the body of light. For when there is a ſkreen between the candle and the eye, yet the light paſſeth to the paper whereon one writeth; ſo that the light is ſeen where the body of the flame is not ſeen, and where any colour, if it were placed where the body of the flame is, would not be ſeen. I judge that ſound is of this latter nature; for when two are placed on both ſides of a wall, and the voice is heard, I judge it is not only the original ſound which paſſeth in an arched line; but the ſound which paſſeth above the wall in a right line, begetteth the like motion round about it as the firſt did, though more weak.

Experiments in conſort touching the ſympathy or antipathy of ſounds one with another.

278. ALL concords and diſcords of muſic are, no doubt, ſympathies and antipathies of ſounds. And ſo, likewiſe, in that muſic which we call broken muſic, or conſort muſic,

muſic, ſome conſorts 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 muſic agree well: organs and the voice agree well, *etc.* But the virginals and the lute; or the Welſh harp and Iriſh harp; or the voice and pipes alone, agree not ſo well; but for the melioration of muſic, there is yet much left, in this point of exquiſite conſorts, to try and inquire.

279. THERE is a common obſervation, that if a lute or viol be laid upon the back, with a ſmall ſtraw upon one of the ſtrings; and another lute or viol be laid by it; and in the other lute or viol the uniſon to that ſtring be ſtruck, it will make the ſtring move; which will appear both to the eye, and by the ſtraw's falling off. The like will be, if the diapaſon or eighth to that ſtring be ſtruck, either in the ſame lute or viol, or in others lying by; but in none of theſe there is any report of ſound that can be diſcerned, but only motion.

280. IT was deviſed, that a viol ſhould have a lay of wire-ſtrings below, as cloſe to the belly as a lute; and then the ſtrings of guts mounted upon a bridge as in ordinary viols; to the end that by this means the upper ſtrings ſtruck, ſhould make the lower reſound by ſympathy, and ſo make the muſic the better; which if it be to purpoſe, then ſympathy worketh as well by report of ſound as by motion. But this device I conceive to be of no uſe, becauſe the upper ſtrings, which are ſtopped in great variety, cannot maintain a diapaſon or uniſon with the lower, which are never ſtopped. But if it ſhould be of uſe at all, it muſt be in inſtruments which have no ſtops; as virginals and harps; wherein trial may be made of two rows of ſtrings, diſtant the one from the other.

281. THE experiment of ſympathy may be transferred, perhaps, from inſtruments of ſtrings to other inſtruments of ſound. As to try, if there were in one ſteeple two bells of uniſon, whether the ſtriking of the one would move the other, more than if it were another accord: 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.

282. IT ſeemeth, both in ear and eye, the inſtrument of ſenſe hath a ſympathy or ſimilitude with that which giveth the reflection, as hath been touched before: for as the ſight of the eye is like a cryſtal, or glaſs, or water; ſo is the ear a ſinuous cave, with a hard bone to ſtop and reverberate the ſound: which is like to the places that report echos.

Experiments in conſort touching the hindering or helping of the hearing.

283. WHEN a man yawneth, he cannot hear ſo well. The cauſe is, for that the membrane of the ear is extended; and ſo rather caſteth off the ſound than draweth it to.

284. WE hear better when we hold our breath than contrary; inſomuch as in all liſtening to attain a ſound afar off, men hold their breath. The cauſe is, for that in all expiration the motion is outwards; and therefore rather driveth away the voice than draweth it: and beſides we ſee, that in all labour to do things with any ſtrength, we hold the breath; and liſtening after any ſound that is heard with difficulty, is a kind of labour.

285. LET it be tried, for the help of the hearing, and I conceive it likely to ſucceed, to make an inſtrument like a tunnel; the narrow part whereof may be of the bigneſs of the hole of the ear; and the broader end much larger, like a bell at the

ſkirts; and the length half a foot or more. And let the narrow end of it be ſet cloſe to the ear: and mark whether any ſound, abroad in the open air, will not be heard diſtinctly from farther diſtance, than without that inſtrument; being, as it were, an ear-ſpectacle. And I have heard there is in Spain an inſtrument in uſe to be ſet to the ear, that helpeth ſomewhat thoſe that are thick of hearing.

286. If the mouth be ſhut cloſe, nevertheleſs there is yielded by the roof of the mouth a murmur; ſuch as is uſed by dumb men. But if the noſtrils be likewiſe ſtopped, no ſuch murmur can be made: except it be in the bottom of the palate towards the throat. Whereby it appeareth manifeſtly, that a ſound in the mouth, except ſuch as aforeſaid, if the mouth be ſtopped, paſſeth from the palate through the noſtrils.

Experiments in conſort touching the ſpiritual and fine nature of ſounds.

287. The repercuſſion of ſounds, which we call echo, is a great argument of the ſpiritual eſſence of ſounds. For if it were corporeal, the repercuſſion ſhould be created in the ſame manner, and by like inſtruments, with the original ſound: but we ſee what a number of exquiſite inſtruments muſt concur in ſpeaking of words, whereof there is no ſuch matter in the returning of them, but only a plain ſtop and repercuſſion.

288. The exquiſite differences of articulate ſounds, carried along in the air, ſhew that they cannot be ſignatures or impreſſions in the air, as hath been well refuted by the ancients. For it is true, that ſeals make excellent impreſſions; and ſo it may be thought of ſounds in their firſt generation: but then the dilation and continuance of them without any new ſealing, ſhew apparently they cannot be impreſſions.

289. All ſounds are ſuddenly made, and do ſuddenly periſh: but neither that, nor the exquiſite differences of them, is matter of ſo great admiration: for the quaverings and warblings in lutes and pipes are as ſwift; and the tongue, which is no very fine inſtrument, doth in ſpeech make no fewer motions than there be letters in all the words which are uttered. But that ſounds ſhould not only be ſo ſpeedily generated, but carried ſo far every way in ſuch a momentary time, deſerveth more admiration. As for example; if a man ſtand in the middle of a field and ſpeak aloud, he ſhall be heard a furlong in a 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.

290. The ſudden generation and periſhing of ſounds, muſt be one of theſe two ways. Either that the air ſuffereth ſome force by ſound, and then reſtoreth itſelf, as water doth; which being divided, maketh many circles, till it reſtore itſelf to the natural conſiſtence: 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 materiate qualities of the air ſtraightways ſuffocate it; like unto flame, which is generated with alacrity, but ſtraight quenched by the enmity of the air or other ambient bodies.

There be theſe differences, in general, by which ſounds are divided: 1. Muſical, immuſical. 2. Treble, baſe. 3. Flat, ſharp. 4. Soft, loud. 5. Exterior, interior. 6. Clean, harſh or purling. 7. Articulate, inarticulate.

We have laboured, as may appear, in this inquiſition of ſounds diligently; both becauſe ſound is one of the moſt hidden portions of nature, as we ſaid in the beginning,

ning, and becauſe it is a virtue which may be called incorporeal and immateriate; whereof there be in nature but few. Beſides, we were willing, now in theſe our firſt centuries, to make a pattern or precedent of an exact inquiſition; and we ſhall do the like hereafter in ſome other ſubjects which require it. For we deſire that men ſhould learn and perceive, how ſevere a thing the true inquiſition of nature is; and ſhould accuſtom themſelves by the light of particulars to enlarge their minds to the amplitude of the world, and not reduce the world to the narrowneſs of their minds.

Experiment ſolitary touching the orient colours in diſſolution of metals.

291. METALS give orient and fine colours in diſſolutions; as gold giveth an excellent yellow; quickſilver an excellent green; tin giveth an excellent azure: likewiſe in their putrefactions or ruſts; as vermilion, verdegreaſe, biſe, cirrus, *etc.* 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 lightſome.

Experiment ſolitary touching prolongation of life.

292. IT conduceth unto long life, and to the more placid motion of the ſpirits, which thereby do leſs prey and conſume the juice of the body, either that mens actions be free and voluntary, that nothing be done *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 ſenſe of the 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.

Experiment ſolitary touching appetite of union in bodies.

293. IT is certain that in all bodies there is an appetite of union and evitation of ſolution of continuity: and of this appetite there be many degrees; but the moſt remarkable and fit to be diſtinguiſhed are three. The firſt in 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 kind, this appetite is ſtrong; as in iron, in ſtone, in wood, *etc.* 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, glue, birdlime, *etc.* 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, than in preſerving their own conſiſtence; and which have little predominance in drought or moiſture.

Experiment

Experiment ſolitary touching the like operations of heat and time.

294. TIME and heat are fellows in many effects. Heat drieth bodies that do eaſily expire; as parchment, leaves, roots, clay, *etc.* And ſo doth time or age arefy; as in the ſame bodies, *etc.* Heat diſſolveth and melteth bodies that keep in their ſpirits; as in divers liquefactions: and ſo doth time in ſome bodies of a ſofter conſiſtence, as is manifeſt in honey, which by age waxeth more liquid; and the like in ſugar; and ſo in old oil, which is ever more clear and more hot in medicinable uſe. Heat cauſeth the ſpirits to ſearch ſome iſſue out of the body; as in the volatility of metals; and ſo doth time; as in the ruſt of metals. But generally heat doth that in a ſmall time, which age doth in long.

Experiment ſolitary touching the differing operations of fire and time.

295. 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 cruſt of bread, biſket, ſweet-meats, ſalt, *etc.* The cauſe is, for that in thoſe things which wax hard with time, the work of the fire is a kind of melting; and in thoſe that wax ſoft with time, contrariwiſe, the work of the fire is a kind of baking; and whatſoever the fire baketh, time doth in ſome degree diſſolve.

Experiment ſolitary touching motions by imitation.

296. MOTIONS paſs from one man to another, not ſo much by exciting imagination, as by imitation; eſpecially if there be an aptneſs or inclination before. Therefore gaping, or yawning, and ſtretching do paſs from man to man; for that that cauſeth gaping and ſtretching is, when the ſpirits are a little heavy by any vapour, or the like. For then they ſtrive, as it were, to wring out and expel that which loadeth them. So men drowſy, and deſirous to ſleep, or before the fit of an ague, do uſe to yawn and ſtretch; and do likewiſe yield a voice or ſound, which is an interjection of expulſion: ſo that if another be apt and prepared to do the like, he followeth by the ſight of another. So the laughing of another maketh to laugh.

Experiment ſolitary touching infectious diſeaſes.

297. THERE be ſome known diſeaſes that are infectious; and others that are not. Thoſe that are infectious are, firſt, ſuch as are chiefly in the ſpirits, and not ſo much in the humours; and therefore paſs eaſily from body to body: ſuch are peſtilences, lippitudes, and ſuch like. Secondly, ſuch as taint the breath, which we ſee paſſeth manifeſtly from man to man; and not inviſibly, as the affects of the ſpirits do: ſuch are conſumptions of the lungs, *etc.* Thirdly, ſuch as come forth to the ſkin, and therefore taint the air or the body adjacent; eſpecially if they conſiſt in an unctuous ſubſtance not apt to diſſipate; ſuch are ſcabs and leproſy. Fourthly, ſuch as are merely in the humours, and not in the ſpirits, breath, or exhalations: and therefore they never infect but by touch only; and ſuch a touch alſo as cometh within the *epidermis*; as the venom of the French-pox, and the biting of a mad dog.

Experiment ſolitary touching the incorporation of powders and liquors.

298. MOST powders grow more cloſe and coherent by mixture of water, than by mixture of oil, though oil be the thicker body; as meal, *etc.* The reaſon is the congruity of bodies; which if it be more, maketh a perfecter imbibition and incorporation;

tion; which in moſt powders is more between them and water, than between them and oil: but painters colours ground, and aſhes, do better incorporate with oil.

Experiment ſolitary touching exerciſe of the body.

299. MUCH motion and exerciſe is good for ſome bodies; and ſitting and leſs 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 not 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 ſendeth nouriſhment into the parts more forcibly. Secondly, that it helpeth to excern by ſweat, and ſo maketh the parts aſſimilate the more perfectly. Thirdly, that it maketh the ſubſtance of the body more ſolid and compact; and ſo leſs apt to be conſumed and depredated by the ſpirits. The evils that come of exerciſe are, firſt, that it maketh the ſpirits more hot and predatory. Secondly, that it doth abſorb likewiſe, and attenuate too much the moiſture of the body. Thirdly, that it maketh too great concuſſion, eſpecially if it be violent, of the inward parts, which delight more in reſt. But generally exerciſe, if it be much, is no friend to prolongation of life; which is one cauſe why women live longer than men, becauſe they ſtir leſs.

Experiment ſolitary touching meats that induce ſatiety.

300. SOME food we may uſe long, and much, without glutting; as bread, fleſh that is not fat or rank, *etc.* Some other, though pleaſant, glutteth ſooner; as ſweet meats, fat meats, *etc.* The cauſe is, for that appetite conſiſteth in the emptineſs of the mouth of the ſtomach; 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 ſwing 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 of novelty; and to diſtinguiſh not only in meats and drinks, but alſo in motions, loves, company, delights, 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 whatſoever is too pleaſing at firſt, groweth quickly to ſatiate.

NATURAL HISTORY.

CENTURY IV.

Experiments in conſort touching the clarification of liquors, and the accelerating thereof.

ACCELERATION of time, in works of nature, may well be eſteemed *inter magnalia naturae.* And even in divine miracles, accelerating of the time is next to the creating of the matter. We will now therefore proceed to the inquiry 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.

301. LIQUORS are, many of them, at the firſt thick and troubled; as muſte, wort, juices of fruits, or herbs expreſſed, *etc.* 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 repreſenteth bodies clear and untroubled. The third, by the refining the ſpirit itſelf, which thereby giveth to the liquor more ſplendor and more luſtre.

302. 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 ſevered, draweth with it the groſſer parts of the liquor; and laſtly, by percolation or paſſage.

303. SECONDLY, for the even diſtribution of the ſpirits, it is wrought by gentle heat; and by agitation or motion, for of time we ſpeak not, becauſe it is that we would anticipate and repreſent; and it is wrought alſo by mixture of ſome other body, which hath a virtue to open the liquor, and to make the ſpirits the better paſs through.

304. 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 ſhewn the cauſes, for the accelerating of clarification in general, and the inducing of it, take theſe inſtances and trials.

305. IT is in common practice to draw wine or beer from the lees, which we call racking, whereby it will clarify much the ſooner: for the lees, though they keep the drink in heart, and make it laſting; yet withal they caſt up ſome ſpiſſitude: and this inſtance is to be referred to ſeparation.

306. ON

306. 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 take another veſſel of new beer, and rack the one veſſel from the lees, and pour the lees of the racked veſſel into the unracked veſſel, and ſee the effect: this inſtance is referred to the refining of the ſpirits.

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

308. THE longer malt or herbs, or the like, are infuſed in liquor, the more thick and troubled the liquor is; but the longer they be decocted in the liquor, the clearer it is. The reaſon 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 decoction, though more goeth forth, yet it either purgeth at the top, or ſettleth at the bottom. And therefore the moſt exact way to clarify is, firſt, to infuſe, and then to take off the liquor and decoct it; as they do in beer, which hath malt firſt infuſed in the liquor, and is afterwards boiled with the hop. This alſo is referred to ſeparation.

309. TAKE hot embers, and put them about a bottle filled with new beer, almoſt to the very neck; let the bottle be well ſtopped, leſt it fly 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 ſet by. Take alſo lime both quenched and unquenched, and ſet the bottles in them *ut ſupra*. This inſtance is referred both to the even diſtribution, and alſo to the refining of the ſpirits by heat.

310. TAKE bottles and ſwing them, or carry them in a wheel-barrow upon rough ground, twice in a day: but then you may not fill the bottles full, but leave ſome air; for if the liquor come cloſe to the ſtopple, it cannot play nor flower: and when you have ſhaken them well either way, pour the drink into another bottle ſtopped cloſe after the uſual manner; for if it ſtay with much air in it, the drink will pall; neither will it ſettle ſo perfectly in all the parts. Let it ſtand ſome twenty four hours: then take it, and put it again into a bottle with air, *ut ſupra*: and thence into a bottle ſtopped, *ut ſupra*: and ſo repeat the ſame operation for ſeven days. Note, that in the emptying of one bottle into another, you muſt do it ſwiftly leſt the drink pall. It were good alſo to try it in a bottle with a little air below the neck, without emptying. This inſtance is referred to the even diſtribution and refining of the ſpirits by motion.

311. 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 ſtirred with it: for it may be that the groſſer part of the beer will cleave to the milk: the doubt is, whether the milk will ſever well again; which is ſoon tried. And it is uſual in clarifying hippocras to put in milk; which after ſevereth and carrieth with it the groſſer parts of the hippocras, 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.

Experiments in conſort touching maturation, and the accelerating thereof. And firſt touching the maturation and quickning of drinks. And next, touching the maturation of fruits.

THE accelerating of maturation we will now inquire of. And of maturation itſelf. It is of three natures. The maturation of fruits: the maturation of drinks: and the maturation of impoſtumes and ulcers. This laſt we refer to another place, where we ſhall handle experiments medicinal. There be alſo other maturations, as of metals, *etc.* whereof we will ſpeak as occaſion ſerveth. But we will begin with that of drinks, becauſe it hath ſuch affinity with the clarification of liquors.

312. FOR the maturation of drinks, it is wrought by the congregation of the ſpirits together, whereby they digeſt more perfectly the groſſer parts: and it is effected partly by the ſame means that clarification is, whereof we ſpake before, but then note, that an extreme clarification doth ſpread the ſpirits ſo ſmooth, as they become dull, and the drink dead, which ought to have a little flowering. And therefore all your clear amber drink is flat.

313. WE ſee the degrees of maturation of drinks; in muſte, in wine, as it is drunk, and in vinegar. Whereof muſte hath not the ſpirits well congregated; wine hath them well united, ſo as they make the parts ſomewhat more oily; vinegar hath them congregated, but more jejune, and in ſmaller quantity, the greateſt and fineſt ſpirit and part being exhaled: for we ſee vinegar is made by ſetting the veſſel of wine againſt the hot ſun; and therefore vinegar will not burn; for that much of the finer parts is exhaled.

314. THE refreſhing and quickning of drink palled or dead, is by enforcing the motion of the ſpirit: ſo we ſee that open weather relaxeth the ſpirit, and maketh it more lively in motion. We ſee alſo bottling of beer or ale, while it is new and full of ſpirit, ſo that it ſpirteth when the ſtopple is taken forth, maketh the drink more quick and windy. A pan of coals in the cellar doth likewiſe good, and maketh the drink work again. New drink put to drink that is dead provoketh it to work again: nay, which is more, as ſome affirm, a brewing of new beer ſet by old beer, maketh it work again. It were good alſo to enforce the ſpirits by ſome mixtures, that may excite and quicken them; as by putting into the bottles, nitre, chalk, lime, *etc.* We ſee cream is matured, and made to riſe more ſpeedily by putting in cold water; which, as it ſeemeth, getteth down the whey.

315. IT is tried, that the burying of bottles of drink well ſtopped, either in dry earth a good depth; or in the bottom of a well within water; and beſt of all, the hanging of them in a deep well ſomewhat above the water for ſome fortnights ſpace, is an excellent 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.

316. As for the maturation of fruits; it is wrought by the calling forth of the ſpirits of the body outward, and ſo ſpreading them more ſmoothly: and likewiſe by digeſting in ſome degree the groſſer parts: and this is effected by heat, motion, attraction; and by a rudiment of putrefaction: for the inception of putrefaction hath in it a maturation.

317. THERE were taken apples, and laid in ſtraw; in hay; in flour; in chalk; in lime; covered over with onions; covered over with crabs; cloſed up in wax; ſhut

ſhut in a box, *etc.* There was alſo an apple hanged up in ſmoke; of all which the experiment ſorted in this manner.

318. AFTER a month's ſpace, the apple incloſed 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 its firſt freſhneſs and moiſture: but the inconvenience is, that it taſteth a little of the wax; which, I ſuppoſe, in a pomgranate, or ſome ſuch thick-coated fruit, it would not do.

319. THE apple hanged in the ſmoke, turned like an old mellow apple wrinkled, dry, ſoft, ſweet, yellow within. The cauſe is, for that ſuch a degree of heat, which doth neither melt nor ſcorch, for we ſee that in a great heat, a roſt apple ſoftneth and melteth; and pigs feet, made of quarters of wardens, ſcorch and have a ſkin of cole, doth mellow, and not adure: the ſmoke alſo maketh the apple, as it were, ſprinkled with ſoot, which helpeth to mature. We ſee that in drying of pears and prunes in the oven, and removing of them often as they begin to ſweat, there is a like operation; but that is with a far more intenſe degree of heat.

320. The apples covered in the lime and aſhes were well matured; as appeared both in their yellowneſs and ſweetneſs. The cauſe is, for that that degree of heat which is in lime and aſhes, being a ſmothering heat, is of all the reſt moſt proper, for it doth neither liquefy nor arefy; and that is true maturation. Note, that the taſte of thoſe apples was good; and therefore it is the experiment fitted for uſe.

321. THE apples covered with crabs and onions were likewiſe well matured. The cauſe is, not any heat; but for that the crabs and the onions draw forth the ſpirits of the apple, and ſpread them equally throughout the body; which taketh away hardneſs. So we ſee one apple ripeneth againſt another. And therefore in making of cyder they turn the apples firſt upon a heap. So one cluſter of grapes that toucheth another whilſt it groweth, ripeneth faſter; *botrus contra botrum citius matureſcit.*

322. THE apples in the hay and ſtraw ripened apparently, though not ſo much as the other; but the apple in the ſtraw more. The cauſe is, for that the hay and ſtraw have a very low degree of heat, but yet cloſe and ſmothering, and which drieth not.

323. The apple in the cloſe box was ripened alſo: the cauſe is, for that all air kept cloſe hath a degree of warmth: as we ſee in wool, furr, pluſh, *etc.* Note, that all theſe were compared with another apple of the ſame kind, that lay of itſelf: and in compariſon of that were more ſweet and more yellow, and ſo appeared to be more ripe.

324. TAKE an apple, or pear, or other like fruit, and roll it upon a table hard: we ſee in common experience, that the rolling doth ſoften and ſweeten the fruit preſently; which is nothing but the ſmooth diſtribution of the ſpirits into the parts: for the unequal diſtribution of the ſpirits maketh the harſhneſs: but this hard rolling is between concoction, and a ſimple maturation; therefore, if you ſhould roll them but gently, perhaps twice a-day; and continue it ſome ſeven days, it is like they would mature more finely, and like unto the natural maturation.

325. TAKE an apple, and cut out a piece of the top, and cover it, to ſee whether that ſolution of continuity will not haſten a maturation: we ſee that where a waſp, or a fly, or a worm hath bitten, in a grape, or any fruit, it will ſweeten haſtily.

326. TAKE an apple, *etc.* and prick it with a pin full of holes, not deep, and ſmear it a little with ſack or cinnamon water, or ſpirit of wine, every day for ten days, to ſee if the virtual heat of the wine or ſtrong waters will not mature it.

In theſe trials alſo, as was uſed in the firſt, ſet another of the ſame fruits by to compare them; and try them by their yellowneſs and by their ſweetneſs.

Experiment ſolitary touching the making of gold.

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 propounded, to effect it, are, in the practice, full of error and impoſture; and in the theory, full of unſound imaginations. For to ſay, that nature hath an intention 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 leproſities of metals were cured, they would become gold; and that a little quantity of the medicine, in the work of projection, will turn a ſea of the baſer metal into gold by multiplying: all theſe are but dreams; and ſo are many other grounds of alchemy. And to help the matter, the alchemiſts call in likewiſe many vanities out of aſtrology, natural magic, 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 materiate amongſt metals, of other metals leſs ponderous and leſs materiate; than, *via verſa*, to make ſilver of lead or quickſilver; both which are more ponderous than ſilver; ſo that they need rather a farther degree of fixation, than any condenſation. In the mean time, by occaſion of handling the axioms touching maturation, we will direct a trial touching the maturing of metals, and thereby turning ſome of them into gold: for we conceive indeed, that a perfect good concoction, or digeſtion, or maturation of ſome metals, will produce gold. And here we call to mind, that we knew a Dutchman, that had wrought himſelf into the belief of a great perſon, by undertaking that he could make gold: whoſe diſcourſe was, that gold might be made; but that the alchemiſts over-fired the work: for, he ſaid, the making of gold did require a very temperate heat, as being in nature a ſubterrany work, where little heat cometh; but yet more to the making of gold than of any other metal; and therefore that he would do it with a great lamp, that ſhould carry a temperate and equal heat: and that it was the work of many months. The device of the lamp was folly; but the over-firing now uſed, and the equal heat to be required, and the making it a work of ſome good time, are no ill diſcourſes.

WE reſort therefore to our axioms of maturation, in effect touched before. The firſt is, that there be uſed a temperate heat; for they are ever temperate heats that digeſt and mature: wherein we mean temperate according to the nature of the ſubject; for that may be temperate to fruits and liquors, which will not work at all upon metals. The ſecond is, that the ſpirits of the metal be quickened, and the tangible parts opened: for without thoſe two operations, the ſpirit of the metal wrought upon

upon will not be able to digeſt the parts. The third is that the ſpirits do ſpread themſelves even, and move not ſubſultorily; for that will make the parts cloſe and pliant. And this requireth a heat that doth not riſe and fall, but continue as equal as may be. The fourth is, that no part of the ſpirit be emitted, but detained: for if there be emiſſion of ſpirit the body of the metal will be hard and churliſh. And this will be performed, partly by the temper of the fire; and partly by the cloſeneſs of the veſſel. The fifth is, that there be choice made of the likelieſt and beſt prepared metal for the verſion: for that will facilitate the work. The ſixth is, that you give time enough for the work: not to prolong hopes, as the alchemiſts do, but indeed to give nature a convenient ſpace to work in. Theſe principles are moſt certain and true; we will now derive a direction of trial out of them, which may, perhaps, by farther meditation be improved.

327. LET there be a ſmall furnace made of a temperate heat; let the heat be ſuch as may keep the metal perpetually molten, and no more; for that above all importeth to the work. For the material, take ſilver, which is the metal that in nature ſymbolizeth moſt with gold; put in alſo with the ſilver, a tenth part of quick-ſilver, and a twelfth part of nitre, by weight; both theſe to quicken and open the body of the metal: and ſo let the work be continued by the ſpace of ſix months at the leaſt. I wiſh alſo, that there be at ſometimes an injection of ſome oiled ſubſtance; ſuch as they uſe in the recovering of gold which by vexing with ſeparations hath been made churliſh: and this is to lay the parts more cloſe and ſmooth, which is the main work. For gold, as we ſee, is the cloſeſt and therefore the heavieſt of metals; and is likewiſe the moſt flexible and tenſible. Note, that to think to make gold of quickſilver, becauſe it is the heavieſt, is a thing not be hoped; for quick-ſilver will not indure the manage of the fire. Next to ſilver, I think copper were fitteſt to be the material.

Experiment ſolitary touching the nature of gold.

328. GOLD hath theſe natures; greatneſs of weight; cloſeneſs of parts; fixation; pliantneſs, or ſoftneſs; immunity from ruſt; colour or tincture of yellow. Therefore the ſure way, though moſt about, to make gold, is to know the cauſes of the ſeveral natures before rehearſed, and the axioms concerning the ſame. For if a man can make a metal that hath all theſe properties, let men diſpute whether it be gold or no?

Experiments in conſort touching the inducing and accelerating of putrefaction.

THE inducing and accelerating of putrefaction, is a ſubject of a very univerſal inquiry: for corruption is a reciprocal to generation: and they two are as nature's two terms or boundaries; and the guides to life and death. Putrefaction is the work of the ſpirits of bodies, which ever are unquiet to get forth and congregate with the air, and to enjoy the ſun-beams. The getting forth, or ſpreading of the ſpirits, which is a degree of getting forth, hath five differing operations. If the ſpirits be detained within the body, and move more violently, there followeth colliquation, as in metals, *etc.* If more mildly, there followeth digeſtion, or maturation; as in drinks and fruits. If the ſpirits be not merely detained, but protrude a little, and that motion be confuſed and inordinate, there followeth putrefaction; which ever diſſolveth the conſiſtence of the body into much inequality; as in fleſh, rotten fruits, ſhining wood, *etc.* and alſo in the ruſt 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.

creatures perfect. But if the ſpirits iſſue out of the body, there followeth deſiccation, induration, conſumption, *etc.* as in brick, evaporation of bodies liquid, *etc.*

329. THE means to induce and accelerate putrefaction, are, firſt, by adding ſome crude or watry moiſture; as in wetting of any fleſh, fruit, wood, with water, *etc.* for contrariwiſe unctuous and oily ſubſtances preſerve.

330. THE ſecond is by invitation or excitation; as when a rotten apple lieth cloſe to another apple that is ſound: or when dung, which is a ſubſtance already putrified, is added to other bodies. And this is alſo notably ſeen in church-yards where they bury much, where the earth will conſume the corps in far ſhorter time than other earth will.

331. THE third is by cloſeneſs and ſtopping, which detaineth the ſpirits in priſon more than they would; and thereby irritateth them to ſeek iſſue; as in corn and cloths which wax muſty; and therefore open air, which they call *aër perflabilis*, doth preſerve: and this doth appear more evidently in agues, which come, moſt of them, of obſtructions and penning the humours which thereupon putrify.

332. THE fourth is by ſolution of continuity; as we ſee an apple will rot ſooner if it be cut or pierced; and ſo will wood, *etc.* And ſo the fleſh of creatures alive, where they have received any wound.

333. THE fifth is either by the exhaling or by the driving back of the principal ſpirits which preſerve the conſiſtence of the body; ſo that when their government is diſſolved, every part returneth to his nature or homogeny. And this appeareth in urine and blood when they cool, and thereby break: it appeareth alſo in the gangrene, or mortification of fleſh, either by opiates or by intenſe colds. I conceive alſo the ſame effect is in peſtilences; for that the malignity of the infecting vapour danceth the principal ſpirits, and maketh them fly and leave their regiment; and then the humours, fleſh, and ſecondary ſpirits, do diſſolve and break, as in an anarchy.

334. THE ſixth is when a foreign ſpirit, ſtronger and more eager than the ſpirit of the body, entreth the body; as in the ſtinging of ſerpents. And this is the cauſe, generally, that 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 humours in agues, *etc.* which may be counted as foreign ſpirits, though they be bred within the body, do extinguiſh and ſuffocate the natural ſpirits and heat.

335. THE ſeventh is by ſuch a weak degree of heat, as ſetteth the ſpirits in a little motion, but is not able either to digeſt the parts, or to iſſue the ſpirits; as is ſeen in fleſh kept in a room, that is not cool: whereas in a cool and wet larder it will keep longer. And we ſee that vivification, whereof putrefaction is the baſtard brother, is effected by ſuch ſoft heats; as the hatching of eggs, the heat of the womb, *etc.*

336. THE eighth is by the releaſing of the ſpirits, which before were cloſe kept by the ſolidneſs of their coverture, and thereby their appetite of iſſuing checked; as in the artificial ruſts induced by ſtrong waters in iron, lead, *etc.* and therefore wetting haſteneth ruſt or putrefaction of any thing, becauſe it ſofteneth the cruſt for the ſpirits to come forth.

337. THE ninth is by the interchange of heat and cold, or wet and dry; as we ſee in the mouldering of earth in froſts and ſun; and in the more haſty rotting of wood, that is ſometimes wet, ſometimes dry.

338. THE

338. 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 ſtirred; and mens bodies not exerciſed.

339. ALL moulds are inceptions of putrefaction; as the moulds of pies and fleſh; the moulds of oranges and lemons, which moulds afterwards turn into worms, or more odious putrefactions: and therefore, commonly, prove to be of ill odour. And if the body be liquid, and not apt to putrify totally, it will caſt up a mother in the top, as the mothers of diſtilled waters.

340. Moss is a kind of mould of the earth and trees. But it may be better ſorted as a rudiment of germination; to which we refer it.

Experiments in conſort, touching prohibiting and preventing putrefaction.

IT is an inquiry of excellent uſe, to inquire of the means of preventing or ſtaying putrefaction; for therein conſiſteth the means of conſervation of bodies: for bodies have two kinds of diſſolutions; the one by conſumption and deſiccation; the other by putrefaction. But as for the putrefactions of the bodies of men and living creatures, as in agues, worms, conſumptions of the lungs, impoſtumes, and ulcers both inwards and outwards, they are a great part of phyſic and ſurgery; and therefore we will reſerve the inquiry of them to the proper place, where we ſhall handle medicinal experiments of all ſorts. Of the reſt we will now enter into an inquiry: wherein much light may be taken from that which hath been ſaid of the means to induce or accelerate putrefactions: for the removing that which cauſed putrefaction, doth prevent and avoid putrefaction.

341. THE firſt means of prohibiting or checking putrefaction, is cold: for ſo we ſee that meat and drink will laſt longer unputrified, or unſoured, 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 conſtipation of the tangible parts.

342. THE ſecond is aſtriction: for aſtriction prohibiteth diſſolution: as we ſee generally in medicines, whereof ſuch as are aſtringents do inhibit putrefaction: and by the ſame reaſon of aſtringency, ſome ſmall quantity of oil of vitriol will keep freſh water long from putrifying. And this aſtriction is in a ſubſtance that hath a virtual cold; and it worketh partly by the ſame means that cold doth.

343. 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 flour keep more freſh: and liquors, drinks, and juices, with a little oil caſt on the top, keep freſh. Contrariwiſe, we ſee that cloth and apparel not aired, do breed moths 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 emiſſion of ſpirits to diſcharge ſome of the ſuperfluous moiſture, it doth hurt, for they require airing.

344. THE fourth is motion and ſtirring; for putrefaction aſketh reſt: for the 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

ing over of corn in a garner, or letting it run like an hour-glaſs, from an upper room into a lower, doth keep it ſweet; and running waters putrify not: and in mens bodies, exerciſe hindereth putrefaction; and contrariwiſe, reſt and want of motion, or ſtoppings, whereby the run of humours, or the motion of perſpiration is ſtayed, further putrefaction; as we partly touched a little before.

345. THE fifth is, the breathing forth of the adventitious moiſture in bodies; for as wetting doth haſten putrefaction: ſo convenient drying, whereby the more radical moiſture is only kept in, putteth back putrefaction: ſo we ſee that herbs and flowers, if they be dried in the ſhade, or dried in the hot ſun for a ſmall time keep beſt. For the emiſſion of the looſe and adventitious moiſture doth betray the radical moiſture; and carrieth it out for company.

346. THE ſixth is the ſtrengthening of the ſpirits of bodies; for as a great heat keepeth bodies from putrefaction, but a tepid heat inclineth them to putrefaction; ſo a ſtrong ſpirit likewiſe preſerveth, and a weak or faint ſpirit diſpoſeth to corruption. So we find that ſalt water corrupteth not ſo ſoon as freſh: and ſalting of oyſters, and powdering of meat, keepeth them from putrefaction. It would be tried alſo, whether chalk put into water, or drink, doth not preſerve it from putrifying or ſpeedy ſouring. So we ſee that ſtrong beer will laſt longer than ſmall; that all things that are hot and aromatical, do help to preſerve liquors, or powders, *etc.* which they do as well by ſtrengthening the ſpirits, as by ſoaking out the looſe moiſture.

347. THE ſeventh is ſeparation of the cruder parts, and thereby making the body more equal; for all imperfect mixture is apt to putrify; and watry ſubſtances are more apt to putrify than oily. So we ſee diſtilled waters will laſt longer than raw waters; and things that have paſſed the fire do laſt longer than thoſe that have not paſſed the fire; as dried pears, *etc.*

348. THE eighth is the drawing forth continually of that part where the putrefaction beginneth: 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 dead bodies: and the ſame reaſon is of preſerving herbs, or fruits, or flowers, in bran or meal.

349. THE ninth is the commixture of any thing that is more oily or ſweet: for ſuch bodies are leaſt apt to putrify, the air working little upon them; and they not putrifying, preſerve the reſt. And therefore we ſee ſyrups and ointments will laſt longer than juices.

350. THE tenth is the commixture of ſomewhat that is dry; for putrefaction beginneth firſt from the ſpirits; and then from the moiſture: and that that is dry is unapt to putrify: and therefore ſmoke preſerveth fleſh; as we ſee in bacon and neats tongues, and Martlemas beef, *etc.*

351. 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 overcharged and compreſſed, will hardly receive the exhaling of any thing, but rather repulſe it. It was tried in a blown bladder, whereinto fleſh was put, and likewiſe a flower, and it ſorted 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 hogſhead, putting into the hogſhead, before, that which you would have preſerved; and in the inſtant that you withdraw the bellows, ſtop the hole cloſe.

Experiment

Experiment ſolitary touching wood ſhining in the dark.

352. THE experiment of wood that ſhineth in the dark, we have diligently driven and purſued: the rather, for that of all things that give light here below, it is the moſt durable, and hath leaſt apparent motion. Fire and flame are in continual expence; ſugar ſhineth only while it is in ſcraping; and ſalt-water while it is in daſhing; glow-worms have their ſhining while they live, or a little after; only ſcales of fiſhes putrified ſeem to be of the ſame nature with ſhining wood: and it is true, that all putrefaction hath with it an inward motion, as well as fire or light. The trial ſorted thus: 1. The ſhining is in ſome pieces more bright, in ſome more dim; but the moſt bright of all doth not attain to the light of a glow-worm. 2. The woods that have been tried to ſhine, are chiefly ſallow and willow; alſo the aſh and hazle; it may be it holdeth in others. 3. Both roots and bodies do ſhine, but the roots better. 4. The colour of the ſhining part, by day-light, is in ſome pieces white, in ſome pieces inclining to red; which in the country they call the white and red garnet. 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 croſs, or into beads, *etc.* But you muſt not look to have an image, or the like, in any thing that is lightſome, for even a face in iron red-hot will not be ſeen, the light confounding the ſmall differences of lightſome and darkſome, which ſhew the figure. 6. There was the ſhining part pared off, till you came to that that did not ſhine; but within two days the part contiguous began alſo to ſhine, being laid abroad in the dew; ſo as it ſeemeth the putrefaction ſpreadeth. 7. There was other dead wood of like kind that was laid abroad, which ſhined not at the firſt; but after a night's lying abroad began to ſhine. 8. There was other wood that did firſt ſhine; and being laid dry in the houſe, within five or ſix 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 rotted both in ſtock and root while it grew. 12. Part of the wood that ſhined was ſteeped in oil, 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. Trial 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.

Experiment ſolitary touching the acceleration of birth.

353. THE bringing forth of living creatures may be accelerated in two reſpects: the one, if the embryo ripeneth and perfecteth ſooner: the other, if there be ſome cauſe from the mother's body, of expulſion or putting it down: whereof the former is good, and argueth ſtrength; the latter is ill, and cometh by accident or diſeaſe. And therefore the ancient obſervation is true, that the child born in the ſeventh month doth commonly well; but born in the eighth month, doth for the moſt part die. But the cauſe aſſigned is fabulous; which is, that in the eighth month

be the return of the reign of the planet Saturn, which, as they ſay, is a planet malign; whereas in the ſeventh is the reign of the moon, which is a planet propitious. But the true cauſe is, for that where there is ſo great a prevention of the ordinary time, it is the luſtineſs of the child; but when it is leſs, it is ſome indiſpoſition of the mother.

Experiment ſolitary touching the acceleration of growth and ſtature.

354. To accelerate growth or ſtature, it muſt proceed either from the 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 child corpulent; and growing in breadth rather than in heighth. 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 countries do wax more tall, than where they feed more upon bread and fleſh. There is alſo a received tale; that boiling of daiſy roots in milk, which it is certain are great driers, 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; for that attenuateth the juice, and furthereth the motion of the ſpirits upwards. Neither is it without cauſe, that Xenophon, in the nurture of the Perſian children, doth ſo much commend their feeding upon cardamon; which, he ſaith, made them grow better, and be of a more active habit. Cardamon is in latin *naſturtium*; and with us water-creſſes; which, it is certain, is an herb, that whilſt it is young, is friendly to life. As for the quickening of natural heat, it muſt be done chiefly with exerciſe; and therefore no doubt much going to ſchool, where they ſit ſo much, hindreth 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; for even long ſucking doth hinder both wit and ſtature. This hath been tried, that a whelp that hath been fed with nitre in milk, hath become very little, but extreme lively: for the ſpirit of nitre is cold. And though it be an excellent medicine in ſtrength of years for prolongation of life; yet it is in children and young creatures an enemy to growth: and all for the ſame reaſon; for heat is requiſite to growth; but after a man is come to his middle age, heat conſumeth the ſpirits; which the coldneſs of the ſpirit of nitre doth help to condenſe and correct.

Experiments in conſort touching ſulphur and mercury, two of Paracelſus's principles.

THERE be two great families of things; you may term them by ſeveral names; ſulphureous and mercurial, which are the chemiſts words, for as for their *ſal*, which is their third principle, it is a compound of the other two; inflammable and not inflammable; mature and crude; oily and watry. For we ſee that in ſubterranies there are, as the fathers of their tribes, brimſtone and mercury; in vegetables and living creatures there is water and oil: 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 ſky. And theſe pairs, though they be unlike in the primitive differences of matter, yet they ſeem to have many conſents: for mercury and ſulphur are principal materials of metals; water and oil are principal materials of vegetables and animals; and ſeem to differ but in maturation or concoction: flame, in vulgar opinion, is but air incenſed; and they both have quickneſs of motion, and facility of ceſſion, much alike:

alike: and the interſtellar ſky, though the opinion be vain that the ſtar is the denſer 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 naturae*, to turn water or watry juice into oil or oily juice: greater in nature, than to turn ſilver or quickſilver into gold.

355. THE inſtances we have wherein crude and watry ſubſtance turneth into fat and oily, are of four kinds. Firſt in the mixture of earth and water; which mingled by the help of the ſun gather a nitrous fatneſs, more than either of them have ſeverally; as we ſee in that they put forth plants, which need both juices.

356. THE ſecond is in the aſſimilation of nouriſhment, made in the bodies of plants and living creatures; whereof plants turn the juice of mere water and earth into a great deal of oily matter: living creatures, though much of their fat and fleſh are out of oily aliments, as meat and bread, yet they aſſimilate alſo in a meaſure their drink of water, *etc.* But theſe two ways of verſion of water into oil, namely, by mixture and by aſſimilation, are by many paſſages and percolations, and by long continuance of ſoft heats, and by circuits of time.

357. THE third is in the inception of putrefaction; as in water corrupted; and the mothers of waters diſtilled; both which have a kind of fatneſs or oil.

358. THE fourth is in the dulceration of ſome metals; as *ſaccharum Saturni*, etc.

359. 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 aſſimilation of bodies crude into bodies digeſted; as in plants and living creatures, whoſe nouriſhment is far more crude than their bodies: but this digeſtion is by a great compaſs, as hath been ſaid. As for the more full handling of theſe two principles, whereof this is but a taſte, the inquiry of which is one of the profoundeſt inquiries 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.

Experiment ſolitary touching chameleons.

360. 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 hog doth: his back crooked; his ſkin ſpotted with little tumours, leſs eminent nearer the belly; his tail ſlender and long: on each foot he hath five fingers; three on the outſide, and two on the inſide; his tongue of a marvellous length in reſpect of his body, and hollow at the end; which he will lanch out to prey upon flies. Of colour green, and of a duſky yellow, brighter and whiter towards the belly; yet ſpotted with blue, white and red. If he be laid upon green, the green predominateth; if upon yellow, the yellow; not ſo if he be laid upon blue, or red, or white; only the green ſpots receive a more orient luſtre; laid upon black, he looketh all black, though not without a mixture of green. He feedeth not only upon air, though that be his principal ſuſtenance, for ſometimes he taketh flies, as was ſaid; yet ſome that have kept chameleons a whole year together, could never perceive that ever they fed upon any thing elſe but air; and might ob-

ſerve their bellies to ſwell after they had exhauſted the air, and cloſed their jaws; which they open commonly againſt the rays of the ſun. They have a fooliſh tradition in magic, that if a chameleon be burnt upon the top of an houſe, it will raiſe a tempeſt; ſuppoſing, according to their vain dreams of ſympathies, becauſe he nouriſheth with air, his body ſhould have great virtue to make impreſſion upon the air.

Experiment ſolitary touching ſubterraneous fires.

361. IT is reported by one of the ancients, that in part of Media there are eruptions of flames out of plains; and that thoſe flames are clear, and caſt not forth ſuch ſmoke, and aſhes, and pumice, as mountain flames do. The reaſon, no doubt, is becauſe the flame is not pent as it is in mountains and earthquakes which caſt flame. There be alſo ſome blind fires under ſtone, which flame not out, but oil being poured upon them they flame out. The cauſe whereof is, for that it ſeemeth the fire is ſo choked, as not able to remove the ſtone, it is heat rather than flame; which nevertheleſs is ſufficient to inflame the oil.

Experiment ſolitary touching nitre.

362. IT is reported, that in ſome lakes the water is ſo nitrous, as, if foul clothes be put into it, it ſcoureth them of itſelf: and if they ſtay any whit long, they moulder away. And the ſcouring virtue 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 foul and viſcous, and ſticketh upon a body.

Experiment ſolitary touching congealing of air.

363. TAKE a bladder, the greateſt you can get; fill it full of wind, and tie it about the neck with a ſilk thread waxed; and upon that put likewiſe wax very cloſe; ſo that when the neck of the bladder drieth, no air may poſſibly get in or 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 a fortnight's diſtance, ſee whether the bladder be ſhrunk; for if it be, then it is plain that the coldneſs of the earth or ſnow hath condenſed the air, and brought it a degree nearer to water: which is an experiment of great conſequence.

Experiment ſolitary touching congealing of water into cryſtal.

364. IT is a report of ſome good credit, that in deep caves there are penſile cryſtals, and degrees of cryſtal that drop from above; and in ſome other, though more rarely, that riſe from below: Which though it be chiefly the work of cold, yet it may be that water that paſſeth through the earth, gathereth a nature more clammy, and fitter to congeal and become ſolid than water of itſelf. Therefore trial ſhould be made, to lay a heap of earth, in great froſts, upon a hollow veſſel, putting a canvas between, that it falleth not in: and pour water upon it, in ſuch quantity as will be ſure to ſoak through; and ſee whether it will not make an harder ice in the bottom of the veſſel, and leſs apt to diſſolve than ordinarily. I ſuppoſe alſo, that if you make the earth narrower at the bottom than at the top, in faſhion of a ſugar-loaf reverſed, it will help the experiment. For it will make the ice, where it iſſueth, leſs in bulk; and evermore ſmallneſs of quantity is a help to verſion.

Experiment

Experiment ſolitary touching preſerving of roſe-leaves both in colour and ſmell.

365. TAKE damaſk roſes, and pull them; then dry them upon the top of an houſe, upon a lead or terras, 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 glaſs, with a narrow mouth, ſtuffing them cloſe together, but without bruiſing: ſtop the bottle or glaſs cloſe, and theſe roſes will retain not only their ſmell perfect, but their colour freſh for a year at leaſt. Note, that nothing doth ſo much deſtroy any plant, or other body, either by putrefaction or arefaction, as the adventitious moiſture which hangeth looſe in the body, if it be not drawn out. For it betrayeth and tolleth forth the innate and radical moiſture along with it when itſelf goeth forth. And therefore in living creatures, moderate ſweat doth preſerve the juice of the body. Note, that theſe roſes, when you take them from the drying, have little or no ſmell; ſo that the ſmell is a ſecond ſmell, that iſſueth out of the flower afterwards.

Experiments in conſort touching the continuance of flame.

366. THE continuance of flame, according to the diverſity of the body inflamed, and other circumſtances, is worthy the inquiry; chiefly, for that though flame be almoſt of a momentary laſting, yet it receiveth the more, and the leſs: we will firſt therefore ſpeak at large of bodies inflamed 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 a hundred and ſixteen pulſes. The ſame quantity of ſpirit of wine, mixed with the ſixth part of a ſpoonful of nitre, burnt but to the ſpace of ninety four pulſes. Mixed with the like quantity of bay-ſalt, eighty three pulſes. Mixed with the like quantity of gunpowder, which diſſolved into a black water, one hundred and ten 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 the ſpace of eighty ſeven pulſes. Mixed with the ſixth part of a ſpoonful of milk, it burnt to the ſpace of one hundred pulſes; and the milk was curdled. Mixed with the ſixth part of a ſpoonful of water, it burnt to the ſpace of eighty ſix 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 ninety four pulſes. A piece of wood of the bigneſs of an arrow, and about a finger's length, was ſet up in the midſt, and the ſpirit of wine burnt to the ſpace of ninety four pulſes. So that the ſpirit of wine ſimple endured the longeſt; and the ſpirit of wine with the bay-ſalt, and the equal quantity of water, were the ſhorteſt.

367. CONSIDER well, whether the more ſpeedy going forth of the flame be cauſed by the greater vigour of the flame in burning; or by the reſiſtance of the body mixed, and the averſion thereof to take flame: which will appear by the quantity of the ſpirit of wine that remaineth after the going out of the flame. And it ſeemeth clearly to be the latter; for that the mixture of things leaſt apt to burn, is the ſpeedieſt in going out. And note, by the way, that ſpirit of wine burned, till it go out of itſelf, will burn no more; and taſteth nothing ſo hot in the mouth as it did; no, nor yet ſour, as if it were a degree towards vinegar, which burnt wine doth; but flat and dead.

368. NOTE, that in the experiment of wax aforeſaid, the wax diſſolved in the burning, and yet did not incorporate itſelf with the ſpirit of wine, to produce one flame; but whereſoever the wax floated, the flame forſook it, till at laſt it ſpread all over, and put the flame quite out.

369. THE

369. THE experiments of the mixtures of the ſpirit of wine inflamed, 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-ſtuff, with the particulars that follow; *viz.* water, *aqua vitae*, milk, bay-ſalt, oil, 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 ſwifteſt in conſuming was that with ſaw-duſt; which firſt burned fair till ſome part of the candle was conſumed, and the duſt gathered about the ſnuff; but then it made the ſnuff big and long, and to burn duſkiſhly, and the candle waſted in half the time of the wax pure. The next in ſwiftneſs were the oil and butter, which conſumed by a fifth part ſwifter than the pure wax. Then followed in ſwiftneſs the clear wax itſelf. Then the bay-ſalt, which laſted about an eighth part longer than the clear wax. Then followed the *aqua vitae*, which laſted about a fifth part longer than the clear wax. Then followed the milk and water, with little difference from the *aqua vitae*, but the water ſloweſt. And in theſe four laſt, the wick would ſpit forth little ſparks. For the nitre, it would not hold lighted above ſome twelve pulſes: but all the while it would ſpit out portions of flame, which afterwards would go out into a vapour. For the brimſtone, it would hold lighted much about the ſame time with the nitre; but then after a little while it would harden and cake about the ſnuff; ſo that the mixture of bay-ſalt with wax will win an eighth part of the time of laſting, and the water a fifth.

370. AFTER the ſeveral materials were tried, trial was likewiſe made of ſeveral wicks; as of ordinary cotton, ſewing thread, ruſh, ſilk, ſtraw, and wood. The ſilk, ſtraw, and wood, would flame a little, till they came to the wax, and then go out: of the other three, the thread conſumed faſter than the cotton, by a ſixth part of time: the cotton next: then the ruſh conſumed ſlower than the cotton, by at leaſt a third part of time. For the bigneſs of the flame, the cotton and thread caſt a flame much alike; and the ruſh much leſs and dimmer. *Query*, whether the wood and wicks both, as in torches, conſume faſter than the wicks ſimple?

371. WE have ſpoken of the ſeveral materials, and the ſeveral wicks: but to the laſting of the flame it importeth alſo, not only what the material is, but in the ſame material whether it be hard, ſoft, old, new, *etc.* Good houſewives, to make their candles burn the longer, uſe to lay them, one by one, in bran or flour, which make them harder, and ſo they conſume the ſlower: inſomuch as by this means they will outlaſt other candles of the ſame ſtuff almoſt half in half. For bran and flour have a virtue to harden; ſo that both age, and lying in the bran, doth help to the laſting. And we ſee that wax candles laſt longer than tallow candles, becauſe wax is more firm and hard.

372. THE laſting of flame alſo dependeth upon the eaſy 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 farther off. We ſee alſo that lamps laſt longer, becauſe the veſſel is far broader than the breadth of a taper or candle.

373. TAKE

373. 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 only one hole in it, at the end of the return fartheſt from the turret. Reverſe it, and fill it full of oil by that hole; and then ſet it upright again; and put a wick in at the hole, and lighten it: you ſhall find that it will burn ſlow, and a long time: which is cauſed, as was ſaid laſt before, for that the flame fetcheth the nouriſhment afar off. You ſhall find alſo, that as the oil waſteth and deſcendeth, ſo the top of the turret by little and little filleth with air; which is cauſed by the rarefaction of the oil by the heat. It were worthy the obſervation, to make a hole in the top of the turret, and to try when the oil is almoſt conſumed, whether the air made of the oil, if you put to it a flame of a candle, in the letting of it forth, will inflame. It were good alſo to have the lamp made, not of tin, but of glaſs, that you may ſee how the vapour or air gathereth by degrees in the top.

374. A FOURTH point that importeth the laſting of the flame, is the cloſeneſs of the air wherein the flame burneth. We ſee, that if wind bloweth upon a candle, it waſteth apace. We ſee alſo, it laſteth longer in a lanthorn than at large. And there are traditions of lamps and candles, that have burnt a very long time in caves and tombs.

375. A FIFTH point that importeth the laſting 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 ſcorcheth in froſty weather, and ſo furthereth the conſumption. 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.

Experiments in conſort touching burials or infuſions of divers bodies in earth.

376. 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 will make artificial porcellane, *etc.* And the like you may do for conſervation, if the bodies be hard and ſolid; as clay, wood, *etc.* 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 putrify, than good by the virtual cold, to conſerve them; except the earth be very dry and ſandy.

377. AN orange, lemon, and apple, wrapt in a linen cloth, being buried for a fortnight's ſpace four feet 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 became putrified.

378. A BOTTLE of beer, buried in like manner as before, became more lively, better taſted, and clearer than it was. And a bottle of wine in like manner. A bottle of vinegar ſo buried came forth more lively and more odoriferous, ſmelling almoſt

moſt like a violet. And after the whole month's burial, all the three came forth as freſh and lively, if not better, than before.

379. IT were a profitable experiment, to preſerve oranges, lemons, and pomgranates, till ſummer; for then their price will be mightily increaſed. This may be done, if you put them in a pot or veſſel well covered, that the moiſture of the earth come not at them; or elſe by putting them in a conſervatory of ſnow. And generally, whoſoever will make experiments of cold, let him be provided of three things; a conſervatory of ſnow; a good large vault, twenty feet at leaſt under the ground; and a deep well.

380. THERE hath been a tradition, that pearl, and coral, and turquois-ſtone, that have loſt their colours, may be recovered by burying in the earth: which is a thing of great profit, if it would ſort: but upon trial of ſix weeks 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 conſtringent; and ſo make the body more united, and thereby more reſplendent.

Experiment ſolitary touching the affects in mens bodies from ſeveral winds.

381. MENS bodies are heavier, and leſs diſpoſed to motion, when ſouthern winds blow, than when northern. The cauſe is, for that when the ſouthern winds blow, the humours do, in ſome degree, melt and 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.

Experiment ſolitary touching winter and ſummer ſickneſſes.

382. IT is commonly ſeen, that more are ſick in the ſummer, and more die in the winter; except it be in peſtilent diſeaſes, which commonly reign in ſummer or autumn. The reaſon is, becauſe diſeaſes are bred, indeed, chiefly by heat; but then they are cured moſt by ſweat and purge; which in the ſummer cometh on or is provoked more eaſily. As for peſtilent diſeaſes, the reaſon why moſt die of them in ſummer is, becauſe they are bred moſt in the ſummer; for otherwiſe thoſe that are touched are in moſt danger in the winter.

Experiment ſolitary touching peſtilential ſeaſons.

383. 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 not found true; for many times there have been great plagues in dry years. Whereof the cauſe may be, for that drought in the bodies of iſlanders habituated to moiſt airs, doth exaſperate the humours, and maketh them more apt to putrify or inflame: beſides, it tainteth the waters, commonly, and maketh them leſs wholeſome. And again in Barbary, the plagues break up in the ſummer months, when the weather is hot and dry.

Experiment ſolitary touching an error received about epidemical diſeaſes.

384. MANY diſeaſes, both epidemical and others, break forth at particular times And the cauſe is falſly imputed to the conſtitution of the air at that time when they break forth or reign; whereas it proceedeth, indeed, from a precedent ſequence and ſeries of the ſeaſons of the year: and therefore Hippocrates in his prognoſtics doth make

make good obſervations of the diſeaſes that enſue upon the nature of the precedent four ſeaſons of the year.

Experiment ſolitary touching the alteration or preſervation of liquors in wells or deep vaults.

385. TRIAL hath been made with earthen bottles well ſtopped, hanged in a well of twenty fathom deep at the leaſt; and ſome of the bottles have been let down into the water, ſome others have hanged above, within about a fathom of the water; and the liquors ſo tried have been beer, not new, but ready for drinking, and wine, and milk. The proof hath been, that both the beer and the wine, as well within water as above, have not been palled or deadned at all; but as good, or ſomewhat better, than bottles of the ſame drinks and ſtaleneſs kept in a cellar. But thoſe which did hang above water were apparently the beſt; and that beer did flower a little; whereas that under water did not, though it were freſh. The milk ſoured and began to putrify. Nevertheleſs it is true, that there is a village near Blois, where in deep caves they do thicken milk, in ſuch ſort that it becometh very pleaſant: which was ſome cauſe of this trial of hanging milk in the well: but our proof was naught; neither do I know whether that milk in thoſe caves be firſt boiled. It were good therefore to try it with milk ſodden, and with cream; for that milk of itſelf is ſuch a compound body, of cream, curds and whey, as it is eaſily turned and diſſolved. It were good alſo to try the beer when it is in wort, that it may be ſeen whether the hanging in the well will accelerate the ripening and clarifying of it.

Experiment ſolitary touching ſtuttering.

386. DIVERS we ſee do ſtutter. 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 ſtutter: and we ſee that in thoſe that ſtutter, if they drink wine moderately, they ſtutter leſs, becauſe it heateth: and ſo we ſee, that they that ſtutter, do ſtutter more in the firſt offer to ſpeak, than in continuance; becauſe the tongue is by motion ſomewhat heated. In ſome alſo, it may be, though rarely, the dryneſs of the tongue; which likewiſe maketh it leſs apt to move as well as cold: for it is an affect that cometh to ſome wiſe and great men; as it did unto Moſes, who was *linguae praepeditae*; and many ſtutterers, we find, are very choleric men; choler inducing a dryneſs in the tongue.

Experiments in conſort touching ſmells.

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

388. SWEET ſmells are moſt forcible in dry ſubſtances when they are broken; and ſo likewiſe in oranges or lemons, the nipping of their rind giveth out their ſmell more; and generally when bodies are moved or ſtirred, though not broken, they ſmell more; as a ſweet-bag waved. The cauſe is double: the one, for that there is a greater emiſſion of the ſpirit when way is made; and this holdeth in the break-

ing, nipping, or cruſhing; it holdeth alſo, in ſome degree, in the moving: but in this laſt there is a concurrence of the ſecond cauſe; which is the impulſion of the air, that bringeth the ſcent faſter upon us.

389. THE daintieſt ſmells of flowers are out of thoſe plants whoſe leaves ſmell not; as violets, roſes, wall-flowers, gilly-flowers, pinks, woodbines, vine-flowers, apple-blooms, limetree-blooms, bean-blooms, *etc.* 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 evanid and weaker than that of the leaves; as it is in roſemary flowers, lavender flowers, and ſweet-briar roſes. But where there is leſs heat, there the ſpirit of the plant is digeſted and refined and ſevered from the groſſer juice, in the efflorescence, and not before.

390. MOST odours ſmell beſt broken or cruſhed, as hath been ſaid; but flowers preſſed or beaten do loſe the freſhneſs and ſweetneſs of their odour. The cauſe is, for that when they are cruſhed, the groſſer and more earthy ſpirit cometh out with the finer, and troubleth it; whereas in ſtronger odours there are no ſuch degrees of the iſſue of the ſmell.

Experiments in conſort touching the goodneſs and choice of water.

391. IT 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 find ſome difference, though not much: and the lighter you may account the better.

392. SECONDLY, try them by boiling upon an equal fire: and that which conſumeth away faſteſt, you may account the beſt.

393. THIRDLY, try them in ſeveral bottles, or open veſſels, matches in every thing elſe, and ſee which of them laſt longeſt without ſtench or corruption. And that which holdeth unputrified longeſt, you may likewiſe account the beſt.

394. FOURTHLY, try them by making drinks ſtronger or ſmaller, with the ſame quantity of malt; and you may conclude, that that water which maketh the ſtronger drink, is the more concocted and nouriſhing; though perhaps it be not ſo good for medicinal uſe. And ſuch water, commonly, is the water of large and navigable rivers; and likewiſe in large and clean ponds of ſtanding water: for upon both them the ſun hath more power than upon fountains or ſmall rivers. And I conceive that chalk-water is next them the beſt for going fartheſt in drink: for that alſo helpeth concoction; ſo it be out of a deep well; for then it cureth the rawneſs of the water; but chalky water, towards the top of the earth, is too fretting; as it appeareth in laundry of cloths, which wear out apace if you uſe ſuch waters.

395. FIFTHLY, the houſewives do find a difference in waters, for the bearing or not bearing of ſoap: and it is likely that the more fat water will bear ſoap beſt; for the hungry water doth kill the unctuous nature of the ſoap.

396. SIXTHLY, you may make a judgment of waters according to the place whence they ſpring or come: the rain-water is, by the phyſicians, eſteemed the fineſt and the beſt; but yet it is ſaid to putrify ſooneſt; which is likely, becauſe of the fineneſs of the ſpirit: and in conſervatories of rain-water, ſuch as they have in Venice, *etc.* they are found not ſo choice waters; the worſe, perhaps, becauſe they are covered aloft, and kept from the ſun. Snow-water is held unwholſome; inſomuch as the people that dwell at the foot of the ſnow mountains, or otherwiſe upon the aſcent, eſpecially the women, by drinking of ſnow-water, have great bags hanging

hanging under their throats. Well-water, except it be upon chalk, or a very plentiful ſpring, maketh meat red; which is an ill ſign. Springs on the tops of high hills are the beſt: for both they ſeem to have a lightneſs and appetite of mounting; and beſides, they are moſt pure and unmingled; and again, are more percolated through a great ſpace of earth. For waters in valleys join in effect under ground with all waters of the ſame level; whereas ſprings on the tops of hills paſs through a great deal of pure earth, with leſs mixture of other waters.

397. SEVENTHLY, judgment may be made of waters by the ſoil whereupon the water runneth; as pebble is the cleaneſt and beſt taſted, and next to that, clay-water; and thirdly, water upon chalk; fourthly, that upon ſand; and worſt of all upon mud. Neither may you truſt waters that taſte ſweet; for they are commonly found in riſing grounds of great cities; which muſt needs take in a great deal of filth.

Experiment ſolitary touching the temperate heat under the equinoctial.

398. 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 breezes 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 breezes are great, as about nine or ten of the clock in the forenoon. Another cauſe is, for that the length of the night, and the dews thereof, do compenſate the heat of the day. A third cauſe is the ſtay of the ſun; not in reſpect of day and night, for that we ſpake of before, but in reſpect of the ſeaſon; for under the line the ſun croſſeth the line, and maketh two ſummers and two winters, but in the ſkirts of the torrid zone it doubleth and goeth back again, and ſo maketh one long ſummer.

399. THE heat of the ſun maketh men black in ſome countries, as in Æthiopia and Guiney, *etc.* 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 concocteth it than ſoaketh it; and therefore we ſee that all Æthiopes are fleſhy and plump, and have great lips; all which betoken moiſture retained, and not drawn out. We ſee alſo, that the Negroes are bred in countries that have plenty of water by rivers or otherwiſe: for Meroë, which was the metropolis of Æthiopia, 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 above Cape Verde is likewiſe moiſt, inſomuch as it is peſtilent through moiſture: but the countries of the Abyſſenes, and Barbary, and Peru, where they are tawny, and olivaſter, and pale, are generally more ſandy and dry. As for the Æthiopes, 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.

Experiment ſolitary touching motion after the inſtant of death.

400. SOME creatures do move a good while after their head is off; as birds: ſome a very little time; as men and all beaſts: ſome move, though cut in ſeveral pieces; as ſnakes, eels, worms, flies, *etc.* Firſt therefore it is certain, that the immediate cauſe of death is the reſolution or extinguiſhment of the ſpirits; and

that the deſtruction or corruption of the organs is but the mediate cauſe. But ſome organs are ſo peremptorily neceſſary, that the extinguiſhment of the ſpirits doth ſpeedily follow; but yet ſo as there is an interim of a ſmall time. It is reported by one of the ancients of credit, that a ſacrificed beaſt hath lowed after the heart hath been ſevered; and it is a report alſo of credit, that the head of a pig hath been opened, and the brain put into the palm of a 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; inſomuch as it is extant in ſtory, that an emperor of Rome, to ſhew the certainty of his hand, did ſhoot a great forked arrow at an oſtrich, as ſhe ran ſwiftly upon the ſtage, and ſtruck off her head; and yet ſhe continued the race a little way with the head off. As for worms, and flies, and eels, the ſpirits are diffuſed almoſt all over; and therefore they move in their ſeveral pieces.

NATURAL HISTORY.

CENTURY V.

Experiments in conſort touching the acceleration of germination.

WE will now inquire 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 *producat*, which is the word of animation: for the other words are but the words of eſſence. And they are of excellent and general uſe for food, medicine, and a number of mechanical arts.

401. THERE were ſown in a bed, turnip-ſeed, radiſh-ſeed, wheat, cucumber-ſeed, and peas. The bed we call a hot-bed, and the manner of it is this: there was taken horſe-dung, old and well rotted; this was laid upon a bank half a foot high, and ſupported round about with planks; and upon the top was caſt ſifted earth, ſome two fingers deep; and then the ſeed ſprinkled upon it, having been ſteeped all night in water mixed with cow-dung. The turnip-ſeed and the wheat came up half an inch above ground within two 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 peas, 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.

402. THERE was wheat ſteeped in water mixed with cow-dung; other in water mixed with horſe-dung; other in water mixed with pigeon-dung; other in urine of man; other in water mixed with chalk powdered; other in water mixed with ſoot; other in water mixed with aſhes; other in water mixed with bay-ſalt; other in claret wine; other in malmſey; other in ſpirit of wine. The proportion of the mixture was a fourth part of the ingredients to the water; ſave that there was not of the ſalt above an eighth part. The urine, and wines, and ſpirit of wine, were ſimple without mixture of water. The time of the ſteeping was twelve hours. The time of the year October. There was alſo other wheat ſown unſteeped, but watered twice a day with warm water. There was alſo other wheat ſown ſimple, to compare it with the reſt. The event was; that thoſe that were in the mixture of dung, and urine, and ſoot, chalk, aſhes, and ſalt, came up within ſix days: and thoſe that afterwards proved the higheſt, thickeſt, and moſt luſty, were firſt the urine; and then the dungs; next the chalk; next the ſoot; next the aſhes; next the ſalt; next the wheat ſimple of itſelf, unſteeped and unwatered; next the watered twice a day with warm water; next the claret wine. So that theſe three laſt were ſlower than the ordinary wheat of itſelf; and this culture

culture did rather retard than advance. As for thoſe that were ſteeped in malmſey, and ſpirit of wine, they came not up at all. This is a rich experiment for profit; for the moſt of the ſteepings are cheap things; and the goodneſs of the crop is a great matter of gain; if the goodneſs of the crop anſwer the earlineſs of the coming up: as it is like it will; both being from the vigour of the ſeed; which alſo partly appeared in the former experiments, as hath been ſaid. This experiment ſhould be tried in other grains, ſeeds, and kernels: for it may be ſome ſteeping will agree beſt with ſome ſeeds. It ſhould be tried alſo with roots ſteeped as before, but for longer time. It ſhould be tried alſo in ſeveral ſeaſons of the year, eſpecially the ſpring.

403. STRAWBERRIES watered now and then, as once in three days, with water wherein hath been ſteeped ſheeps-dung or pigeons-dung, will prevent and come early. And it is like the ſame effect would follow in other berries, herbs, flowers, grains, or trees. And therefore it is an experiment, though vulgar in ſtrawberries, yet not brought into uſe generally: for it is uſual to help the ground with muck; and likewiſe to recomfort it ſometimes with muck put to the roots; but to water it with muck water, which is like to be more forcible, is not practiſed.

404. DUNG, or chalk, or blood, applied in ſubſtance, ſeaſonably, to the roots of trees, doth ſet them forwards. But to do it unto herbs, without mixture of water or earth, it may be theſe helps are too hot.

405. THE former means of helping germination, are either by the 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 the 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 been tried with grapes; inſomuch as they will come a month earlier than the grapes abroad.

406. BESIDES the two means of accelerating germination formerly deſcribed; that is to ſay, the mending of the nouriſhment; and comforting of the ſpirit of the plant; there is a third, which is the making way for the eaſy coming to the nouriſhment, and drawing it. And therefore gentle digging and looſening of the earth about the roots of trees; and the removing herbs and flowers into new earth once in two years, which is the ſame thing, for the new earth is ever looſer, doth greatly further the proſpering and earlineſs of plants.

407. 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 the ſpace of ten days the ſtandard did put forth a fair green leaf, and ſome other little buds, which ſtood at a ſtay, without any ſhew of decay or withering, more than ſeven days. But afterwards that leaf faded, but the young buds did ſprout on;

on; which afterward opened into fair leaves in the ſpace of three months; and continued ſo a while after, till upon removal we left the trial. But note, that the leaves were ſomewhat paler and lighter-coloured than the leaves uſed to be abroad. Note, that the firſt buds were in the end of October; and it is likely that if it had been in the ſpring time, it would have put forth with greater ſtrength, and, it may be, to have grown on to bear flowers. By this means you may have, as it ſeemeth, roſes ſet in the midſt of a pool, being ſupported with ſome ſtay; which is matter of rareneſs and pleaſure, though of ſmall uſe. This is the more ſtrange, for that the like roſe-ſtandard was put at the ſame time into water mixed with horſe-dung, the horſe-dung about the fourth part to the water, and in four months ſpace, while it was obſerved, put not forth any leaf, though divers buds at the firſt, as the other.

408. 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 radiſh-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.

409. NOTE, that if roots, or peas, 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 radiſh, *etc.* come in a month, that in other grounds will not come in two, and ſo make double returns.

410. 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 mortify. But caſually ſome wheat lay under the pan, which was ſomewhat moiſtened by the ſuing of the pan; which in ſix weeks, as aforeſaid, looked mouldy to the eye, but it was ſprouted forth half a finger's length.

411. IT ſeemeth by theſe inſtances of water, that for nouriſhment the water is almoſt all in all, and that the earth doth but keep the plant upright, and ſave it from over-heat and over-cold; and therefore is a comfortable experiment for good drinkers. It proveth alſo that our former opinion, that drink incorporate with fleſh or roots, as in capon-beer, *etc.* will nouriſh more eaſily, than meat and drink taken ſeverally.

412. THE houſing of plants, I conceive, will both accelerate germination, and bring forth flowers and plants in the colder ſeaſons: and as we houſe hot-country plants, as lemons, oranges, myrtles, to ſave them; ſo we may houſe our own country plants, to forward them, and make them come in the cold ſeaſons; in ſuch ſort, that you may have violets, ſtrawberries, peas, all winter: ſo that you ſow or remove them at fit times. This experiment is to be referred unto the comforting of the ſpirit of the plant by warmth, as well as houſing their boughs, *etc.* So then the means to accelerate germination, are in particular eight, in general three.

Experiments in conſort touching the putting back or retardation of germination.

413. To make roſes, or other flowers come late, it is an experiment of pleaſure. For the ancients eſteemed much of *roſa ſera*. And indeed the November roſe is the ſweeteſt, having been leſs exhaled by the ſun. The means are theſe. Firſt, the cutting off their tops immediately after they have done bearing; and then they will come again the ſame year about November: but they will not come juſt on the tops where they were cut, but out of thoſe ſhoots which were, as it were, water boughs. The cauſe is, for

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.

414. THE ſecond is the pulling off the buds of the roſe, when they are newly knotted; for then the ſide branches will bear. The cauſe is the ſame with the former: for cutting off the tops, and pulling off the buds, work the ſame effect, in retention of the ſap for a time, and diverſion of it to the ſprouts that were not ſo forward.

415. THE third is the cutting off ſome few of the top boughs in the ſpring time, but ſuffering the lower bows to grow on. The cauſe is, for that the boughs do help to draw up the ſap more ſtrongly; and we ſee that in polling of trees, many do uſe to leave a bough or two on the top, to help to draw up the ſap. And it is reported alſo, that if you graft upon the bough of a tree, and cut off ſome of the old boughs, the new cions will periſh.

416. THE fourth is by laying the roots bare about Chriſtmas ſome days. The cauſe is plain, for that it doth arreſt the ſap from going upwards for a time; which arreſt is afterwards releaſed by the covering of the root again with earth; and then the ſap getteth up, but later.

417. THE fifth is the removing of the tree ſome month before it buddeth. The cauſe is, for that ſome time will be required after the remove for the reſettling, before it can draw the juice; and that time being loſt, the bloſſom muſt needs come forth later.

418. THE ſixth is the grafting of roſes in May, which commonly gardeners do not till July; and then they bear not till the next year; but if you graft them in May, they will bear the ſame year, but late.

419. THE ſeventh is the girding of the body of the tree about with ſome packthread; for that alſo in a degree reſtraineth the ſap, and maketh it come up more late and more ſlowly.

420. THE eighth is the planting of them in a ſhade, or in a hedge; the cauſe is, partly the keeping out of the ſun, which haſteneth the ſap to riſe; and partly the robbing of them of nouriſhment by the ſtuff in the hedge. Theſe means may be practiſed upon other, both trees and flowers, *mutatis mutandis*.

421. MEN have entertained a conceit that ſheweth prettily; namely, that if you graft a late-coming fruit upon a ſtock of a fruit-tree that cometh early, the graft will bear fruit early; as a peach upon a cherry; and contrariwiſe, if an early-coming fruit upon a ſtock of a fruit-tree that cometh late, the graft will bear fruit late; as a cherry upon a peach. But theſe are but imaginations, and untrue. The cauſe is, for that the cion over-ruleth the ſtock quite; and the ſtock is but paſſive only, and giveth aliment, but no motion to the graft.

Experiments in conſort touching the melioration of fruits, trees, and plants.

WE will ſpeak now, how to make fruits, flowers, and roots larger, in more plenty, and ſweeter than they uſe to be; and how to make the trees themſelves more tall, more ſpread, and more haſty and ſudden than they uſe to be. Wherein there is no doubt but the former experiments of acceleration will ſerve much to theſe purpoſes. And again, that theſe experiments, which we ſhall now ſet down, do ſerve alſo for acceleration, becauſe both effects proceed from the increaſe of vigour in the tree; but yet

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.

422. IT is an aſſured experience, that an heap of flint or ſtone, laid about the bottom of a wild tree, as an oak, elm, aſh, *etc.* upon the firſt planting, doth make it proſper double as much as without it. The cauſe is, for that it retaineth the moiſture which falleth at any time upon the tree, and ſuffereth it not to be exhaled by the 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 ſteddy at the firſt. *Quary*, If laying of ſtraw ſome height about the body of a tree, will not make the tree forwards. For though the root giveth the ſap, yet it is the body that draweth it. But you muſt note, that if you lay ſtones about the ſtalk of lettuce, or other plants that are more ſoft, it will over-moiſten the roots, ſo as the worms will eat them.

423. A TREE, at the firſt ſetting, ſhould not be ſhaken, until it hath taken root fully: and therefore ſome have put two little forks about the bottom of their trees to keep them upright; but after a year's rooting, then ſhaking doth the tree good, by looſening of the earth, and, perhaps, by exerciſing as it were, and ſtirring the ſap of the tree.

424. GENERALLY the cutting away of boughs and ſuckers at the root and body doth make trees grow high; and contrariwiſe, the polling and cutting of the top maketh them grow ſpread and buſhy. As we ſee in pollards, *etc.*

425. IT is reported, that to make haſty-growing coppice woods, the way is, to take willow, ſallow, poplar, alder, of ſome ſeven years growth; and to ſet them, not upright but aſlope, 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.

426. WHEN you would have many new roots of fruit trees, take a low tree and bow it, and lay all his branches aflat upon the ground, and caſt earth upon them; and every twig will take root. And this is a very profitable experiment for coſtly trees, for the boughs will make ſtocks without charge; ſuch as are apricots, peaches, almonds, cornelians, mulberries, figs, *etc.* The like is continually practiſed with vines, roſes, muſk-roſes, *etc.*

427. FROM May to July you may take off the bark of any bough, being of the bigneſs of three or four inches, and cover the bare place, ſomewhat above and below, with loam well tempered with horſe-dung, binding it faſt down. Then cut off the bough about Allhollontide in the bare place, and ſet it in the ground; and it will grow to be a fair tree in one year. The cauſe may be, for that the baring from the bark keepeth the ſap from deſcending towards winter, and ſo holdeth it in the bough; and it may be alſo that the loam and horſe-dung applied to the bare place to 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.

428. IT hath been practiſed in trees that ſhew fair and bear not, to bore a hole through the heart of the tree, and thereupon it will bear. Which may be, for that the tree before had too much repletion, and was oppreſſed with its own ſap; for repletion is an enemy to generation.

429. IT hath been practiſed in trees that do not bear, to cleave two or three of the chief roots, and to put into the cleft a ſmall pebble, which may keep it open, and then it will bear. The cauſe may be, for that a root of a tree may be, as it were, hide-

bound, no leſs than the body of the tree, but it will not keep open without ſomewhat put into it.

430. IT is uſually practiſed, to ſet trees that require much ſun upon walls againſt the ſouth; as apricots, peaches, plums, vines, figs, and the like. It hath a double commodity; the one, the heat of the wall by reflexion; the other, the taking away of the ſhade; for when a tree groweth round, the upper boughs over-ſhadow the lower: but when it is ſpread upon a wall, the ſun cometh alike upon the upper and lower branches.

431. IT hath alſo been practiſed, by ſome, to pull off ſome leaves from the trees ſo ſpread, that the ſun may come upon the bough and fruit the better. There hath been practiſed alſo a curioſity, to ſet a tree upon the north ſide of a wall, and at a little height to draw it through the wall, and ſpread it 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 ſorted 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 compaſſing a tree below with ſtraw.

432. THE lowneſs of the bough where the fruit cometh, maketh the fruit greater, and to ripen better; for you ſhall ever ſee, in apricots, peaches, or melocotones upon a wall, the greateſt fruits towards the bottom. And in France, the grapes that make the wine, grow upon low vines bound to ſmall ſtakes; and the raiſed vines in arbours make but verjuice. It is true, that in Italy and other countries where they have hotter ſun, they raiſe them upon elms and trees; but I conceive, if the French manner of planting low were brought in uſe there, their wines would be ſtronger and ſweeter. But it is more chargeable in reſpect of the props. It were good to try whether a tree grafted ſomewhat near the ground, and the lower boughs only maintained, and the higher continually pruned off, would not make a larger fruit.

433. To have fruit in greater plenty, the way is to graft not only upon young ſtocks, but upon divers boughs of an old tree; for they will bear great numbers of fruit: whereas if you graft but upon one ſtock, the tree can bear but few.

434. THE digging yearly about the roots of trees, which is a great means both to the acceleration and melioration of fruits, is practiſed in nothing but in vines; which if it were transferred unto other trees and ſhrubs, as roſes, *etc.* I conceive would advance them likewiſe.

435. IT hath been known, that a fruit tree hath been blown up almoſt by the roots, and ſet up again, and the next year bear exceedingly. The cauſe of this was nothing but the looſening of the earth, which comforteth any tree, and is fit to be practiſed more than it is in fruit-trees: for trees cannot be ſo fitly removed into new grounds, as flowers and herbs may.

436. 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.

437. IF an herb be cut off from the roots in the beginning of winter, and then the earth be troden 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

And gardeners uſe to tread down any looſe ground after they have ſown onions, or turnips, *etc.*

438. 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 itſelf of a ſpongy ſubſtance, it draweth the moiſture of the earth to it, and ſo feedeth the root. This is of greateſt uſe for onions, turnips, parſnips, and carrots.

439. THE ſhifting of ground is a means to better the tree and fruit; but with this caution, that all things do proſper beſt when they are advanced to the better: your nurſery of ſtocks ought to be in a more barren ground than the ground is whereunto you remove them. So all graſiers prefer their cattle from meaner paſtures to better. We ſee alſo, that hardneſs in youth lengtheneth life, becauſe it leaveth a cheriſhing to the better of the body in age: nay, in exerciſes, it is good to begin with the hardeſt, as dancing in thick ſhoes, *etc.*

440. IT hath been obſerved, that hacking of trees in their bark, both downright and acroſs, ſo as you may make them rather in ſlices than in continued hacks, doth great good to trees; and eſpecially delivereth them from being hide-bound, and killeth their moſs.

441. SHADE to ſome plants conduceth to make them large and proſperous, more than ſun; as in ſtrawberries and bays, *etc.* Therefore amongſt ſtrawberries ſow here and there ſome borage ſeed; and you ſhall find the ſtrawberries under thoſe leaves far more large than their fellows. And bays you muſt plant to the north, or defend them from the ſun by a hedge-row; and when you ſow the berries, weed not the borders for the firſt half year; for the weed giveth them ſhade.

442. To increaſe the crops of plants, there would be conſidered not only the increaſing the luſt of the earth, or of the plant, but the ſaving alſo of that which is ſpilt. So they have lately made a trial to ſet wheat; which nevertheleſs hath been left off, becauſe of the trouble and pains: yet ſo much is true, that there is much ſaved by the ſetting, in compariſon of that which is ſown; both by keeping it from being picked up by birds, and by avoiding the ſhallow lying of it, whereby much that is ſown taketh no root.

443. IT is preſcribed by ſome of the ancients, that you take ſmall trees, upon which figs or other fruit grow, being yet unripe, and cover the trees in the middle of autumn with dung until the ſpring; and then take them up in a warm day, and replant them in good ground; and by that means the former year's tree will be ripe, as by a new birth, when other trees of the ſame kind do but bloſſom. But this ſeemeth to have no great probability.

444. IT is reported, that if you take nitre, and mingle it with water, to the thickneſs of honey, and therewith anoint the bud, after the vine is cut, it will ſprout forth within eight 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.

445. TAKE ſeed, or kernels of apples, pears, oranges; or a peach, or a plum-ſtone, *etc.* and put them into a ſquill, which is like a great onion, and they will come up much earlier than in the earth itſelf. This I conceive to be as 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 ſame would be done, by putting kernels into a turnip, or the like; ſave that the ſquill is more vigorous and hot. It may be tried alſo, with putting onion-

ſeed into an onion-head, which thereby, perhaps, will bring forth a larger and earlier onion.

446. THE pricking of a fruit in ſeveral places, when it is almoſt at its bigneſs, and before it ripeneth, hath been practiſed with ſucceſs, to ripen the fruit more ſuddenly. We ſee the example of the biting of waſps or worms upon fruit, whereby it manifeſtly ripeneth the ſooner.

447. IT is reported, that *alga marina*, ſea-weed, put under the roots of coleworts, and, perhaps, of other plants, will further their growth. The virtue, no doubt, hath relation to ſalt, which is a great help to fertility.

448. IT hath been practiſed, to cut off the ſtalks of cucumbers, immediately after their bearing, cloſe by the earth; and then to caſt a pretty quantity of earth upon the plant that remaineth, and they will bear the next year fruit long before the ordinary time. The cauſe may be, for that the ſap goeth down the ſooner, and is not ſpent in the ſtalk or leaf, which remaineth after the fruit. Where note, that the dying in the winter of the roots of plants that are annual, ſeemeth 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.

449. THE pulling off many of the bloſſoms from a fruit tree, doth make the fruit fairer. The cauſe is manifeſt; for that the ſap hath the leſs to nouriſh. And it is a common experience, that if you do not pull off ſome bloſſoms the firſt time a tree bloometh, it will bloſſom itſelf to death.

450. 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, *etc.* from a wild 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.

451. IT hath been generally received, that a plant watered with warm water, will come up ſooner and better, than with cold water or with ſhowers. But our experiment of watering wheat with warm water, as hath been ſaid, ſucceeded not; which may be, becauſe the trial was too late in the year, namely, 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.

452. THERE is no doubt, but that the grafting, for the moſt part, doth meliorate the fruit. The cauſe is manifeſt; for that the nouriſhment is better prepared in the ſtock, than in the crude earth: but yet note well, that there be ſome trees, that are ſaid to come up more happily from the 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.

453. 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 *e converſo*; which we rejected before: for the cion will govern. Nevertheleſs, it is probable enough, that if you can get a cion to grow upon a ſtock of another kind, that is much moiſter than its own ſtock, it may make the fruit greater, becauſe it will yield more plentiful nouriſhment; though it is like it will make the fruit baſer. But generally the grafting is upon a drier ſtock; as the apple upon a crab; the pear upon a thorn; *etc.* Yet it is reported, that in the Low-Countries

Low-Countries they will graft an apple cion 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 cion 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.

454. 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 cion may likewiſe make fruit greater; as if you take a cion, and graft it upon a ſtock the firſt year; and then cut it off, and graft it upon another ſtock the ſecond year; and ſo for a third or fourth year; and then let it reſt, it will 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.

455. 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.

456. IT is reported, that mulberries will be fairer, and the trees more fruitful, if you bore the trunk of the tree through in ſeveral places, and thruſt into the places bored wedges of ſome hot trees, as turpentine, maſtic-tree, guaiacum, juniper, *etc.* The cauſe may be, for that adventive heat doth chear up the native juice of the tree.

457. 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 increaſing the luſt or ſpirit of the root; theſe things being more forcible than ordinary compoſts.

458. IT is reported by one of the ancients, that artichokes 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.

460. COLEWORTS are reported by one of the ancients to proſper exceedingly, and to be better taſted, if they be ſometimes watred with ſalt water; and much more with water mixed with nitre; the ſpirit of which is leſs adurent than ſalt.

461. IT is reported, that cucumbers will prove more tender and dainty, if their ſeeds be ſteeped a little in milk; the cauſe may be, for that the ſeed being mollified with the milk, will be too weak to draw the groſſer juice of the earth, but only the finer. The ſame experiment may be made in artichokes and other ſeeds, when you would take away either their flaſhineſs or bitterneſs. They ſpeak alſo, that the like effect followeth of ſteeping in water mixed with honey; but that ſeemeth to me not ſo probable, becauſe honey hath too quick a ſpirit.

462. IT is reported, that cucumbers will be leſs watry, and more melon-like, if in the pit where you ſet them, you fill it, half-way up, with chaff or ſmall ſticks, and then pour earth upon them; for cucumbers, as it ſeemeth, do extremely affect moiſture, and over-drink themſelves; which this chaff or chips forbiddeth. Nay, it is further reported that if, when a cucumber is grown, you ſet a pot of water about five or ſix inches diſtance from it, it will in twenty-four hours ſhoot ſo much out as

to

to touch the pot; which, if it be true, is an experiment of an higher nature than belongeth to this title: for it diſcovereth perception in plants, to move towards that which ſhould help and comfort them, though it be at a diſtance. The ancient tradition of the vine is far more ſtrange; it is, that if you ſet a ſtake or prop ſome diſtance from it, it will grow that way; which is far ſtranger, as is ſaid, than the other: for that water may work by a ſympathy of attraction; but this of the ſtake ſeemeth to be a reaſonable diſcourſe.

463. IT hath been touched before, that terebration of trees doth make them proſper better. But it is found alſo, that it maketh the fruit ſweeter and better. The cauſe is, for that, notwithſtanding the terebration, they may receive aliment ſufficient, and yet no more than they can well turn and digeſt; and withal do ſweat out the coarſeſt and unprofitableſt juice; even as it is in living creatures, which by moderate feeding, and exerciſe, and ſweat, attain the ſoundeſt habit of body.

464. As terebration doth meliorate fruit, ſo upon the like reaſon doth letting of plants blood; as pricking vines, or other trees, after they be of ſome growth; and thereby letting forth gum or tears; though this be not to continue, as it is in terebration, but at ſome ſeaſons. And it is reported, that by this artifice bitter almonds have been turned into ſweet.

465. THE ancients for the dulcerating of fruit do commend ſwines dung above all other dung; which may be becauſe of the moiſture of that beaſt, whereby the excrement hath leſs acrimony; for we ſee ſwines and pigs fleſh is the moiſteſt of fleſhes.

466. IT is obſerved by ſome, that all herbs wax ſweeter, both in ſmell and taſte, if after they be grown up ſome reaſonable time, they be cut, and ſo you take the latter ſprout. The cauſe may be, for that the longer the juice ſtayeth in the root and ſtalk, the better it concocteth. For one of the chief cauſes why grains, ſeeds, and fruits are more nouriſhing than leaves, is the length of time in which they grow to maturation. It were not amiſs to keep back the ſap of herbs, or the like, by ſome fit means, till the end of ſummer; whereby, it may be, they will be more nouriſhing.

467. 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 cion: for otherwiſe it dulleth it. They commend much the grafting of pears or apples upon a quince.

468. BESIDES the means of melioration of fruits before mentioned, it is ſet down as tried, that a mixture of bran and ſwines dung, or chaff and ſwines dung, eſpecially laid up together for a month to rot, is a very great nouriſher and comforter to a fruit-tree.

469. 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.

470. 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

effected by an empty pot without earth in it, put over a fruit, being propped up with a ſtake, as it hangeth upon the tree; and the better, if ſome few pertuſions be made in the pot. Wherein, beſides the defending of the fruit from extremity of ſun or weather, ſome give a reaſon, that the fruit loving and coveting the open air and ſun, is invited by thoſe pertuſions to ſpread and approach as near the open air as it can; and ſo enlargeth in magnitude.

471. ALL trees in high and ſandy grounds are to be ſet deep; and in watry grounds more ſhallow. And in all trees, when they be removed, eſpecially fruit-trees, care ought to be taken, that the ſides of the trees be coaſted, north and ſouth, *etc.* as they ſtood before. The ſame is ſaid alſo of ſtone out of the quarry, to make it more durable; though that ſeemeth to have leſs reaſon; becauſe the ſtone lieth not ſo near the ſun, as the tree groweth.

472. TIMBER trees in a coppice wood do grow better than in an open field; both becauſe they offer not to ſpread ſo much, but ſhoot up ſtill in heighth; 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 or buttreſſes of ſtone, ripen more than upon a plain wall.

473. IT is ſaid, that if potado-roots be ſet in a pot filled with earth, and then the pot with earth be ſet likewiſe within the ground ſome two or three inches, the roots will grow greater than ordinary. The cauſe may be, for that having earth enough within the pot to nouriſh them; and then being ſtopped by the bottom of the pot from putting ſtrings downward, they muſt needs grow greater in breadth and thickneſs. And it may be, that all ſeeds or roots potted, and ſo ſet into the earth, will proſper the better.

474. THE cutting off the leaves of radiſh, or other roots, in the beginning of winter, before they wither, and covering again the root ſomething high with earth, will preſerve the root all winter, and make it bigger in the ſpring following, as hath been partly touched before. So that there is a double uſe of this cutting off the leaves; for in plants where the root is the eſculent, as radiſh and parſnips, it will make the root the greater; and ſo it will do to the heads of onions. And where the fruit is the eſculent, by ſtrengthning the root, it will make the fruit alſo the greater.

475. IT is an experiment of great pleaſure, to make the leaves of ſhady trees larger than ordinary. It hath been tried for certain that a cion of a weech-elm, grafted upon the ſtock of an ordinary elm, will put forth leaves almoſt as broad as the brim of one's hat. And it is very likely, that as in fruit-trees the graft maketh a greater fruit; ſo in trees that bear no fruit, it will make the greater leaves. It would be tried therefore in trees of that kind chiefly, as birch, aſp, willow; and eſpecially the ſhining willow, which they call ſwallow-tail, becauſe of the pleaſure of the leaf.

476. THE barrenneſs of trees by accident, beſides the weakneſs of the ſoil, ſeed, or root; and the injury of the weather, cometh either of their overgrowing with moſs, or their being hide-bound, or their planting too deep, or by iſſuing of the ſap too much into the leaves. For all theſe there are remedies mentioned before.

Experiments in conſort touching compound fruits and flowers.

WE ſee that in living creatures, that have male and female, there is copulation of ſeveral kinds; and ſo compound creatures; as the mule, that is generated betwixt

twixt the horſe and the aſs; and ſome other compounds which we call monſters, though more rare: and it is held that that proverb, *Africa ſemper aliquid monſtri parit*, cometh, for that the fountains of waters there being rare, divers ſorts of beaſts come from ſeveral parts to drink; and ſo being refreſhed, fall to couple, and many times with ſeveral kinds. The compounding or mixture of kinds in plants is not found out; which nevertheleſs, if it be poſſible, is more at command than that of living creatures; for that their luſt requireth a voluntary motion; wherefore it were one of the moſt noble experiments touching plants to find it out: for ſo you may have great variety of new fruits and flowers yet unknown. Grafting doth it not: that mendeth the fruit, or doub'eth the flowers, *etc.* but it hath not the power to make a new kind. For the cion ever over-ruleth the ſtock.

477. IT hath been ſet down by one of the ancients, that if you take two twigs of ſeveral fruit-trees, and flat them on the ſides, and then bind them cloſe together and ſet them in the ground, they will come up in one ſtock; but yet they will put forth their ſeveral fruits without any commixture in the fruit. Wherein note, by the way, that unity of continuance is eaſier to procure than unity of ſpecies. It is reported alſo, that vines of red and white grapes being ſet in the ground, and the upper parts being flatted and bound cloſe together, will put forth grapes of the ſeveral colours upon the ſame branch; and grape-ſtones of ſeveral colours within the ſame grape: but the more after a year or two; the unity, as it ſeemeth, growing more perfect. And this will likewiſe help, if from the 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.

478. THEY report, that divers ſeeds put into a clout, and laid in earth well dunged, will put up plants contiguous; which, afterwards, being bound in, their ſhoots will incorporate. The like is ſaid of kernels put into a bottle with a narrow mouth filled with earth.

479. IT is reported, that young trees of ſeveral kinds ſet contiguous without any binding, and very oft 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.

Experiments in conſort touching the ſympathy and antipathy of plants.

THERE are many ancient and received traditions and obſervations touching the ſympathy and antipathy of plants; for that ſome will thrive beſt growing near others, which they impute to ſympathy; and ſome worſe, which they impute to antipathy. But theſe are idle and ignorant conceits, and forſake the true indication of the cauſes, as the moſt part of experiments that concern ſympathies and antipathies do. For as to plants, neither is there any ſuch ſecret friendſhip or hatred as they 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; Whereſoever 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 neighbourhood doth good, becauſe the nouriſhments are contrary or ſeveral: but where two plants draw much the ſame juice, there the neighbourhood hurteth, for the one deceiveth the other.

480. FIRST

480. FIRST therefore, all plants that do draw much nouriſhment from the earth, and ſo ſoak the earth and exhauſt it, hurt all things that grow by them; as great trees, eſpecially aſhes, and ſuch trees as ſpread their roots near the top of the ground. So the colewort is not an enemy, though that were anciently received, to the vine only; 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 nouriſheth.

481. 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 rue doth proſper much, and becometh ſtronger, if it be ſet by a fig-tree; which, we conceive, is cauſed not by reaſon of friendſhip, but by extraction of a contrary juice: the one drawing juice fit to reſult ſweet, the other bitter. So they have ſet down likewiſe, that a roſe ſet by garlick is ſweeter; which likewiſe may be, becauſe the more fetid juice of the earth goeth into the garlick, and the more odorate into the roſe.

482. THIS we ſee manifeſtly, that there be certain corn-flowers which come ſeldom or never in other places, unleſs they be ſet, but only amongſt corn: as the bluebottle, a kind of yellow marygold, wild poppy, and fumitory. Neither can this be, by reaſon of the culture of the ground, by ploughing or furrowing; as ſome herbs and flowers will grow but in ditches new caſt; for if the ground lie fallow and unſown, they will not come: ſo as it ſhould ſeem to be the corn that qualifieth the earth, and prepareth it for their growth.

483. 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 rue more ſtrong and bitter, as the ancients have noted, good ſtore of rue planted about the fig-tree will make the fig more ſweet. Now the taſtes that do moſt offend in fruits, and herbs, and roots, are bitter, harſh, ſour, and wateriſh, or flaſhy. It were good therefore to make the trials following:

484. TAKE wormwood or rue, and ſet it near lettuce or coleflory, or artichoke, and ſee whether the lettuce or the coleflory, *etc.* become not the ſweeter.

485. TAKE a ſervice-tree, or a cornelian-tree, or an elder-tree, which we know have fruits of harſh and binding juice, and ſet them near a vine, or fig-tree, and ſee whether the grapes or figs will not be the ſweeter.

486. TAKE cucumbers or pumpions, and ſet them, here and there, amongſt muſk-melons, and ſee whether the melons will not be more winy, and better taſted. Set cucumbers, likewiſe, amongſt radiſh, and ſee whether the radiſh will not be made the more biting.

487. TAKE ſorrel, and ſet it amongſt raſps, and ſee whether the raſps will not be the ſweeter.

488. TAKE common briar, and ſet it amongſt violets or wall-flowers, and ſee whether it will not make the violets or wall-flowers ſweeter, and leſs earthy in their ſmell. So ſet lettuce or cucumbers amongſt roſemary or bays, and ſee whether the roſemary or bays will not be the more odorate or aromatical.

489. CONTRARIWISE, you muſt take heed how you ſet herbs together, that draw much the like juice. And therefore I think roſemary will loſe in ſweetneſs, 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; as if you ſhould ſet tanſey by angelica, it may be the angelica would be the weaker, and fitter for mixture in perfume. And if you ſhould ſet rue by common wormwood, it may be the wormwood would turn to be liker Roman wormwood.

490. THIS axiom is of large extent; and therefore would be ſevered and refined by trial. Neither muſt you expect to have a groſs difference by this kind of culture, but only farther perfection.

491. TRIAL would be alſo made in herbs poiſonous and purgative, whoſe ill quality, perhaps, may be diſcharged, or attempered, by ſetting ſtronger poiſons or purgatives by them.

492. IT is reported, that the ſhrub called our ladies ſeal, which is a kind of briony, and coleworts, ſet near together, one or both will die. The cauſe is, for that they be both great depredators of the earth, and one of them ſtarveth the other. The like is ſaid of a reed and a brake: both which are ſucculent; and therefore the one deceiveth the other. And the like of hemlock and rue; both which draw ſtrong juices.

493. SOME of the ancients, and likewiſe divers of the modern writers, that have laboured in natural magic, have noted a ſympathy between the ſun, moon, and ſome principal ſtars, and certain herbs and plants. And ſo they have denominated ſome herbs ſolar, and ſome lunar; and ſuch like toys put into great words. It is manifeſt that there are ſome flowers that have reſpect to the ſun in two kinds, the one by opening and ſhutting, and the other by bowing and inclining the head. For marygolds, tulips, pimpernel, and indeed moſt flowers, do open and ſpread their leaves abroad when the ſun ſhineth ſerene and fair: and again, in ſome part, cloſe them, or gather them inward, either towards night, or when the ſky is overcaſt. Of this there needeth no ſuch ſolemn reaſon to be aſſigned; as to ſay, that they rejoice at the preſence of the ſun, and mourn at the abſence thereof. For it is nothing elſe but a little loading of the leaves, and ſwelling them at the bottom, with the moiſture of the air; whereas the dry air doth extend them: and they make it a piece of the wonder, that garden-clover will hide the ſtalk when the ſun ſheweth bright; which is nothing but a full expanſion of the leaves. For the bowing and inclining the head, it is found in the great flower of the ſun, in marygolds, wartwort, mallow flowers, and others. The cauſe is ſomewhat more obſcure than the former; but I take it to be no other, but that the part againſt which the ſun beateth waxeth more faint and flaccid in the ſtalk, and thereby leſs able to ſupport the flower.

494. WHAT a little moiſture will do in vegetables, even though they be dead and ſevered 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 thereinto they put the oaten-beard, leaving half of it ſticking forth of the quill: then they take a little white box of wood, to deceive men, as if ſomewhat

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in the box did work the feat; in which, with a pin, they make a little hole, enough to take the beard, but not to let the croſs ſink down, but to ſtick. Then likewiſe, by way of impoſture, they make a queſtion; as, Who is the faireſt woman in the company? or, Who hath a glove or card? and cauſe another to name divers perſons: and upon every naming they ſtick the croſs in the box, having firſt put it towards their mouth, as if they charmed it; and the croſs ſtirreth 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 ſtick the croſs in the box; and then you ſhall ſee it turn finely and ſoftly three or four turns; which is cauſed by the untwining of the beard by the moiſture. You may ſee it more evidently, if you ſtick the croſs between your fingers, inſtead of the box; and therefore you may ſee, that this motion, which is effected by ſo little wet, is ſtronger than the cloſing or bending of the head of a marygold.

495. IT is reported by ſome, that the herb called *roſa ſolis*, whereof they make ſtrong waters, will, at the noon-day when the ſun ſhineth hot and bright, have a great dew upon it. And therefore, that the right name is *ros ſolis*: which they impute to a delight and ſympathy that it hath with the ſun. Men favour wonders. It were good firſt to be ſure, that the dew that is found upon it, be not the dew of the morning preſerved, when the dew of other herbs is breathed away; for it hath a ſmooth and thick leaf, that doth not diſcharge the dew ſo ſoon as other herbs that are more ſpungy and porous. And it may be purſlane, or ſome other herb, doth the like, and is not marked. But if it be ſo, that it hath more dew at noon than in the morning, then ſure it ſeemeth to be an exudation of the herb itſelf. As plums ſweat when they are ſet into the oven: for you will not, I hope, think, that it is like Gideon's fleece of wool, that the dew ſhould fall upon that and no where elſe.

496. IT is certain, that the honey dews are found more upon oak leaves, than upon aſh, or beech, or the like: but whether any cauſe be from the leaf itſelf to concoct the dew; or whether it be only that the leaf is cloſe and ſmooth, and therefore drinketh not in the dew, but preſerveth it, may be doubted. It would be well enquired, whether manna the drug doth fall but upon certain herbs or leaves only. Flowers that have deep ſockets, do gather in the bottom a kind of honey; as honeyſuckles, both the woodbine and the trefoil, lilies, and the like. And in them certainly the flower beareth part with the dew.

497. THE experience is, that the froth which they call woodſeare, being like a kind of ſpittle, is found but upon certain herbs, and thoſe hot ones; as lavender, lavender-cotton, ſage, hyſſop, *etc.* Of the cauſe of this enquire farther; for it ſeemeth a ſecret. There falleth alſo mildew upon corn, and ſmutteth it; but it may be, that the ſame falleth alſo upon other herbs, and is not obſerved.

498. IT were good trial were made, whether the great conſent between plants and water, which is a principal nouriſhment of them, will make an attraction at diſtance, and not at touch only. Therefore take a veſſel, and in the middle of it make a falſe bottom of coarſe canvas: fill it with earth above the canvas, and let not the earth be watered; then ſow ſome good ſeeds in that earth; but under the canvas, ſome half a foot in the bottom of the veſſel, lay a great ſponge thoroughly wet in water; and let it lie ſo ſome ten days, and ſee whether the ſeeds will ſprout, and the earth become more moiſt, and the ſponge more dry. The experiment

formerly mentioned of the cucumber creeping to the pot of water, is far ſtranger than this.

Experiments in conſort touching the making herbs and fruits medicinable.

499. THE altering of the ſcent, colour, or taſte of fruit, by infuſing, mixing, or letting into the bark, or root of the tree, herb, or flower, any coloured, aromatical, or medicinal ſubſtance, are but fancies. The cauſe is, for that thoſe things have paſſed their period, and nouriſh not. And all alteration of vegetables in thoſe qualities muſt be by ſomewhat that is apt to go into the nouriſhment of the plant. But this is true, that where kine feed upon wild garlick, their milk taſteth plainly of the garlick: and the fleſh of muttons is better taſted where the ſheep feed upon wild thyme, and other wholeſome herbs. Galen alſo ſpeaketh of the curing of the *ſcirrus* of the liver, by milk of a cow that feedeth but upon certain herbs; and honey in Spain ſmelleth apparently of the roſemary or orange, from whence the bee gathereth it: and there is an old tradition of a maiden that was fed with *napellus*; which is counted the ſtrongeſt poiſon of all vegetables, which with uſe did not hurt the maid, but poiſoned ſome that had carnal company with her. So it is obſerved by ſome, that there is a virtuous bezoar, and another without virtue, which appear to the ſhew alike: but the virtuous is taken from the beaſt that feedeth upon the mountains, where there are theriacal herbs; and that without virtue, from thoſe that feed in the valleys where no ſuch herbs are. Thus far I am of opinion; that as ſteeped wines and beers are very medicinal; and likewiſe bread tempered with divers powders; ſo of meat alſo, as fleſh, fiſh, milk, and eggs, that they may be made of great uſe for medicine and diet, if the beaſts, fowl, or fiſh, be fed with a ſpecial kind of food fit for the diſeaſe. It were a dangerous thing alſo for ſecret empoiſonments. But whether it may be applied unto plants and herbs, I doubt more; becauſe the nouriſhment of them is a more common juice; which is hardly capable of any ſpecial quality, until the plant do aſſimilate it.

500. BUT leſt our incredulity may prejudice any profitable operations in this kind, eſpecially ſince many of the ancients have ſet them down, we think good briefly to propound the four means which they have deviſed of making plants medicinable. The firſt is by ſlitting of the root, and infuſing into it the medicine; as hellebore, opium, ſcammony, treacle, *etc.* and then binding it up again. This ſeemeth to me the leaſt probable; becauſe the root draweth immediately from the earth; and ſo the nouriſhment is the more common and leſs qualified: and beſides, it is a long time in going up ere it come to the fruit. The ſecond way is to perforate the body of the tree, and there to infuſe the medicine; which is ſomewhat better: for if any virtue be received from the medicine, it hath the leſs way, and the leſs time to go up. The third is, the ſteeping of the ſeed or 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

the reſt are applied but at one time; and therefore the virtue may the ſooner vaniſh. But ſtill I doubt, that the root is ſomewhat too ſtubborn to receive thoſe fine impreſſions; and beſides, as I ſaid before, they have a great hill to go up. I judge therefore the likelieſt way to be the perforation of the body of the tree in ſeveral places one above the other; and the filling of the holes with dung mingled with the medicine; and the watering of thoſe lumps of dung with ſquirts of an infuſion of the medicine in dunged water, once in three or four days.

NATURAL HISTORY.

CENTURY VI.

Experiments in conſort touching curioſities about fruits and plants.

OUR experiments we take care to be, as we have often ſaid, either *experimenta fructifera*, or *lucifera*; either of uſe, or of diſcovery: for we hate impoſtures, and deſpiſe curioſities. Yet becauſe we muſt apply ourſelves ſomewhat to others, we will ſet down ſome curioſities touching plants.

501. 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 plums, and peaches, and apricots, upon one tree; but I conceive the diverſity of fruits muſt be ſuch as will graft upon the ſame ſtock. And therefore I doubt, whether you can have apples, or pears, or oranges, upon the ſame ſtock upon which you graft plums.

502. It is a curioſity to have fruits of divers ſhapes and figures. This is eaſily performed, by molding them when the fruit is young, with molds of earth or wood. So you may have cucumbers, *etc.* 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 lemons. You may have alſo fruit in more accurate figures, as we ſaid of men, beaſts, or birds, according as you make the molds. Wherein you muſt underſtand, that you make the mold 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 mold works of liquid things. Some doubt may be conceived, that the keeping of the ſun from the fruit may hurt it: but there is ordinary experience of fruit that groweth covered. *Query*, 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 molds partible, glued, or cemented together, that you may open them when you take out the fruit.

503. It is a curioſity to have inſcriptions, or engravings, in fruit or trees. This is eaſily performed, by writing with a needle, or bodkin, or knife, or the like, when the fruit or trees are young; for as they grow, ſo the letters will grow more large and graphical.

---- Teneriſque meos incidere amores
Arboribus; creſcent illae, creſcetis amores.

504. You may have trees appareled 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,

ſlips, of violets, ſtrawberries, wild thyme, camomile, and ſuch like in the earth. Wherein they do but grow in the tree as they do in pots; though, perhaps, with ſome feeding from the trees. It would be tried alſo with ſhoots of vines, and roots of red roſes; for it may be they being of a more ligneous nature, will incorporate with the tree itſelf.

505. IT is an ordinary curioſity to form trees and ſhrubs, as roſemary, juniper, and the like, into ſundry ſhapes; which is done by molding them within, and cutting them without. But they are but lame things, being too ſmall to keep figure: great caſtles made of trees upon frames of timber, with turrets and arches, were matters of magnificence.

506. AMONGST curioſities I ſhall place coloration, though it be ſomewhat better: for beauty in flowers is their preeminence. It is obſerved by ſome, that gilly-flowers, ſweet-williams, violets, that are coloured, if they be neglected, and neither watered, nor new molded, nor tranſplanted, will turn white. And it is probable that the white with much culture may turn coloured. For this is certain, that the white colour cometh of ſcarcity of nouriſhment; except in flowers that are only white, and admit no other colours.

507. IT is good therefore to ſee what natures do accompany what colours; for by that you ſhall have light how to induce colours, by producing thoſe natures. Whites are more inodorate, for the moſt part, than flowers of the ſame kind coloured; as is found in ſingle white violets, white roſes, white gilly-flowers, white ſtock-gilly-flowers, *etc.* We find alſo that bloſſoms of trees, that are white, are commonly inodorate, as cherries, pears, plums; whereas thoſe of apples, crabs, almonds, and peaches, are bluſhy and ſmell ſweet. The cauſe is, for that the ſubſtance that maketh the flower is of the thineſt and fineſt of the plant, which alſo maketh flowers to be of ſo dainty colours. And if it be too ſparing and thin, it attaineth no ſtrength of odour, except it be in ſuch plants as are very ſucculent; whereby they need rather to be ſcanted in their nouriſhment than repleniſhed, to have them ſweet. As we ſee in white ſatyrion, which is of a dainty ſmell; and in bean-flowers, *etc.* And again, if the plant be of nature to put forth white flowers only, and thoſe not thin or dry, they are commonly of rank and fulſome ſmell; as may-flowers, and white lilies.

508. CONTRARIWISE, in berries the white is commonly more delicate and ſweet in taſte than the coloured, as we ſee in white grapes, in white raſps, in white ſtrawberries, in white currants, *etc.* The cauſe is, for that the coloured are more juiced, and coarſer juiced, and therefore not ſo well and equally concocted; but the white are better proportioned to the digeſtion of the plant.

509. BUT in fruits the white commonly is meaner: as in pear-plums, damaſcenes, *etc.* and the choiceſt plums are black; the mulberry, which though they call it a berry, is a fruit, is better the black than the white. The harveſt white plum is a baſe plum; and the verdoccio, and white date-plum, are no very good plums. 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 plums are a little dry, and come from the ſtone; as the muſcle-plum, the damaſcene-plum, the peach, the apricot, *etc.* yet ſome fruits, which grow not to be black, are of the nature of berries, ſweeteſt ſuch as are paler; as the cœur-cherry, which inclineth more to white, is ſweeter than the red; but the egriot is more ſour.

510. TAKE

510. TAKE gilly-flower ſeed, of one kind of gilly-flower, as of the clove-gilly-flower, which is the moſt common, and ſow it, and there will come up gilly-flowers, ſome of one colour, and ſome of another, caſually, as the ſeed meeteth with nouriſhment in the earth; ſo that the gardeners find, 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 meet 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 ſeemeth, 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, monks-hood, poppy and holyoak.

511. FEW fruits are coloured red within; the queen-apple is; and another apple, called the roſe apple; mulberries likewiſe, and grapes, though moſt toward the ſkin. There is a peach alſo that hath a circle of red towards the ſtone: and the egriot cherry is ſomewhat red within; but no pear, nor warden, nor plum, nor apricot, although they have, many times, red ſides, are coloured red within. The cauſe may be inquired.

512. THE general colour of plants is green, which is a colour that no flower is of. There is a greeniſh primroſe, but it is pale and ſcarce a green. The leaves of ſome trees turn a little murry or rediſh; and they be commonly young leaves that do ſo; as it is in oaks, and vines, and hazle. Leaves rot into a yellow, and ſome hollies have part of their leaves yellow, and 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 towards the north or north-eaſt. Some roots are yellow, as carrots; and ſome plants blood-red, ſtalk and leaf, and all, as amaranthus. Some herbs incline to purple and red; as a kind of ſage doth, and a kind of mint, and *roſa ſolis*, *etc.* And ſome have white leaves, as another kind of ſage, and another kind 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 coarſe and common.

513. 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 neglecting and not removing, prove ſingle. And the way to do it ſpeedily, is to ſow or ſet ſeeds or ſlips of flowers; and as ſoon as they come up, to remove them into new ground that is good. Inquire alſo, whether inoculating of flowers, as ſtock-gilly-flowers, roſes, muſk-roſes, *etc.* doth not make them double. There is a cherry-tree that hath double bloſſoms; but that tree beareth no fruit: and it may be, that the ſame means which, applied to the tree, doth extremely accelerate the ſap to riſe and break forth, would make the tree ſpend itſelf in flowers, and thoſe to become double; which were a great pleaſure to ſee, eſpecially in apple-trees, peach-trees, and almond-trees, that have bloſſoms bluſh-coloured.

514. THE making of fruits without core or ſtone, is likewiſe a curioſity, and ſomewhat better: becauſe whatſoever maketh them ſo, is like to make them more tender and delicate. If a cion 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

viding a quick tree down to the ground, and taking out the pith, and then binding it up again.

515. IT is reported alſo, that a citron grafted upon a quince will have ſmall or no ſeeds; and it is very probable, that any ſour fruit grafted upon a ſtock that beareth a ſweeter fruit, may both make the fruit ſweeter, and more void of the harſh matter of kernels or ſeeds.

516. IT is reported, that not 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 through, 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.

517. IT is reported, that trees watered perpetually with warm water, will make a fruit with little or no core or ſtone. And the rule is general, that whatſoever will make a wild tree a garden tree, will make a garden tree to have leſs core or ſtone.

Experiments in conſort touching the degenerating of plants, and of the tranſmutation of them one into another.

518. THE rule is certain, that plants for want of culture degenerate to be baſer in the ſame kind; and ſometimes ſo far, as to change into another kind. 1. The ſtanding long, and not being removed, maketh them degenerate. 2. Drought, unleſs the earth of itſelf be moiſt, doth the like. 3. So doth removing into worſe earth, or forbearing to compoſt the earth; as we ſee that water mint turneth into field mint, and the colewort into rape, by neglect, *etc.*

519. WHATSOEVER fruit uſeth to be ſet upon a root or a ſlip, if it be ſown, will degenerate. Grapes ſown, figs, almonds, pomgranate kernels ſown, make the fruits degenerate and become wild. And again, moſt of thoſe fruits that uſe to be grafted, if they be ſet of kernels, or ſtones, degenerate. It is true that peaches, as hath been touched before, do better upon ſtones ſet than upon grafting: and the rule of exception ſhould ſeem to be this: that whatſoever plant requireth much moiſture, proſpereth better upon the ſtone or kernel, than upon the graft. For the ſtock, though it giveth a finer nouriſhment, yet it giveth a ſcantier than the earth at large.

520. SEEDS, if they be very old, and yet have ſtrength enough to bring forth a plant, make the plant degenerate. And therefore ſkilful gardeners make trial of the ſeeds before they buy them, whether they be good or no, by putting them into water gently boiled; and if they be good, they will ſprout within half an hour.

521. IT is ſtrange which is reported, that baſil too much expoſed to the ſun doth turn unto wild thyme; although thoſe two herbs ſeem to have ſmall affinity; but baſil is almoſt the only hot herb that hath fat and ſucculent leaves; which oilineſs, if it be drawn forth by the ſun, it is like it will make a very great change.

522. THERE is an old tradition, that boughs of oak put into the earth will put forth wild vines: which if it be true, no doubt it is not the oak that turneth into a vine, but the oak bough putrifying, qualifieth the earth to put forth a vine of itſelf.

523. 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 ſcanty of juice to put forth the former tree; and therefore putteth forth a tree of a ſmaller kind that needeth leſs nouriſhment.

524. THERE is an opinion in the country, that if the ſame ground be oft ſown with the grain that grew upon it, it will in the end grow to be of a baſer kind.

525. IT is certain, that in very ſteril years corn ſown will grow to another kind.

Grandia ſaepe quibus mandavimus hordea ſulcis,
Infelix lolium, et ſteriles dominantur avenae.

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 naturae*; 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 appear ſome manifeſt inſtances of it, the opinion of impoſſibility is to be rejected, and the means thereof to be found out. We ſee, that in living creatures, that come of putrefaction, there is much tranſmutation of one into another; as caterpillars turn into flies, *etc.* 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 lock-eth and boundeth in the creature, that it doth not expatiate. So as we may well conclude, that ſeeing the earth of itſelf 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 our work of *Sylva ſylvarum* account it ſtrange, or think that it is an over-haſte, that we have ſet down particulars untried; for contrariwiſe, in our own eſtimation, we acccount ſuch particulars more worthy than thoſe that are already tried and known: for theſe latter muſt be taken as you find them; but the other do level point-blank at the inventing of cauſes and axioms.

526. FIRST therefore, you muſt make account that if you will have one plant change into another, you muſt have the nouriſhment over-rule the ſeed; and therefore you are to practiſe it by nouriſhments as contrary as may be to the nature of the herb, ſo nevertheleſs as the herb may grow; and likewiſe with ſeeds that are of the weakeſt ſort, and have leaſt vigour. 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 plot: ſo contrariwiſe, plant buſhes, heath, ling, and brakes, upon a wet or marſh ground. This I conceive alſo, that all eſculent and garden herbs, ſet upon the tops of hills, will prove more medicinal, though leſs eſculent than they were before. And it may be likewiſe, ſome wild herbs you may make ſalad-herbs. This is the firſt rule for tranſmutation of plants.

527. THE ſecond rule ſhall be to bury ſome few ſeeds of the herb you would change, amongſt other ſeeds; and then you ſhall ſee, whether the juice of thoſe other ſeeds do not ſo qualify the earth, as it will alter the ſeed whereupon you work. As for example; put parſley ſeed amongſt onion ſeed, or lettuce ſeed amongſt parſley ſeed, or baſil ſeed amongſt thyme ſeed; and ſee the change of taſte or otherwiſe.

wiſe. But you ſhall do well to put the ſeed you would change into a little linen cloth, that it mingle not with the foreign ſeed.

528. THE third rule ſhall be, the making of ſome medley or mixture of earth with ſome other plants bruiſed or ſhaven either in leaf or root: as for example, make earth with a mixture of colewort leaves ſtamped, and ſet in it artichokes or parſnips; ſo take earth made with marjoram, or origanum, or wild thyme, bruiſed or ſtamped, and ſet in it fennel ſeed, *etc.* 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 that there will be a new confection of mold, which perhaps will alter the ſeed, and yet not to the kind of the former herb.

529. THE fourth rule ſhall be, to mark what herbs ſome earths do put forth of themſelves; and to take that earth, and to pot it, or to veſſel it; and in that to 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 find, without any ſtring or root of the nettles; and pot that earth, and ſet in it ſtock-gilly-flowers, or wall-flowers, *etc.* 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 itſelf, whereof you ſhall find ſome inſtances following, and ſow in it purſlane ſeed, or lettuce ſeed; for in theſe experiments, it is likely enough that the earth being accuſtomed to ſend forth one kind of nouriſhment, will alter the new ſeed.

530. THE fifth rule ſhall be, to make the herb grow contrary to its nature; as to make ground-herbs riſe in height: as for example, carry camomile, or wild thyme, or the green ſtrawberry, upon ſticks, as you do hops upon poles; and ſee what the event will be.

531. THE ſixth rule ſhall be, to make plants grow out of the ſun or open air; for that is a great mutation in nature, and may induce a change in the ſeed: as barrel up earth, and ſow ſome ſeed in it, and put it in the bottom of a pond; or put it in ſome great hollow tree; try alſo the ſowing of ſeeds in the bottoms of caves; and pots with ſeeds ſown, hanged up in wells ſome diſtance from the water, and ſee what the event will be.

Experiments in conſort touching the procerity, and lowneſs, and artificial dwarfing of trees.

532. IT is certain, that timber trees in coppice woods grow more upright, and more free from under-boughs, than thoſe that ſtand in the fields: the cauſe whereof is, for that plants have a natural motion to get to the ſun; and beſides, they are not glutted with too much nouriſhment; for that the coppice ſhareth with them; and repletion ever hindereth ſtature: laſtly, they are kept warm; and that ever in plants helpeth mounting.

533. 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 tenuity of juice, both which ſend the ſap upwards. As for juniper, it is but a ſhrub, and groweth not big enough in body to maintain a tall tree.

534. IT is reported, that a good ſtrong canvas ſpread over a tree grafted low, ſoon after it putteth forth, will dwarf it, and make it ſpread. The cauſe is plain; for that all things that grow, will grow as they find room.

535. TREES are generally ſet of roots or kernels; but if you ſet them of ſlips, as of ſome trees you may, by name the mulberry, ſome of the ſlips will take; and thoſe that take, as is reported, will be dwarf trees. The cauſe is, for that a ſlip draweth nouriſhment more weakly than either a root or kernel.

536. ALL plants that put forth their ſap haſtily, have their bodies not proportionable to their length; and therefore they are winders and creepers; as ivy, briony, hops, woodbine: whereas dwarfing requireth a ſlow putting forth, and leſs vigour of mounting.

Experiments in conſort touching the rudiments of plants, and of the excreſcences of plants, or ſuper-plants.

THE Scripture ſaith, 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 mold of earth or bark.

537. Moss groweth chiefly upon ridges of houſes tiled or thatched, and upon the creſts of walls: and that moſs is of a lightſome and pleaſant green. The growing upon ſlopes is cauſed, for that moſs, as on the one ſide it cometh of moiſture and water, ſo on the other ſide the water muſt but ſlide, and not ſtand or pool. And the growing upon tiles, or walls, *etc.* is cauſed, for that thoſe dried earths, having not moiſture ſufficient to put forth a plant, do practiſe germination by putting forth moſs; though when, by age or otherwiſe, they grow to relent and reſolve, they ſometimes put forth plants, as wall-flowers. And and almoſt all moſs hath here and there little ſtalks, beſides the low thrum.

538. Moss groweth upon alleys, eſpecially ſuch as lie cold and upon the north; as in divers terraſes: and again, if they be much troden; or if they were at the firſt graveled; for whereſoever plants are kept down, the earth putteth forth moſs.

539. OLD ground, that hath been long unbroken up, gathereth moſs: and therefore huſbandmen uſe to cure their paſture grounds when they grow to moſs, by tilling them for a year or two: which alſo dependeth upon the ſame cauſe; for that the more ſparing and ſtarving juice of the earth, inſufficient for plants, doth breed moſs.

540. OLD trees are more moſſy 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 moſs.

541. FOUNTAINS have moſs growing upon the ground about them; *Muſcoſi fontes*; The cauſe is, for that the fountains drain the water from the ground adjacent, and leave but ſufficient moiſture to breed moſs: and beſides, the coldneſs of the water conduceth to the ſame.

542. THE moſs of trees is a kind of hair; for it is the juice of the tree that is excerned, and doth not aſſimilate. And upon great trees the moſs gathereth a figure like a leaf.

543. THE moiſter ſort of trees yield little moſs; as we ſee in aſps, poplars, willows, beeches, *etc.* which is partly cauſed for the reaſon that hath been given, of the frank putting up of the ſap into the boughs; and partly for that the barks of thoſe trees are more cloſe and ſmooth, than thoſe of oaks and aſhes; whereby the moſs can the hardlier iſſue out.

544. IN clay-grounds all fruit-trees grow full of moſs, both upon body and boughs; which is cauſed partly by the coldneſs of the ground, whereby the plants nouriſh

nouriſh leſs; and partly by the toughneſs of the earth, whereby the ſap is ſhut in, and cannot get up to ſpread ſo frankly as it ſhould do.

545. WE have ſaid heretofore, that if trees be hide-bound, they wax leſs fruitful, and gather moſs; and that they are holpen by hacking, *etc.* And therefore, by the reaſon of contraries, if trees be bound in with cords, or ſome outward bands, they will put forth more moſs: which, I think, happeneth to trees that ſtand bleak, and upon the cold winds. It ſhould alſo be tried, whether, if you cover a tree ſomewhat thick upon the top after his polling, it will not gather more moſs. I think alſo the watering of trees with cold fountain water, will make them grow full of moſs.

546. THERE is a moſs the perfumers have, which cometh out of apple trees, that hath an excellent ſcent. *Query*, particularly for the manner of the growth, and the nature of it. And for this experiment's ſake, being a thing of price, I have ſet down the laſt experiments how to multiply and call on moſſes.

NEXT unto moſs, I will ſpeak of muſhrooms; which are likewiſe an imperfect plant. The muſhrooms 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 unſown. And therefore ſuch as are upſtarts in ſtate, they call in reproach muſhrooms. It muſt needs be therefore, that they be made of much moiſture; and that moiſture, fat, groſs, and yet ſomewhat concocted. And, indeed, we find that muſhrooms cauſe the accident which we call *incubus*, or the mare in the ſtomach. And therefore the ſurfeit of them may ſuffocate and empoiſon. And this ſheweth, that they are windy; and that windineſs is groſs and ſwelling, not ſharp or griping. And upon the ſame reaſon muſhrooms are a venereous meat.

547. 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 muſhrooms at all ſeaſons of the year fit to be eaten. Some add to the mixture leaven of bread diſſolved in water.

548. IT is reported, that if a hilly field where the ſtubble is ſtanding, be ſet on fire in a ſhowery ſeaſon, it will put forth great ſtore of muſhrooms.

549. IT is reported, that hartſhorn, ſhaven, or in ſmall pieces, mixed with dung and watered, putteth up muſhrooms. And we know hartſhorn is of a fat and clammy ſubſtance: and it may be ox-horn would do the like.

550. IT hath been reported, though it be ſcarce credible, that ivy hath grown out of a ſtag's horn; which they ſuppoſe did rather come from a confrication of the horn upon the ivy, than from the horn itſelf. There is not known any ſubſtance but earth, and the procedures of earth, as tile, ſtone, *etc.* that yieldeth any moſs or herby ſubſtance. There may be trial made of ſome ſeeds, as that of fennel-ſeed, muſtard-ſeed, and rape-ſeed, put into ſome little holes made in the horns of ſtags, or oxen, to ſee if they will grow.

551. THERE is alſo another imperfect plant, that in ſhew is like a great muſhroom: and it is ſometimes as broad as one's hat; which they call a toad's ſtool: but it is not eſculent; and it groweth, commonly, by a dead ſtub of a tree, and likewiſe about the roots of rotten trees: and therefore ſeemeth to take his juice from wood putrified. Which ſheweth, by the way, that wood putrified yieldeth a frank moiſture.

552. THERE is a cake that groweth upon the ſide of a dead tree, that hath gotten no name, but it is large and of a cheſtnut colour, and hard and pithy; whereby it ſhould ſeem, that even dead trees forget not their putting forth; no more than the carcaſes of mens bodies, that put forth hair and nails for a time.

553. THERE

553. THERE is a cod, or bag, that groweth commonly in the fields; that at the firſt is hard like a tennis-ball, and white; and after groweth of a muſhroom colour, and full of light duſt upon the breaking; and is thought to be dangerous for the eyes if the powder get into them; and to be good for kibes. Belike it hath a corroſive and fretting nature.

554. THERE is an herb called Jews-ear, that groweth upon the roots and lower parts of the bodies of trees; eſpecially of elders, and ſometimes aſhes. It hath a ſtrange property; for in warm water it ſwelleth, and openeth extremely. It is not green, but of a duſky brown colour. And it is uſed for ſquinancies and inflammations in the throat; whereby it ſeemeth to have a mollifying and lenifying virtue.

555. THERE is a kind of ſpungy excreſcence, which groweth chiefly upon the roots of the laſer-tree; and ſometimes upon cedar and other trees. It is very white, and light, and friable; which we call agaric. It is famous in phyſic for the purging of tough phlegm. And it is alſo an excellent opener for the liver; but offenſive to the ſtomach: and in taſte, it is at the firſt ſweet, and after bitter.

556. WE find no ſuper-plant that is a formed plant, but miſſeltoe. They have an idle tradition, that there is a bird called a miſſel bird, that feedeth upon a ſeed, which many times ſhe cannot digeſt, and ſo expelleth it whole with her excrement: which falling upon a bough of a tree that hath ſome rift, putteth forth the miſſeltoe. But this is a fable; for it is not probable that birds ſhould feed upon what they cannot digeſt. But allow that, yet it cannot be for other reaſons: for firſt, it is found but upon certain trees; and thoſe trees bear no ſuch fruit, as may allure that bird to ſit and feed upon them. It may be, that bird feedeth upon the miſſeltoe-berries, and ſo is often found there; which may have given occaſion to the tale. But that which maketh an end of the queſtion is, that miſſeltoe hath been found to put forth under the boughs, and not only above the boughs; ſo it cannot be any thing that falleth upon the bough. Miſſeltoe groweth chiefly upon crab-trees, apple-trees, ſometimes upon hazles, and rarely upon oaks; the miſſeltoe whereof is counted very medicinal. It is ever green winter and ſummer; and beareth a white gliſtering berry: and it is a plant utterly differing from the plant upon which it groweth. Two things therefore may be certainly ſet down: firſt, that ſuper-fœtation muſt be by abundance of ſap in the bough that putteth it forth: ſecondly, that that ſap muſt be ſuch as the tree doth excern, and cannot aſſimilate; for elſe it would go into a bough; and beſides, it ſeemeth to be more fat and unctuous than the ordinary ſap of the tree; both by the berry, which is clammy; and by that it continueth green winter and ſummer, which the tree doth not.

557. THIS experiment of miſſeltoe may give light to other practices. Therefore trial ſhould be made by ripping of the bough of a crab-tree in the bark; and watering of the wound every day with warm water dunged, to ſee if it would bring forth miſſeltoe, or any ſuch like thing. But it were yet more likely to try it with ſome other watering or anointing, that were not ſo natural to the tree as water is; as oil, or barm of drink, *etc.* ſo they be ſuch things as kill not the bough.

558. IT were good to try, what plants would put forth, if they be forbidden to put forth their natural boughs: poll therefore a tree, and cover it ſome thickneſs with clay on the top, and ſee what it will put forth. I ſuppoſe it will put forth roots; for ſo will a cion, being turned down into clay: therefore, in this experiment alſo, the tree ſhould be cloſed with ſomewhat that is not ſo natural to the plant as clay is.

Try

Try it with leather, or cloth, or painting, ſo it be not hurtful to the tree. And it is certain, that a brake hath been known to grow out of a pollard.

559. A MAN may count the prickles of trees to be a kind of excreſcence; for they will never be boughs, nor bear leaves. The plants that have prickles are thorns, black and white; brier, 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 venomous prickle; ſo hath borage, but harmleſs. The cauſe muſt be haſty putting forth, want of moiſture, and the cloſeneſs of the bark; for the haſte of the ſpirit to put forth, and the want of nouriſhment to put forth a bough, and the cloſeneſs of the bark, cauſe prickles in boughs; and therefore they are ever like a *pyramis*, for that the moiſture ſpendeth after a little putting forth. And for prickles in leaves, they come alſo of putting forth more juice into the leaf than can ſpread in the leaf ſmooth, and therefore the leaves otherwiſe 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.

560. THERE be alſo plants, that though they have no prickles, yet they have a kind of downy or velvet rind upon their leaves; as roſe-campion, ſtock-gilly-flowers, colts-foot; which down or knap cometh of a ſubtil ſpirit, in a ſoft or fat ſubſtance. For it is certain, that both ſtock-gilly-flowers and roſe-campions, ſtamped, have been applied, with ſucceſs to the wriſts of thoſe that have had tertian and quartan agues; and the vapour of colts-foot hath a ſanative virtue towards the lungs; and the leaf alſo is healing in ſurgery.

561. ANOTHER kind of excreſcence is an exudation of plants joined with putrefaction; 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 peſtilent year; which is a likely thing, becauſe they grow of corruption.

562. THERE is alſo upon ſweet, or other brier, a fine tuft or bruſh of moſs of divers colours; which if you cut you ſhall ever find full of little white worms.

Experiments in conſort touching the producing of perfect plants without ſeed.

563. IT it certain, that earth taken out of the foundations of vaults and houſes, and bottoms of wells, and then put into pots, will put forth ſundry kinds of herbs: but ſome time is required for the germination; for if it be taken but from a fathom deep, it will put forth the firſt year; if much deeper, not till after a year or two.

564. THE nature of the plants growing out of earth ſo taken up, doth follow the nature of the mold itſelf; as if the mold be ſoft and fine it putteth forth ſoft herbs; as graſs, plantain, and the like; if the earth be harder and coarſer, it putteth forth herbs more rough, as thiſtles, firs, *etc.*

565. IT is common experience, that where alleys are cloſe gravelled, the earth putteth forth the firſt year knot graſs, and after ſpire graſs. The cauſe is, for that the hard gravel or pebble at the firſt laying will not ſuffer the graſs to come forth upright, but turneth it to find his way where it can; but after that the earth is ſomewhat looſened at the top, the ordinary graſs cometh up.

566. IT

566. IT is reported, that earth being taken out of ſhady and watry woods ſome depth, and potted, will put forth herbs of a fat and juicy ſubſtance; as penny-wort, purſlane, houſleek, penny-royal, *etc.*

567. THE water alſo doth ſend forth plants that have no roots fixed in the bottom; but they are leſs perfect plants, being almoſt but leaves, and thoſe ſmall ones; ſuch is that we call duck-weed, which hath a leaf no bigger than a thyme leaf, but of a freſher green, and putteth forth a little ſtring into the water far from the bottom. As for the water lily, it hath a root in the ground; and ſo have a number of other herbs that grow in ponds.

568. IT is reported by ſome of the ancients, and ſome modern teſtimony likewiſe, that there be ſome plants that grow upon the top of the ſea, being ſuppoſed to grow of ſome concretion of ſlime from the water, where the ſun beateth hot, and where the ſea ſtirreth little. As for *alga marina*, ſea weed, and *eryngium*, ſea thiſtle, both have roots; but the ſea weed under the water, the ſea thiſtle but upon the ſhore.

569. THE ancients have noted, that there are ſome herbs that grow out of ſnow laid up cloſe together and putrified, and that they are all bitter; and they name one ſpecially, *ſlomus*, which we call moth-mullein. 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 free-ſtone. We ſee alſo that flints, lying above ground, gather moſs; and wall-flowers, and ſome other flowers, grow upon walls; but whether upon the main brick or ſtone, or whether out of the lime or chinks, is not well obſerved: for alders and aſhes have been ſeen to grow out of ſteeples; but they manifeſtly grow out of clefts; inſomuch 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 mold 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 work-folks uſe to ſay they have magical virtue, and will not ſuffer men to gather them.

572. The ſea ſands 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 its 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, *etc.* of which *vide* the experiment 29.

Experiments in conſort touching foreign plants.

574. IT is reported, that earth that was brought out of the Indies, and other remote countries for ballaſt of ſhips, caſt 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

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 countries will endeavour 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 countries tranſlated 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 ſo the virtue 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 countries, being ſet in the colder, will nevertheleſs, even in thoſe cold countries, being ſown of ſeeds late in the ſpring, come up and abide moſt part of the ſummer; as we find it in orange and lemon ſeeds, *etc.* the ſeeds whereof ſown in the end of April will bring forth excellent ſalads, mingled with other herbs. And I doubt not, but the ſeeds of clove trees, and pepper ſeeds, *etc.* if they could come hither green enough to be ſown, would do the like.

Experiments in conſort touching the ſeaſons in which plants come forth.

577. 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 primroſes, violets, anemonies, water-daffadillies, *crocus vernus*, and ſome early tulips. 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 find a little warmth than an hot. And thoſe that come next after, are wall-flowers, cowſlips, hyacinths, roſemary flowers, *etc.* and after them, pinks, roſes, flower-de-luces, *etc.* and the lateſt are gilly-flowers, holyoaks, larksfoot, *etc.* The earlieſt bloſſoms are the bloſſoms of peaches, almonds, cornelians, mezerions, *etc.* 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 find the ſun ſooner than the drier trees. The grains are, firſt rye and wheat; then oats and barley; then peas and beans. For though green peas and beans be eaten ſooner, yet the dry ones that are uſed for horſe meat, are ripe laſt; and it ſeemeth that the fatter grain cometh firſt. The earlieſt fruits are ſtrawberries, cherries, gooſeberries, currans; and after them early apples, early pears, apricots, raſps; and after them, damaſcenes, and moſt kind of plums, peaches, *etc.* and the lateſt are apples, wardens, grapes, nuts, quinces, almonds, ſloes, brier-berries, hips, medlars, ſervices, cornelians, *etc.*

578. IT is to be noted, that, commonly, trees that ripen lateſt, bloſſom ſooneſt; as peaches, cornelians, ſloes, almonds, *etc.* 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.

579. THERE be fruits, but rarely, that come twice a year; as ſome pears, ſtrawberries, *etc.* 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 violet alſo, amongſt flowers, cometh twice a year, eſpecially the double white; and that alſo is a plant full of moiſture. Roſes come twice, but it is not without cutting, as hath been formerly ſaid.

580. In Muſcovy, 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 kind 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 for the later; and not that the later cometh ſooner.

581. There be divers fruit trees in the hot countries, which have bloſſoms, and young fruit, and ripe fruit, almoſt all the year, ſucceeding one another. And it is ſaid the orange hath the like with us, for a great part of ſummer; and ſo alſo hath the fig. And no doubt the natural motion of plants is to have ſo; but that either they want juice to ſpend; or they meet with the cold of the winter: and therefore this circle of ripening cannot be but in ſucculent plants and hot countries.

582. Some herbs are but annual, and die, root and all, once a year; as borage, lettuce, cucumbers, muſk-melons, baſil, tobacco, muſtard-ſeed, and all kinds of corn: ſome continue many years; as hyſſop, germander, lavender, fennel, *etc.* 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, *etc.* and therefore none of theſe are hot. The other cauſe is, for that ſome herbs can worſe endure cold; as baſil, tobacco, muſtard-ſeed. And theſe have all much heat.

Experiments in conſort touching the laſting of herbs and trees.

583. The laſting of plants is moſt in thoſe that are largeſt of body; as oaks, elm, cheſtnut, the loat-tree, *etc.* and this holdeth in trees; but in herbs it is often contrary: for borage, colewort, pompions, which are herbs of the largeſt ſize, are of ſmall durance; whereas hyſſop, winter-ſavoury, germander, thyme, ſage, will laſt long. The cauſe is, for that trees laſt according to the ſtrength and quantity of their ſap and juice; being well munited 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.

584. Trees that bear maſt, and nuts, are commonly more laſting than thoſe that bear fruits; eſpecially the moiſter fruits: as oaks, beeches, cheſtnuts, walnuts, almonds, pine trees, *etc.* laſt longer than apples, pears, plums, *etc.* The cauſe is the fatneſs and oilineſs of the ſap; which ever waſteth leſs than the more watry.

585. Trees that bring forth their leaves late in the year, and caſt them likewiſe late, are more laſting than thoſe that ſprout their leaves early, or ſhed them betimes. The cauſe is, for that the late coming forth ſheweth a moiſture more fixed; and the other more looſe, and more eaſily reſolved. And the ſame cauſe is, that wild trees laſt longer than garden trees; and in the ſame kind, thoſe whoſe fruit is acid, more than thoſe whoſe fruit is ſweet.

586. Nothing procureth the laſting of trees, buſhes and herbs ſo much as often cutting: for every cutting cauſeth 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; inſomuch as annual plants, if you cut them ſeaſonably, and will ſpare the uſe of them, and

ſuffer

ſuffer them to come up ſtill young, will laſt more years than one, as hath been partly touched; ſuch as is lettuce, purſlane, cucumber, and the like. And for great trees, we ſee almoſt all overgrown trees in church-yards, or near ancient buildings, and the like, are pollards, or dottards, and not trees at their full height.

587. SOME experiment ſhould be made, how by art to make plants more laſting than their ordinary period; as to make a ſtalk of wheat, *etc.* laſt a whole year. You muſt ever preſuppoſe, that you handle it ſo as the winter killeth it not; for we ſpeak only of prolonging the natural period. I conceive that the rule will hold, that whatſoever maketh the herb come later than its time, will make it laſt longer time: it were good to try it in a ſtalk of wheat, *etc.* ſet in the ſhade, and encompaſſed with a caſe of wood, not touching the ſtraw, to keep out open air.

As for the preſervation of fruits and plants, as well upon the tree or ſtalk, as gathered, we ſhall handle it under the title of conſervation of bodies.

Experiments in conſort touching the ſeveral figures of plants.

588. 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 rind and bark, breaketh not forth at all, as in the bodies of trees, and ſtalks of herbs, till they begin to branch; and then when they make an eruption, they break forth caſually, where they find beſt way in the bark or rind. It is true, that ſome trees are more ſcattered in their boughs; as ſallow-trees, warden-trees, quince-trees, medlar-trees, lemon-trees, *etc.* ſome are more in the form of a pyramis, and come almoſt to todd; as the pear-tree, which the critics will have to borrow his name of πυρ, fire, orange-trees, fir-trees, ſervice-trees, lime-trees, *etc.* and ſome are more ſpread and broad; as beeches, hornbeam, *etc.* the reſt are more indifferent. The cauſe of ſcattering the boughs, is the haſty breaking forth of the ſap; and therefore thoſe trees riſe not in a body of any height, but branch near the ground. The cauſe of the pyramis is the keeping in of the ſap long before it branch; and the ſpending of it, when it beginneth to branch, by equal degrees. The ſpreading is cauſed by the carrying up of the ſap plentifully, without expence; and then putting it forth ſpeedily and at once.

589. 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 joints or knuckles, as it were ſtops in their germination; as have gilly-flowers, pinks, fennel, corn, reeds, and canes. The cauſe whereof is, for that the ſap aſcendeth unequally, and doth, as it were, tire and ſtop by the way. And it ſeemeth they have ſome cloſeneſs and hardneſs in their ſtalk, which hindereth the ſap from going up, until it hath gathered into a knot, and ſo is more urged to put forth. And therefore they are moſt of them hollow when the ſtalk is dry, as fennel-ſtalk, ſtubble, and canes.

590. FLOWERS all have exquiſite figures; and the flower numbers are chiefly five, and four; as in primroſes, brier roſes, ſingle muſk roſes, ſingle pinks, and gilly-flowers, *etc.* which have five leaves: lilies, flower-de-luces, borage, bugloſs, *etc.* which have four leaves. But ſome put forth leaves not numbered; but they are ever ſmall ones; as marygold, trefoils, *etc.* We ſee alſo, that the ſockets and ſupporters of flowers are figured; as in the five brethren of the roſe, ſockets of gilly-flowers, *etc.* 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 gilly-flowers, to be like the inequality of oak leaves, or vine leaves, or the like: but they ſeldom or never have any ſmall purls.

Experiments in conſort touching ſome principal differences in plants.

591. OF plants, ſome few put forth their bloſſoms before their leaves; as almonds, peaches, cornelians, black thorn, *etc.* but moſt put forth ſome leaves before their bloſſoms; as apples, pears, plums, cherries, white thorn, *etc.* The cauſe is, for that thoſe that put forth their bloſſoms firſt, have either an acute and ſharp ſpirit, and therefore commonly they all put forth early in the ſpring, and ripen very late; as moſt of the particulars before mentioned, or elſe an oily juice, which is apter to put out flowers than leaves.

592. OF plants, ſome are green all winter; others caſt their leaves. There are green all winter, holly, ivy, box, fir, yew, cypreſs, juniper, bays, roſemary, *etc.* The cauſe of the holding green, is the cloſe and compact ſubſtance of their leaves, and the pedicles of them. And the cauſe of that again is either the tough and viſcous juice of the plant, or the ſtrength and heat thereof. Of the firſt ſort is holly; which is of ſo viſcous a juice, as they make birdlime of the bark of it. The ſtalk of ivy is tough, and not fragile, as we ſee in other ſmall twigs dry. Fir yieldeth pitch. Box is a faſt and heavy wood, as we ſee it in bowls. Yew is a ſtrong and tough wood, as we ſee it in bows. Of the ſecond ſort 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 for the leaves, their denſity appeareth, in that either they are ſmooth and ſhining, as in bays, holly, ivy, box, *etc.* or in that they are hard and ſpiry, as in the reſt. And trial ſhould be made of grafting of roſemary, and bays, and box, upon a holly-ſtock; becauſe they are plants that come all winter. It were good to try it alſo with grafts of other trees, either fruit trees, or wild trees; to 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.

593. THERE be ſome plants that bear no flower, and yet bear fruit: there be ſome that bear flowers and no fruit: there be ſome that bear neither flowers nor fruit. Moſt of the great timber trees, as oaks, beeches, *etc.* bear no apparent flowers; ſome few likewiſe of the fruit trees; as mulberry, walnut, *etc.* and ſome ſhrubs, as juniper, holly, *etc.* bear no flowers. Divers herbs alſo bear ſeeds, which is as the fruit, and yet bear no flowers; as purſlane, *etc.* Thoſe that bear flowers and no fruit are few; as the double cherry, the ſallow, *etc.* But for the cherry, it is doubtful whether it be not by art or culture; for if it be by art, then trial ſhould be made, whether apple, and other fruits bloſſoms, may not be doubled. There are ſome few that bear neither fruit nor flower; as the elm, the poplars, box, brakes, *etc.*

594. THERE be ſome plants that ſhoot ſtill upwards, and can ſupport themſelves; as the greateſt part of trees and plants: there be ſome other that creep along the ground; or wind about other trees or props, and cannot ſupport themſelves; as vines, ivy, brier, briony, woodbines, hops, climatis, camomile, *etc.* The cauſe is, as hath been partly touched, for that all plants naturally move upwards; but if the ſap put up too faſt, it maketh a ſlender ſtalk, which will not ſupport the weight: and therefore theſe latter ſort are all ſwift and haſty comers.

Experiments

Experiments in conſort touching all manner of compoſts, and helps of ground.

595. 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, or a ſmall quantity of ground, excelleth. The ordering of dung is, if the ground be arable, to ſpread it immediately before the ploughing and ſowing; and ſo to plough it in: for if you ſpread it long before, the ſun will draw out much of the fatneſs of the dung: if the ground be grazing ground, to ſpread it ſomewhat late towards winter; that the ſun may have the leſs power to dry it up. As for ſpecial compoſts for gardens, as a hot bed, *etc.* we have handled them before.

596. THE ſecond kind of compoſt is, the ſpreading of divers kinds of earths; as marle, chalk, ſea ſand, earth upon earth, pond earth; and the mixtures of them. Marle is thought to be the beſt, as having moſt fatneſs; and not heating the ground too much. The next is ſea ſand, which no doubt obtaineth a ſpecial virtue by the ſalt: for ſalt is the firſt rudiment of life. Chalk over-heateth the ground a little; and therefore is beſt upon cold clay grounds, or moiſt grounds: but I heard a great huſband ſay, that it was a common error, to think that chalk helpeth arable grounds, but helpeth not grazing grounds; whereas indeed it helpeth graſs 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 graſs, becauſe the ground is tired out. It were good to try the laying of chalk upon arable 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 compoſteth itſelf; for I knew a great garden that had a field, in a manner, poured upon it; and it did bear fruit excellently the firſt year of the planting: for the ſurface of the earth is ever the fruitfulleſt. And earth ſo prepared hath a double ſurface. But it is true, as I conceive, that ſuch earth as hath ſalt-petre bred in it, if you can procure it without too much charge, doth excel. The way to haſten the breeding of ſalt-petre, 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 plank the ground over, it will breed ſalt-petre. As for pond earth, or river earth, it is a very good compoſt; eſpecially if the pond have been long uncleanſed, and ſo the water be not too hungry: and I judge it will be yet better if there be ſome mixture of chalk.

597. THE third help of ground is, by ſome other ſubſtances that have a virtue to make ground fertile, though they be not merely earth: wherein aſhes excel; inſomuch as the countries about Ætna and Veſuvius have a kind of amends made them, for the miſchief the irruptions many times do, by the exceeding fruitfulneſs of the ſoil, cauſed by the aſhes ſcattered about. Soot alſo, though thin ſpread in a field or garden, is tried to be a very good compoſt. For ſalt 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 ſteeping of the ſeeds in ſeveral mixtures with water to give them vigour, or watering grounds with compoſt water, we have ſpoken of them before.

598. 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 peas. Brakes caſt upon the ground in the beginning of winter, will make it very fruitful. It were good

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 ſour than otherwiſe.

599. THE fifth help of ground is, heat and warmth. It hath been anciently practiſed to burn heath, and ling, and ſedge, with the vantage of the wind, upon the ground. We ſee that warmth of walls and incloſures 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.

600. 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 thoſe furrows, drawing it traverſe to ſpread the water. And this maketh an excellent improvement, both for corn and graſs. 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 kind, we ſhall ſpeak of them in another place.

NATURAL HISTORY.

CENTURY VII.

Experiments in conſort touching the affinities and differences between plants and inanimate bodies.

601. THE differences between animate and inanimate bodies, we ſhall handle fully under the title of life, and living ſpirits, and powers. We ſhall therefore make but a brief mention of them in this place. The main differences are two. All bodies have ſpirits, and pneumatical parts within them; but the main differences between animate and inanimate, are two: the firſt is, that the ſpirits of things animate are all continued with themſelves, and are branched in veins, and ſecret canals, as blood is: and in living creatures, the ſpirits have not only branches, but certain cells 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 aërial ſubſtance. But inanimate bodies have their ſpirits no whit inflamed or kindled. And this difference conſiſteth not in the heat or coolneſs of ſpirits; for cloves and other ſpices, *naptha* and *petroleum*, have exceeding hot ſpirits, hotter a great deal than oil, wax, or tallow, *etc.* but not inflamed. And when any of thoſe weak and temperate bodies come to be inflamed, then they gather a much greater heat than others have uninflamed, beſides their light and motion, *etc.*

602. 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.

603. THE differences between plants, and metals or foſſils, beſides thoſe four beforementioned, for metals I hold inanimate, are theſe: firſt, metals are more durable than plants: ſecondly, they are more ſolid and hard: thirdly, they are wholly ſubterrany; whereas plants are part above earth, and part under earth.

604. THERE be very few creatures that participate of the nature of plants and metals both; coral is one of the neareſt of both kinds: another is vitriol, for that is apteſt to ſprout with moiſture.

605. ANOTHER ſpecial affinity is between plants and mould or putrefaction: for all putrefaction, if it diſſolve not in arefaction, will in the end iſſue into plants, or living creatures bred of putrefaction. I account moſs, and muſhrooms, and agarick, and other of thoſe kinds, to be but moulds of the ground, walls, and trees, and the like.

like. As for fleſh, and fiſh, and plants themſelves, and a number of other things, after a mouldineſs, or rottenneſs, or corrupting, they will fall to breed worms. Theſe putrefactions, which have affinity with plants, have this difference from them; that they have no ſucceſſion or propagation, though they nouriſh, and have a period of life, and have likewiſe ſome figure.

606. I LEFT once by chance a citron cut, in a cloſe room, for three ſummer months that I was abſent, and at my return there were grown forth, out of the pith cut, tufts of hairs an inch long, with little black heads, as if they would have been ſome herb.

Experiments in conſort touching the affinities and differences of plants and living creatures, and the confiners and participles of them.

607. 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 ſevered, 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 inverſa*; Man is like a plant turned upwards: for the root in plants is as the head in living creatures. Fifthly, living creatures have a more exact figure than plants. Sixthly, living creatures have more diverſity of organs within their bodies, and, as it were, inward figures, than plants have. Seventhly, living creatures have ſenſe, which plants have not. Eighthly, living creatures have voluntary motion, which plants have not.

608. FOR the difference of ſexes in plants, they are oftentimes by name diſtinguiſhed; as male-piony, female-piony; male-roſemary, female-roſemary; he-holly, ſhe-holly, *etc.* but generation by copulation certainly extendeth not to plants. The neareſt approach of it is between the he-palm and the ſhe-palm, which, as they report, if they grow near, incline the one to the other; inſomuch as, that which is more ſtrange, they doubt not to report, that to keep the trees upright from bending, they tie ropes or lines from the one to the other, that the contact might be enjoyed by the contact of a middle body. But this may be feigned, or at leaſt amplified. Nevertheleſs, I am apt enough to think, that this ſame *binarium* 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.

609. THE participles or confiners between plants and living creatures, are ſuch chiefly as are fixed, and have no local motion of remove, though they have a motion in their parts; ſuch as are oiſters, 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 bare the graſs round about. But I ſuppoſe that the figure maketh the fable; for ſo, we ſee, there be

be bee-flowers, *etc.* And as for the graſs, it ſeemeth the plant having a great ſtalk and top doth prey upon the graſs a good way about, by drawing the juice of the earth from it.

Experiments promiſcuous touching plants.

610. THE Indian fig boweth its roots down ſo low in one year, as of itſelf it taketh root again; and ſo multiplieth from root to root, making of one tree a kind of wood. The cauſe is the plenty of the ſap, and the ſoftneſs of the ſtalk, which maketh the bough, being over-loaden, and not ſtiffly upheld, weigh down. It hath leaves as broad as a little target, but the fruit no bigger than beans. The cauſe is, for that the continual ſhade increaſeth the leaves, and abateth the fruit, which nevertheleſs is of a pleaſant taſte. And that no doubt is cauſed by the ſuppleneſs and gentleneſs of the juice of that plant, being that which maketh the boughs alſo ſo flexible.

611. IT is reported by one of the ancients, that there is a certain Indian tree, having few but very great leaves, three cubits long and two broad; and that the fruit, being of good taſte, groweth out of the bark. It may be, there be plants that pour out the ſap ſo faſt, as they have no leiſure either to divide into many leaves, or to put forth ſtalks to the fruit. With us trees, generally, have ſmall leaves in compariſon. The fig hath the greateſt; and next it the vine, 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 burr, gourd, cucumber, and colewort. The cauſe is, like to that of the Indian fig, the haſty and plentiful putting forth of the ſap.

612. THERE be three things in uſe for ſweetneſs; ſugar, honey, manna. For ſugar, to the ancients it was ſcarce known, and little uſed. It is found in canes: *Query*, whether to the firſt knuckle, or further up? And whether the very bark of the cane itſelf 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 labour 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 dews fall, filled like a cellar. It is reported alſo by ſome of the ancients, that there is a tree called Occhus, in the valley of Hyrcania, 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 uſes, may be concocted out of fruits, to the thickneſs of honey, or perhaps of ſugar; the likelieſt are raiſins of the ſun, figs, and currants: the means may be inquired.

613. THE ancients report of a tree by the Perſian ſea, upon the ſhore-ſands, which is nouriſhed with the ſalt water; and when the tide ebbeth, you ſhall ſee the roots as it were bare without bark, being as it ſeemeth corroded by the ſalt, and graſping the ſands like a crab; which nevertheleſs beareth a fruit. It were good to try ſome hard trees, as a ſervice-tree, or fir-tree, by ſetting them within the ſands.

614. THERE be of plants which they uſe for garments, theſe that follow: hemp, flax, cotton, nettles, whereof they make nettle-cloth, *ſericum*, which is a growing ſilk; they make alſo cables of the bark of lime trees. It is the ſtalk that maketh the filaceous matter commonly; and ſometimes the down that groweth above.

615. THEY have in ſome countries a plant of a roſy colour, which ſhutteth in the night, openeth in the morning, and openeth wide at noon; which the inhabitants of

of thoſe countries ſay is a plant that ſleepeth. There be ſleepers enough then; for almoſt all flowers do the like.

616. SOME plants there are, but rare, that have a moſſy or downy root; and likewiſe that have a number of threads, like beards; as mandrakes; whereof witches and impoſtures make an ugly image, giving it the form of a face at the top of the root, and leaving thoſe ſtrings to make a broad beard down to the foot. Alſo there is a kind of nard in Crete, being a kind of *pku*, that hath a root hairy, like a rough-footed dove's foot. So as you may ſee, there are of roots, bulbous roots, fibrous roots, and hirſute roots. And, I take it, in the bulbous, the ſap haſteneth moſt to the air and ſun: in the fibrous, the ſap delighteth more in the earth, and therefore putteth downward: and the hirſute is a middle between both, that beſides the putting forth upwards and downwards, putteth forth in round.

617. THERE are ſome tears of trees, which are combed from the beards of goats: for when the goats bite and crop them, eſpecially in the mornings, the dew being on, the tear cometh forth, and hangeth upon their beards: of this ſort is ſome kind of *laudanum*.

618. THE irrigation of the plane-tree by wine, is reported by the ancients to make it fruitful. It ſhould be tried likewiſe with roots; for upon ſeeds it worketh no great effects.

619. THE way to carry foreign roots a long way, is to veſſel them cloſe in earthen veſſels. But if the veſſels be not very great, you muſt make ſome holes in the bottom, to give ſome refreſhment to the roots; which otherwiſe, as it ſeemeth, will decay and ſuffocate.

620. THE ancient cinnamon was, of all other plants, while it grew, the drieſt; and thoſe things which are known to comfort other plants, did make that more ſteril; for in ſhowers it proſpered worſt: it grew alſo amongſt buſhes of other kinds, where commonly plants do not thrive; neither did it love the ſun. There might be one cauſe of all thoſe effects; namely, the ſparing nouriſhment which that plant required. *Query*, how far *caſſia*, which is now the ſubſtitute of cinnamon, doth participate of theſe things?

621. IT is reported by one of the ancients, that *caſſia*, when it is gathered, is put into the ſkins of beaſts newly 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 than we know any; for there have been cups made of them, and an image of Jupiter. But it is like they were wild vines; for the vines that they uſe for wine, are ſo often cut, and ſo much digged and dreſſed, that their ſap ſpendeth into the grapes, and ſo the ſtalk cannot increaſe much in bulk. The wood of vines is very durable, without rotting. And that which is ſtrange, though no tree hath the twigs, while they are green, ſo brittle, yet the wood dried is extreme tough; and was uſed by the captains of armies amongſt the Romans for their cudgels.

623. IT is reported, that in ſome places vines are ſuffered to grow like herbs, ſpreading upon the ground; and that the grapes of thoſe vines are very great. It were good to make trial, whether plants that uſe to be borne up by props, will not put forth greater leaves and greater fruits if they be laid along the ground; as hops, ivy, woodbine, *etc.*

624. QUIN-

624. QUINCES, or apples, *etc.* if you will keep them long, drown them in honey; but becauſe honey, perhaps, will give them a taſte over-luſcious, it were good to make trial in powder of ſugar, or in ſyrup of wine, only boiled to height. Both theſe ſhould likewiſe be tried in oranges, lemons, and pomgranates; for the powder of ſugar, and ſyrup of wine, will ſerve for more times than once.

625. THE conſervation of fruit ſhould be alſo tried in veſſels filled with fine ſand, or with powder of chalk; or in meal and flour; or in duſt of oak wood; or in mill.

626. 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.

627. 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.

628. IT is reported, that the preſerving of the ſtalk helpeth to preſerve the grape; eſpecially if the ſtalk be put into the pith of alder, the alder not touching the fruit.

629. IT is reported by ſome of the ancients, that fruit put in bottles, and the bottles let down into wells under water, will keep long.

630. OF herbs and plants, ſome are good to eat raw; as lettuce, endive, purſlane, tarragon, creſſes, cucumbers, muſk-melons, radiſh, *etc.* others only after they are boiled, or have paſſed the fire; as parſley, clary, ſage, parſnips, turnips, aſparagus, artichokes, though they alſo being young are eaten raw: but a number of herbs are not eſculent at all; as wormwood, graſs, green corn, centaury, hyſſop, lavender, balm, *etc.* The cauſes are, for that the herbs that are not eſculent, do want the two taſtes in which nouriſhment reſteth; which are fat and ſweet; and have, contrariwiſe, bitter and over-ſtrong taſtes, or a juice ſo crude as cannot be ripened to the degree of nouriſhment. Herbs and plants that are eſculent raw, have fatneſs, or ſweetneſs, as all eſculent fruits; ſuch are onions, lettuce, *etc.* But then it muſt be ſuch a fatneſs, for as for ſweet things, they are in effect always eſculent, as is not over-groſs, and loading of the ſtomach: for parſnips and leeks have fatneſs; but it is too groſs 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 maketh them ſoft and tender, and ſo they become eſculent. As for radiſh and tarragon, and the like, they are for condiments, and not for nouriſhment. And even ſome of thoſe herbs which are not eſculent, are notwithſtanding poculent; as hops, broom, *etc.* *Query*, what herbs are good for drink beſides the two aforenamed; for that it may, perhaps, eaſe the charge of brewing, if they make beer to require leſs malt, or make it laſt longer.

631. PARTS fit for the nouriſhment of man in plants are, ſeeds, roots, and fruits; but chiefly ſeeds and roots. For leaves, they give no nouriſhment at all, or very little: no more do flowers, or bloſſoms, or ſtalks. The reaſon is, for that roots, and ſeeds, and fruits, inaſmuch as all plants conſiſt of an oily and watery ſubſtance commixed, have more of the oily ſubſtance; and leaves, flowers, *etc.* of the watery. And ſecondly, they are more concocted; for the root which continueth ever in the earth, is ſtill concocted by the earth; and fruits and grains we

ſee are half a year or more in concocting; whereas leaves are out and perfect in a month.

632. PLANTS, for the moſt part, are more ſtrong both in taſte and ſmell in the ſeed, than in the leaf and root. The cauſe is, for that in plants that are not of a fierce and eager ſpirit, the virtue is increaſed 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 it in onions, garlick, dragon, *etc.* Nay, there be plants that have their roots very hot and aromatical, and their ſeeds rather inſipid; as ginger. The cauſe is, as was touched before, for that the heat of thoſe plants is very diſſipable; which under the earth is contained and held in; but when it cometh to the air it exhaleth.

633. THE juices of fruits are either watery or oily. I reckon among the watery, all the fruits out of which drink is expreſſed; as the grape, the apple, the pear, the cherry, the pomgranate, *etc.* 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, raſps, oranges, lemons, *etc.* and for thoſe juices that are ſo fleſhy, as they cannot make drink by expreſſion, yet, perhaps, they may make drink by mixture of water;

Poculaque admiſtis imitantur vitea ſorbis.

And it may be hips and brier-berries would do the like. Thoſe that have oily juices, are olives, almonds, nuts of all ſorts, pine-apples, *etc.* and their juices are all inflammable. And you muſt obſerve alſo, that ſome of the watery juices, after they have gathered ſpirit, will burn and inflame; as wine. There is a third kind of fruit that is ſweet, without either ſharpneſs or oilineſs: ſuch as is the fig and the date.

634. IT hath been noted, that moſt trees, and ſpecially thoſe that bear maſt, 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.

635. 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 berries, ſticking cloſe to the body of the tree without ſtalk. It beareth alſo miſſeltoe, though rarely. The cauſe of all theſe may be, the cloſeneſs and ſolidneſs of the wood and pith of the oak, which maketh ſeveral juices find ſeveral eruptions. And therefore if you will deviſe to make any ſuper-plants, you muſt ever give the ſap plentiful riſing and hard iſſue.

636. THERE are two excreſcences which grow upon trees; both of them in the nature of muſhrooms: the one the Romans called *boletus*; which groweth upon the roots of oaks; and was one of the dainties of their table; the other is medicinal, that is called agarick, whereof we have ſpoken before, which groweth upon the tops of oaks; though it be affirmed by ſome, that it groweth alſo at the roots. I do conceive, that many excreſcences of trees grow chiefly where the tree is dead or faded; for that the natural ſap of the tree corrupteth into ſome preternatural ſubſtance.

637. THE greater part of trees bear moſt and beſt on the lower boughs; as oaks, figs, walnuts, pears, *etc.* but ſome bear beſt on the top boughs; as crabs, *etc.* Thoſe that bear beſt below, are ſuch as ſhade doth more good to than hurt. For generally all fruits bear beſt loweſt; becauſe the ſap tireth not, having but a ſhort way: and

therefore

therefore in fruits ſpread upon walls, the loweſt are the greateſt, as was formerly ſaid: ſo it is the ſhade that hindereth the lower boughs; except it be in ſuch trees as delight in ſhade, or at leaſt bear it well. And therefore they are either ſtrong trees, as the oak; or elſe they have large leaves, as the walnut and fig; or elſe they grow in pyramids, as the pear. But if they require very much ſun, they bear beſt on the top; as it is in crabs, apples, plums, *etc.*

638. THERE be trees that bear beſt when they begin to be old; as almonds, pears, vines, and all trees that give maſt. The cauſe is, for that all trees that bear maſt, have an oily fruit; and young trees have a more watry juice, and leſs concocted: and of the ſame kind alſo is the almond. The pear likewiſe, though it be not oily, yet it requireth much ſap, and well concocted; for we ſee it is a heavy fruit and ſolid; much more than apples, plums, *etc.* As for the vine, it is noted, that it beareth more grapes when it is young; but grapes that make better wine when it is old; for that the juice is better concocted: and we ſee that wine is inflammable; ſo as it hath a kind of oilineſs. But the moſt part of trees, amongſt which are apples, plums, *etc.* bear beſt when they are young.

639. THERE be plants that have a milk in them when they are cut; as figs, old lettuce, ſow-thiſtles, ſpurge, *etc.* The cauſe may be an inception of putrefaction: for thoſe milks have all an acrimony: though one would think they ſhould be lenitive. For if you write upon paper with the milk of the fig, the letters will not be ſeen, until you hold the paper before the fire, and then they wax brown; which ſheweth that it is ſharp or fretting juice: lettuce is thought poiſonous, when it is ſo old as to have milk; ſpurge is a kind of poiſon in itſelf; and as for ſow-thiſtles, though coneys eat them, yet ſheep and cattle will not touch them: and beſides, the milk of them rubbed upon warts, in ſhort time weareth them away; which ſheweth the milk of them to be corroſive. We ſee alſo that wheat and other corn, ſown, 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. Euphorbium alſo hath a milk, though not very white, which is of a great acrimony: and ſalladine hath a yellow milk, which hath likewiſe much acrimony; for it cleanſeth the eyes. It is good alſo for cataracts.

640. MUS ROOMS are reported to grow, as well upon the bodies of trees, as upon their roots or upon the earth; and eſpecially upon the oak. The cauſe is, for that ſtrong trees are towards ſuch excreſcences in the nature of earth; and therefore put forth moſs, muſhrooms, and the like.

641. THERE is hardly found a plant 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 Socotra: the herb amaranthus indeed is red all over; and braſil is red in the wood: and ſo is red ſanders. The tree of the *ſanguis draconis* groweth in the form of a ſugar-loaf. It is like the ſap of that plant concocteth in the body of the tree. For we ſee that grapes and pomgranates are red in the juice, but are green in the tear: and this maketh the tree of *ſanguis draconis* leſſer towards the top; becauſe the juice haſteneth not up; and beſides, it is very aſtringent; and therefore of ſlow motion.

642. IT is reported, that ſweet moſs, beſides that upon the apple trees, groweth likewiſe ſometimes upon poplars; and yet generally the poplar is a ſmooth tree of bark, and hath little moſs. The moſs of the larix-tree burneth alſo ſweet, and ſparkleth

leth in the burning. *Query* of the moſſes of odorate trees; as cedar, cypreſs, *lignum aloës, etc.*

643. THE death that is moſt without pain, hath been noted to be upon the taking of the potion of hemlock; which in humanity was the form of execution of capital offenders in Athens. The poiſon of the aſp, that Cleopatra uſed, hath ſome affinity with it. The cauſe is, for that the torments of death are chiefly raiſed by the ſtrife of the ſpirits; and theſe vapours quench the ſpirits by degrees; like to the death of an extreme old man. I conceive it is leſs painful than *opium*, becauſe *opium* hath parts of heat mixed.

644. THERE be fruits that are ſweet before they be ripe, as myrobalanes; ſo fennel ſeeds are ſweet before they ripen, and after grow ſpicy. And ſome never ripen to be ſweet; as tamarinds, berberries, crabs, ſloes, *etc.* The cauſe is, for that the former kind have much and ſubtle heat, which cauſeth early ſweetneſs; the latter have a cold and acid juice, which no heat of the ſun can ſweeten. But as for the myrobalane, it hath parts of contrary natures; for it is ſweet and yet aſtringent.

645. THERE be few herbs that have a ſalt taſte; and contrariwiſe all blood of living creatures hath a ſaltneſs. The cauſe may be, for that ſalt, though it be the rudiment of life, yet in plants the original taſte remaineth not; for you ſhall have them bitter, ſour, ſweet, biting, but ſeldom ſalt, but in living creatures, all thoſe high taſtes may happen to be ſometimes in the humours, 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 ſaltneſs itſelf of blood is but a light and ſecret ſaltneſs: and even among plants, ſome do participate of ſaltneſs, as *alga marina*, ſamphire, ſcurvy-graſs, *etc.* And they report, there is in ſome of the Indian ſeas a ſwimming plant, which they call *ſalgazus*, ſpreading over the ſea in ſuch ſort, as one would think it were a meadow. It is certain, that out of the aſhes of all plants they extract a ſalt which they uſe in medicines.

646. IT is reported by one of the ancients, that there is an herb growing in the water, called *lincoſtis*, which is full of prickles: this herb putteth forth another ſmall herb out of the leaf; which is imputed to ſome moiſture that is gathered between the prickles, which putrified by the ſun germinateth. But I remember alſo I have ſeen, for a great rarity, one roſe grow out of another like honey-ſuckles, that they call top and top-gallants.

647. BARLEY, as appeareth in the malting, being ſteeped in water three days, and afterwards the water drained from it, and the barley turned upon a dry floor, will ſprout half an inch long at leaſt: and if it be let alone, and not turned, much more; until the heart be out. Wheat will do the ſame. Try it alſo with peas and beans. This experiment is not like that of the orpine and ſemper-vive; for there it is of the old ſtore, for no water is added; but here it is nouriſhed from the water. The experiment ſhould be farther 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 farther 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 faſter on in water than in earth; for the nouriſhment is eaſilier drawn out of water than out of earth. It may give ſome light alſo, that drink infuſed with fleſh, as that with the capon, *etc.* will nouriſh faſter and eaſilier than meat and drink together. Try the ſame experiment with roots

as

as well as with grains: as for example, take a turnip, and ſteep it a while, and then dry it, and ſee whether it will ſprout.

648. MALT in the drenching will ſwell; and that in ſuch a manner, as after the putting forth in ſprouts, and the drying 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 lying of the parts, but by ſome addition of ſubſtance drawn from the water in which it was ſteeped.

649. MALT gathereth a ſweetneſs to the taſte, which appeareth yet more in the wort. The dulceration of things is worthy to be tried to the full: for that dulceration importeth a degree to nouriſhment: and the making of things inalimental to become alimental, may be an experiment of great profit for making new victual.

650. 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 eaſy to break; as we ſee by the pilling of onions, what a holding ſubſtance the ſkin is.

651. 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 burr. 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.

652. IT is reported, that fir and pine, eſpecially if they be old and putrified, though they ſhine not as ſome rotten woods do, yet in the ſudden breaking they will ſparkle like hard ſugar.

653. THE roots of trees do ſome of them put downwards deep into the ground; as the oak, pine, fir, *etc.* Some ſpread more towards the ſurface of the earth; as the aſh, cypreſs-tree, olive, *etc.* 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 leſs. And the ſame reaſon under ground, to avoid receſs from the ſun, maketh them ſpread the more. And we ſee it cometh to paſs in ſome trees which have been planted too deep in the ground, that for love of approach to the ſun, they forſake their firſt root, and put out another more towards the top of the earth. And we ſee alſo, that the olive is full of oily juice; and aſh maketh the beſt fire; and cypreſs is an hot tree. As for the oak, which is of the former ſort, it loveth the earth; and therefore groweth ſlowly. And for the pine and fir likewiſe, they have ſo much heat in themſelves, as they need leſs the heat of the ſun. There be herbs alſo that have the ſame difference; as the herb they call *morſus diaboli*; which putteth the root down ſo low, as you cannot pull it up without breaking; which gave occaſion to the name and fable; for that it was ſaid, it was ſo wholſom 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 fir, which they deſired to remove whole, that had a root under ground eight cubits deep; and ſo the root came up broken.

654. IT hath been obſerved, that a branch of a tree, being 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 ſee, that a tree pared round in the body above ground, will die. The cauſe may be, for

for that the unbarked part draweth the nouriſhment beſt, but the bark continueth it only.

655. GRAPES will continue freſh and moiſt all winter long, if you hang them cluſter by cluſter in the roof of a warm room; eſpecially if when you gather the cluſter, you take off with the cluſter ſome of the ſtock.

656. THE reed or cane is a watery 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 than other wood; that it putteth forth no boughs, though many ſtalks come out of one root. It differeth much in greatneſs; the ſmalleſt being fit for thatching of houſes, and ſtopping the chinks of ſhips, better than glue or pitch. The ſecond bigneſs is uſed for angle-rods and ſtaves; and in China for beating of offenders upon the thighs. The differing kinds of them are; the common reed; the *caſſia fiſtu'a*; and the ſugar reed. Of all plants it boweth the eaſieſt, and riſeth 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.

657. THE ſap of trees when they are let blood, is of differing natures. Some more watery 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 be dry. 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 ſpungy: the milk of the fig hath the quality of the rennet, to gather cheeſe: and ſo have certain ſour herbs wherewith they make cheeſe in Lent.

658. THE timber and wood are in ſome trees more clean, in ſome more knotty; and it is a good trial, 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 chamblett.d; as oak, whereof wainſcot is made; maple, whereof trenchers are made: ſome more ſmooth, as fir and walnut: 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 that concern their uſe; as oak, cedar, and cheſtnut, are the beſt builders; ſome are beſt for plough timber, as aſh; ſome for piers, 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 tough, and not apt to rift with ordnance; wherein Engliſh and Iriſh timber are thought to excel: ſome for maſts of ſhips; as fir and pine, becauſe of their length, ſtraightneſs, and lightneſs: ſome for pale, as oak; ſome for fuel, as aſh; and ſo of the reſt.

659. THE coming of trees and plants in certain regions, and not in others, is ſometimes caſual: for many have been tranſlated, and have proſpered well; as damaſk roſes, that have not been known in England above an hundred years, and now are ſo common. But the liking of plants in certain ſoils more than in others, is merely natural; as the fir and pine love the mountains; the poplar, willow, ſallow, and alder, love rivers and moiſt places; the aſh loveth coppices, but is beſt in ſtandards alone; juniper loveth chalk; and ſo do moſt fruit trees; ſamphire groweth

but

but upon rocks; reeds and oſiers grow where they are waſhed with water; the vine loveth ſides of hills, turning upon the ſouth-eaſt ſun, *etc.*

660. 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 mellow grounds fit for wheat. Muſtard-ſeed, growing after the plough, ſheweth a good ſtrong ground alſo for wheat: burnet ſheweth good meadow, and the like.

661. THERE are found in divers countries ſome other plants that grow out of trees, and plants, beſides miſſeltoe: as in Syria, there is an herb called *caſſytas*, that groweth out of tall trees, and windeth itſelf 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 *faunos*, upon the wild olive. And an herb called *hippophaeſton* upon the fullers thorn: which, they ſay, is good for the falling ſickneſs.

662. IT hath been obſerved by ſome of the ancients, that howſoever cold and eaſterly winds are thought to be great enemies to fruit, yet nevertheleſs ſouth winds are alſo found to do hurt, eſpecially in the bloſſoming time; and the more, if ſhowers follow. It ſeemeth, they call forth the moiſture too faſt. The weſt winds are the beſt. It hath been obſerved alſo, that green and open winters do hurt trees; inſomuch as if two or three ſuch winters come together, almond trees, and ſome other trees, will die. The cauſe is the ſame with the former, becauſe the luſt of the earth over-ſpendeth itſelf: howſoever ſome other of the ancients have commended warm winters.

663. SNOWS lying long cauſe a fruitful year; for firſt, they keep in the ſtrength of the earth; ſecondly, they water the earth better than rain: for in ſnow the earth doth, as it were, ſuck the water as out of the teat: thirdly, the moiſture of ſnow is the fineſt moiſture, for it is the froth of the cloudy waters.

664. SHOWERS, if they come a little before the ripening of fruits, do good to all ſucculent and moiſt fruits; as vines, olives, pomgranates; yet it is rather for plenty than for goodneſs; for the beſt vines are in the drieſt vintages: ſmall ſhowers are likewiſe good for corn, ſo as parching heats come not upon them. Generally night ſhowers are better than day ſhowers, for that the ſun followeth not ſo faſt upon them; and we ſee even in watering by the hand, it is beſt in ſummer time to water in the evening.

665. THE differences of earths, and the trial of them, are worthy to be diligently inquired. The earth that with ſhowers doth eaſilieſt ſoften, is commended; and yet ſome earth of that kind will be very dry and hard before the ſhowers. The earth that caſteth up from the plough a great clod, is not ſo good as that which caſteth up a ſmaller clod. The earth that putteth forth moſs eaſily, and may be called mouldy, is not good. The earth that ſmelleth well upon the digging, or ploughing, is commended; as containing the juice of vegetables almoſt already prepared. It is thought by ſome, that the ends of low rain-bows fall more upon one kind of earth than upon another; as it may well be; for that that earth is moſt roſcid: and therefore it is commended for a ſign of good earth. The poorneſs of the herbs, it is plain, ſhew the poorneſs of the earth; and eſpecially if they be in colour more dark: but if the herbs ſhew withered, or blaſted at the top, it ſheweth the earth to be very cold; and ſo doth the moſſineſs of trees. The earth, whereof the graſs is ſoon parched with the ſun, and toaſted, is commonly forced earth, and barren in its own nature.

The tender, cheſſome, and mellow earth, is the beſt, being mere mould, between the two extremes of clay and ſand, eſpecially if it be not loamy and binding. The earth, that after rain will ſcarce be ploughed, is commonly fruitful: for it is cleaving, and full of juice.

666. IT is ſtrange, which is obſerved by ſome of the ancients, that duſt helpeth the fruitfulneſs of trees, and of vines by name; inſomuch as they caſt duſt upon them of purpoſe. It ſhould ſeem, that that powdering, when a ſhower cometh, maketh a kind of ſoiling to the tree, being earth and water finely laid on. And they note, that countries where the fields and ways are duſty bear the beſt vines.

667. IT is commended by the ancients for an excellent help to trees, to lay the ſtalks and leaves of lupins about the roots, or to plough them into the ground where you will ſow corn. The burning alſo of the cuttings of vines, and caſting them upon land, doth much good. And it was generally received of old, that dunging of grounds when the weſt 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.

668. 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 inciſion, which is the ordinary manner of graſting: the ſecond was terebration through the middle of the ſtock, and putting in the cions there: and the third was paring of two vines that grow together to the marrow, and binding them cloſe.

669. THE diſeaſes and ill accidents of corn are worthy to be inquired; and would be more worthy to be inquired, 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 woald. This cannot be remedied, otherwiſe than that in countries of ſmall incloſure the grounds be turned into larger fields: which I have known to do good in ſome farms. Another diſeaſe is the putting forth of wild 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 wild oats. Another diſeaſe is the ſatiety 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 kind of grain, as wheat, barley, *etc.* it will proſper but poorly: therefore, beſides the reſting of the ground, you muſt vary the ſeed. Another ill accident is from the winds, which hurt at two times; at the flowering, by ſhaking off 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 countries common: inſomuch as the word *calamitas* 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 reſow ſummer corn, where they ſowed winter corn. Another ill accident is bitter froſts continued without ſnow, eſpecially in the beginning of the winter, after the ſeed is new ſown. Another 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 ear itſelf, eſpecially when hot ſuns break often out of clouds. Another diſeaſe is weeds; and they are ſuch as either choke and overſhadow the corn, and bear it down; or ſtarve the corn, and deceive it of nouriſhment. Another

diſeaſe

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 oil, or any thing that is fat; for thoſe ſubſtances have an antipathy with nouriſhment of water.

670. 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 ſound: it hath not been practiſed, but it is thought to be of uſe, to make ſome mixture 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 houſleek doth good. Though grain, that toucheth oil or fat, receiveth hurt, yet the ſteeping of it in the dregs of oil, when it beginneth to putrify, which they call *amurca*, is thought to aſſure it againſt worms. It is reported alſo, that if corn be mowed, it will make the grain longer, but emptier, and having more of the huſk.

671. 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 grains laſt better than others. The corn which in the fanning lieth loweſt is the beſt: and the corn, which broken or bitten retaineth a little yellowneſs, is better than that which is very white.

672. IT hath been obſerved, that of all roots of herbs, the root of ſorrel goeth the fartheſt into the earth; inſomuch that 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 groweth. It is a cold and acid herb, that, as it ſeemeth, loveth the earth, and is not much drawn by the ſun.

673. IT hath been obſerved that ſome herbs like beſt being watered with ſalt water; as radiſh, beet, rue, pennyroyal; this trial ſhould be extended to ſome other herbs; eſpecially ſuch as are ſtrong, as tarragon, muſtard-ſeed, rocket, and the like.

674. IT is ſtrange that is generally received, how ſome poiſonous beaſts affect odorate and wholſom herbs; as that the ſnake 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, than the virtue of the herb.

675. IT were a matter of great profit, ſave that I doubt it is too conjectural to venture upon, if one could diſcern what corn, herbs, or fruits, are like to be in plenty or ſcarcity, by ſome ſigns and prognoſtics in the beginning of the year: for as for thoſe that are like to be in plenty, they may be bargained for upon the ground; as the old relation was of Thales; who to ſhew how eaſy it was for a philoſopher to be rich, when he foreſaw a great plenty of olives, made a monopoly of them. And for ſcarcity, men may make profit in keeping better the old ſtore. Long continuance of ſnow is believed to make a fruitful year of corn: an early winter, or a very late winter, a barren year of corn: an open and ſerene winter, an ill year of fruit: theſe we have partly touched before: but other prognoſtics of like nature are diligently to be inquired.

676. THERE ſeem to be in ſome plants ſingularities, wherein they differ from all other; the olive hath the oily part only on the outſide; whereas all other fruits have it in the nut or kernel. The fir hath, in effect, no ſtone, nut, nor kernel; except

cept you will count the little grains kernels. The pomgranate and pine-apple have only amongſt fruits grains diſtinct in ſeveral cells. No herbs have curled leaves, but cabbage and cabbage-lettuce. None have doubled leaves, one belonging to the ſtalk, another to the fruit or ſeed, but the artichoke. No flower hath that kind of ſpread that the woodbine hath. This may be a large field of contemplation; for it ſheweth that in the frame of nature, there is, in the producing of ſome ſpecies, a compoſition of matter, which happeneth oft, and may be much diverſified: in others, ſuch as happeneth rarely, and admitteth little variety: for ſo it is likewiſe in beaſts: dogs have a reſemblance with wolves and foxes; horſes with aſſes; kine with buffles; hares with coneys, *etc.* And ſo in birds: kites and keſtrels have a reſemblance with hawks; common doves, with ring-doves and turtles; black-birds with thruſhes and maviſes; crows with ravens, daws, and choughs, *etc.* 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 herbaliſts, 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 ancient and modern writers have alſo laboured; but their cauſes and axioms are ſo full of imagination, and ſo infected with the old received theories, as they are mere inquinations of experience, and concoct it not.

Experiment ſolitary touching healing of wounds.

677. IT hath been obſerved by ſome of the ancients, that ſkins, eſpecially of rams, newly pulled off, and applied to the wounds of ſtripes, do keep them from ſwelling and exulcerating; and likewiſe heal them and cloſe them up; and that the whites of eggs do the ſame. The cauſe is a temperate conglutination; for both bodies are clammy and viſcous, and do bridle the deflux of humours to the hurts, without penning them in too much.

Experiment ſolitary touching fat diffuſed in fleſh.

678. YOU may turn almoſt all fleſh into a fatty ſubſtance, if you take fleſh and cut it into pieces, and put the pieces into a 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, *etc.*

Experiment ſolitary touching ripening of drink before the time.

679. 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 ſhould be tried in wort.

Experiment ſolitary touching piloſity and plumage.

680. BEASTS are more hairy than men, and ſavage men more than civil; and the plumage of birds exceedeth the piloſity of beaſts. The cauſe of the ſmoothneſs in 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 excrementi-

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tious heat and moiſture, for whatſoever aſſimilateth, goeth not into the hair, and excrementitious moiſture aboundeth moſt in beaſts, and men that are more ſavage. Much the ſame reaſon is there of the plumage of birds; for birds aſſimilate leſs, and excern more than beaſts; for their excrements are ever liquid, 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 than beaſts, becauſe their fleſh doth aſſimilate more finely, and ſecerneth more ſubtilly. Again, the head of man hath hair upon the firſt birth, which no other part of the body hath. The cauſe may be want of perſpiration; for much of the matter of hair, in the other parts of the body, goeth forth by inſenſible perſpiration; and beſides, the ſkull being of a more ſolid ſubſtance, nouriſheth and aſſimilateth leſs, and excerneth 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 perſpirable. And children likewiſe are not hairy, for that their ſkins are more perſpirable.

Experiment ſolitary touching the quickneſs of motion in birds.

681. BIRDS are of ſwifter motion than beaſts; for the flight of many birds is ſwifter than the race of any beaſts. The cauſe is, for that the ſpirits in birds are in greater proportion, in compariſon of the bulk of their body, than in beaſts: for as for the reaſon that ſome give, that they are partly carried, whereas beaſts go, that is nothing; for by that reaſon ſwimming ſhould be ſwifter than running: and that kind of carriage alſo is not without labour of the wing.

Experiment ſolitary touching the different clearneſs of the ſea.

682. THE ſea is clearer when the north wind bloweth, than when the ſouth wind. The cauſe is for that ſalt water hath a little oilineſs in the ſurface thereof, as appeareth in very hot days: and again, for that the ſouthern wind relaxeth the water ſomewhat; and no water boiling is ſo clear as cold water.

Experiment ſolitary touching the different heats of fire and boiling water.

683. FIRE burneth wood, making it firſt luminous; then black and brittle; and laſtly, broken and incinerate; ſcalding water doth none of theſe. The cauſe is, for that by fire the ſpirit of the body is firſt refined, and then emitted; whereof the refining or attenuation cauſeth the light; and the emiſſion, firſt the fragility, and after the diſſolution into aſhes; neither doth any other body enter: but in water the ſpirit of the body is not refined ſo much; and beſides part of the water entereth, which doth increaſe the ſpirit, and in a degree extinguiſheth 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 paſſeth, hot water worketh the effects of fire; as in eggs boiled and roſted, into which the water entereth not at all, there is ſcarce difference to be diſcerned; but in fruit, and fleſh, whereinto the water entereth in ſome part, there is much more difference.

Experiment ſolitary touching the qualification of heat by moiſture.

684. THE bottom of a veſſel of boiling water, as hath been obſerved, is not very much heated, ſo as men may put their hand under the veſſel and remove it. The cauſe is, for that the moiſture of water as it quencheth coals where it entereth, ſo it doth

doth allay 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; not by entrance of the body, but by qualifying of the heat and cold; as we ſee in this inſtance: and we ſee likewiſe, that the water of things diſtilled in water, which they call the bath, differeth not much from the water of things diſtilled by fire. We ſee alſo, that pewter-diſhes with water in them will not melt eaſily, but without it they will; nay we ſee more, that butter, or oil, which in themſelves are inflammable, yet by virtue of their moiſture will do the like.

Experiment ſolitary touching yawning.

685. IT hath been noted by the ancients, that it is dangerous to pick one's ear whilſt he yawneth. The cauſe is, for that in yawning the inner parchment of the ear is extended, by the drawing in of the ſpirit and breath; for in yawning, and ſighing both, the ſpirit is firſt ſtrongly drawn in, and then ſtrongly expelled.

Experiment ſolitary touching the hiccough.

686. IT hath been obſerved by the ancients, that ſneezing doth ceaſe the hiccough. The cauſe is, for that the motion of the hiccough is a lifting up of the ſtomach, which ſneezing doth ſomewhat depreſs, and divert the motion another way. For firſt we ſee that the hiccough cometh of fulneſs of meat, eſpecially in children, which cauſeth an extenſion of the ſtomach: we ſee alſo it is cauſed by acid meats, or drinks, which is by the pricking of the ſtomach; and this motion is ceaſed either by diverſion, or by detention of the ſpirits; diverſion, as in ſneezing; detention, as we ſee holding of the breath doth help ſomewhat to ceaſe the hiccough; and putting a man into an earneſt ſtudy doth the like, as is commonly uſed: and vinegar put to the noſtrils, or gargarized, doth it alſo; for that it is aſtringent, and inhibiteth the motion of the ſpirits.

Experiment ſolitary touching ſneezing.

687. LOOKING againſt the ſun doth induce ſneezing. The cauſe is not the heating of the noſtrils, for then the holding up of the noſtrils againſt the ſun, though 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 humour which was deſcending to the noſtrils, is diverted to the eyes.

Experiment ſolitary touching the tenderneſs of the teeth.

688. THE teeth are more by cold drink, or the like, affected than the other parts. The cauſe is double; the one, for that the reſiſtance of bone to cold is greater than of fleſh, for that the fleſh ſhrinketh, but the bone reſiſteth, whereby the cold 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.

Experiment ſolitary touching the tongue.

689. 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, pyed cattle are ſpotted in their tongues, *etc.* The cauſe is, no doubt, the tenderneſs of the part, which thereby receiveth more eaſily all alterations, than any other parts of the fleſh.

Experiment ſolitary touching the taſte.

690. WHEN the mouth is out of taſte, it maketh things taſte ſometimes ſalt, chiefly bitter; and ſometimes lothſome, but never ſweet. The cauſe is, the corrupting of the moiſture about the tongue, which many times turneth bitter, and ſalt, and lothſome; but ſweet never; for the reſt are degrees of corruption.

Experiment ſolitary touching ſome prognoſtics of peſtilential ſeaſons.

691. IT was obſerved in the great plague of the laſt year, that there were ſeen in divers ditches and low grounds about London, many toads that had tails two or three inches long at the leaſt; whereas toads uſually have no tails at all. Which argueth a great diſpoſition to putrefaction in the ſoil and air. It is reported likewiſe, that roots, ſuch as carrots and parſnips, are more ſweet and luſcious in infectious years, than in other years.

Experiment ſolitary touching ſpecial ſimples for medicines.

692. WISE 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 ſtopped and ſhut; and they expel that which is offenſive, gently, without too much perturbation. Of this kind are alder-flowers; which therefore are proper for the ſtone: of this kind is the dwarf-pine; which is proper for the jaundice: of this kind is hartſhorn; which is proper for agues and infections: of this kind is piony; which is proper for ſtoppings in the head: of this kind is fumitory; which is proper for the ſpleen: and a number of others. Generally, divers creatures bred of putrefaction, though they be ſomewhat lothſome to take, are of this kind; as earth-worms, timber-ſows, ſnails, *etc.* And I conceive that the trochiſks of vipers, which are ſo much magnified, and the fleſh of ſnakes ſome ways condited, and corrected, which of late are grown into ſome credit, are of the ſame nature. So the parts of beaſts putrified, as *caſtoreum* and muſk, which have extreme ſubtile parts, are to be placed amongſt them. We ſee alſo, that putrefactions of plants, as agarick and Jews-ear, are of greateſt virtue. 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 ſubtilty of operation, to take bodies putrified; ſuch as may be ſafely taken.

Experiments

Experiments in conſort touching Venus.

693. IT hath been obſerved by the ancients, that much uſe of Venus doth dim the ſight; and yet eunuchs, which are unable to generate, are nevertheleſs alſo dim-ſighted. The cauſe of dimneſs of ſight in the former, is the expence 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; where alſo the diminution of the ſpirits concurreth as another cauſe: we ſee alſo that blindneſs cometh by rheums and cataracts. Now in eunuchs, there are all the notes of moiſture; as the ſwelling of their thighs, the looſeneſs of their belly, the ſmoothneſs of their ſkin, *etc.*

694. THE pleaſure in the act of Venus is the greateſt of the pleaſures of the ſenſes; the matching of it with itch is improper, though that alſo be pleaſing to the touch. But the cauſes are profound. Firſt, all the organs of the ſenſes qualify the motions of the ſpirits; and make ſo many ſeveral ſpecies of motions, and pleaſures or diſ-pleaſures thereupon, as there be diverſities of organs. The inſtruments of ſight, hearing, taſte, and ſmell, are of ſeveral frame; and ſo are the parts for generation. Therefore Scaliger doth well to make the pleaſure of generation a ſixth ſenſe; and if there were any other differing organs, and qualified perforations for the ſpirits to paſs, there would be more than the five ſenſes: neither do we well know, whether ſome beaſts and birds have not ſenſes that we know not; and the very ſcent of dogs is almoſt a ſenſe by itſelf. Secondly, the pleaſures of the touch are greater and deeper than thoſe of the other ſenſes; as we ſee in warming upon cold; or refrige-ration upon heat: for as the pains of the touch are greater than the offences of other ſenſes; ſo likewiſe are the pleaſures. It is true, that the affecting of the ſpirits im-mediately, and, as it were, without an organ, is of the greateſt pleaſure; which is but in two things: ſweet ſmells; and wine, and the like ſweet vapours. For ſmells, we ſee their great and ſudden effect in fetching men again when they ſwoon: for drink, it is certain that the pleaſure of drunkenneſs is next the pleaſure of Venus; and great joys, likewiſe, make the ſpirits move and touch themſelves: and the plea-ſure of Venus is ſomewhat of the ſame kind.

695. IT hath been always obſerved, that men are more inclined to Venus in the winter, and women in the ſummer. The cauſe is, for that the ſpirits, in a body more hot and dry, as the ſpirits of men are, by the ſummer are more exhaled and diſſipated: and in the winter more condenſed and kept entire: but in bodies that are cold and moiſt, as womens are, the ſummer doth cheriſh the ſpirits, and calleth them forth; the winter doth dull them. Furthermore, the abſtinence, or inter-miſſion of the uſe of Venus in moiſt and well habituate bodies, breedeth a num-ber of diſeaſes: and eſpecially dangerous impoſtumations. The reaſon is evident; for that it is a principal evacuation, eſpecially of the ſpirits: for of the ſpirits, there is ſcarce any evacuation, but in Venus and exerciſe. And therefore the omiſſion of either of them breedeth all diſeaſes of repletion.

Experiments in conſort touching the inſecta.

THE nature of vivification is very worthy the inquiry: and as the nature of things is commonly better perceived in ſmall than in great; and in imperfect, than in per-fect; and in parts, than in whole: ſo the nature of vivification is beſt inquired in creatures bred of putrefaction. The contemplation whereof hath many excellent fruits.

fruits. First, in diſcloſing the original of vivification. Secondly, in diſcloſing the original of figuration. Thirdly, in diſcloſing many things in the nature of perfect creatures, which in them lie more hidden. And fourthly, in traducing, by way of operation, ſome obſervations in the *inſecta*, to work effects upon perfect creatures. Note, that the word *inſecta* agreeth not with the matter, but we ever uſe it for brevity's ſake, intending by it creatures bred of putrefaction.

696. THE *inſecta* are found to breed out of ſeveral matters: ſome breed of mud or dung; as the earth-worms, eels, ſnakes, *etc.* For they are both putrefactions: for water in mud doth putrify, as not able to preſerve itſelf: and for dung, all excrements are the refuſe and putrefactions of nouriſhment. Some breed in wood, both growing and cut down. *Query*, in what woods moſt, and at what ſeaſons? We ſee that the worms with many feet, which round themſelves into balls, are bred chiefly under logs of timber, but not in the timber; and they are ſaid to be found alſo many times in gardens, where no logs are. But it ſeemeth their generation requireth a coverture, both from ſun and rain or dew, as the timber is; and therefore they are not venomous, but contrariwiſe are held by the phyſicians to clarify the blood. It is obſerved alſo, that *cimices* are found in the holes of bed-ſides. Some breed in the hair of living creatures, as lice and tikes; which are bred by the ſweat cloſe kept, and ſomewhat arefied by the hair. The excrements of living creatures do not only breed *inſecta* when they are excerned, but alſo while they are in the body; as in worms, whereto children are moſt ſubject, and are chiefly in the guts. And it hath been lately obſerved by phyſicians, that in many peſtilent diſeaſes, there are worms found in the upper parts of the body, where excrements are not, but only humours putrified. Fleas breed principally of ſtraw or mats, where there hath been a little moiſture; or the chamber and bed-ſtraw kept cloſe, and not aired. It is received, that they are killed by ſtrewing wormwood in the rooms. And it is truly obſerved, that bitter things are apt rather to kill, than engender putrefaction; and they be things that are fat or ſweet, that are apteſt to putrify. There is a worm that breedeth in meal, of the ſhape of a large white maggot, which is given as a great dainty to nightingales. The moth breedeth upon cloth, and other lanifices; eſpecially if they be laid up dankiſh and wet. It delighteth to be about the flame of a candle. There is a worm called a wevil, bred under ground, and that feedeth upon roots; as parſnips, carrots, *etc.* Some breed in waters, eſpecially ſhaded, but they muſt be ſtanding waters; as the water-ſpider that hath ſix legs. The fly called the gad-fly, breedeth of ſomewhat that ſwimmeth upon the top of the water, and is moſt about ponds. There is a worm that breedeth of the dregs of wine decayed; which afterwards, as is obſerved by ſome of the ancients, turneth into a gnat. It hath been obſerved by the ancients, that there is a worm that breedeth in old ſnow, and is of colour rediſh 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 vivify. And the reaſon 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 exhale with heat, which were preſerved in cold. It is affirmed both by the ancient and modern obſervation, that in furnaces of copper and braſs, where *chalcites*, which is vitriol, is 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

ing 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 vivify, if it have matter proportionable. Now the great axiom of vivification is, that there muſt be heat to dilate the ſpirit of the body; an active ſpirit to be dilated; matter viſcous or tenacious to hold in the ſpirit; and that matter to be put forth and figured. Now a ſpirit dilated by ſo ardent a fire as that of the furnace, as ſoon as ever it cooleth never ſo little, congealeth preſently. And, no doubt, this action is furthered by the *chalcites*, which hath a ſpirit that will put forth and germinate, as we ſee in chemical trials. Briefly, moſt things putrified bring forth *inſecta* of ſeveral names; but we will not take upon us now to enumerate them all.

697. THE *inſecta* have been noted by the ancients to feed little: but this hath not been diligently obſerved; for graſhoppers eat up the green of whole countries; and ſilk-worms devour leaves ſwiftly; and ants make great proviſion. It is true, that creatures that ſleep and reſt much, eat little; as dormice, and bats, *etc.* 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, a diaphragm and an inteſtine; and they have all ſkins; which in moſt of the *inſecta* are caſt often. They are not, generally, of long life: yet bees have been known to live ſeven years: and ſnakes are thought, the rather for the caſting of their ſpoil, to live till they be old: and eels, which many times breed of putrefaction, will live and grow very long: and thoſe that interchange 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 *ephemera* that live but a day. The cauſe is the exility of the ſpirit, or perhaps the abſence of the ſun; for that if they were brought in, or kept cloſe, they might live longer. Many of the *inſecta*, as butterflies and other flies, revive eaſily when they ſeem dead, being brought to the ſun or fire. The cauſe whereof is the diffuſion of the vital ſpirit, and the eaſy dilating of it by a little heat. They ſtir a good while after their heads are off, or that they be cut in pieces; which is cauſed alſo, for that their vital ſpirits are more diffuſed throughout all their parts, and leſs confined to organs than in perfect creatures.

698. THE *inſecta* 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 to their hills; and bees do admirably know the way from a flowery heath two or three miles off to their hives. It may be, gnats and flies have their imagination more mutable and giddy, as ſmall birds likewiſe have. It is ſaid by ſome of the ancients, that they have only the ſenſe of feeling, which is manifeſtly untrue; for if they go forth right to a place, they muſt needs have ſight; beſides, they delight more in one flower or herb than in another, and therefore have taſte: and bees are called with ſound upon braſs, and therefore they have hearing; which ſheweth likewiſe, that though their ſpirit 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.

Experiment

Experiment ſolitary touching leaping.

699. A MAN leapeth better with weights in his hands than without. The cauſe is, for that the weight, if it be proportionable, ſtrengtheneth the ſinews by contracting them. For otherwiſe, where no contraction is needful, weight hindereth. As we ſee in horſe-races, men are curious to foreſee that there be not the leaſt weight upon the one horſe more than upon the other. In leaping with weights the arms are firſt caſt backwards, and then forwards, with ſo much the greater force; for the hands go backward before they take their riſe. *Query*, if the contrary motion of the ſpirits, immediately before the motion we intend, doth not cauſe the ſpirits as it were to break forth with more force? as breath alſo, drawn and kept in, cometh forth more forcibly: and in caſting of any thing, the arms, to make a great ſwing, are firſt caſt backward.

Experiment ſolitary touching the pleaſures and diſpleaſures of the ſenſes, eſpecially of hearing.

700. OF muſical tones and unequal ſounds we have ſpoken before; but touching the pleaſure and diſpleaſure of the ſenſes, not ſo fully. Harſh ſounds, as of a ſaw when it is ſharpened; grinding of one ſtone againſt another; ſqueaking or ſhrieking noiſe; make a ſhivering 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 horrible, becauſe they excite the memory of things that are odious or fearful; but the ſame things painted do little affect. As for ſmells, taſtes, and touches, they be things that do affect by a participation or impulſion of the body of the object. So it is ſound alone that doth immediately and incorporeally affect moſt; this is moſt manifeſt in muſic, and concords and diſcords 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 diſcord itſelf is but a harſhneſs of divers ſounds meeting. It is true that inequality not ſtayed upon, but paſſing, is rather an increaſe of ſweetneſs; as in the purling of a wreathed 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, diſcords, and harſh ſounds, which we call by divers names, as ſhrieking or grating, ſuch as we now ſpeak of. As for the ſetting of the teeth on edge, we ſee plainly what an intercourſe there is between the teeth and the organ of the hearing, by the taking of the end of a bow between the teeth, and ſtriking upon the ſtring.

NATURAL HISTORY.

CENTURY VIII.

Experiment ſolitary touching veins of medicinal earth.

701. THERE be minerals and foſſils in great variety; but of veins of earth medicinal, but few: the chief are *terra lemnia*, *terra ſigillata communis*, and *bolus armenus*; whereof *terra lemnia* is the chief. The virtues of them are, for curing of wounds, ſtanching of blood, ſtopping of fluxes, and rheums, and arreſting the ſpreading of poiſon, infection, and putrefaction: and they have of all other ſimples the perfecteſt and pureſt quality of drying, with little or no mixture of any other quality. Yet it is true, that the bole-armoniac is the moſt cold of them, and that *terra lemnia* is the moſt hot; for which cauſe the iſland Lemnos, where it is digged, was in the old fabulous ages conſecrated to Vulcan.

Experiment ſolitary touching the growth of ſponges.

702. ABOUT the bottom of the Straits are gathered great quantities of ſponges, which are gathered from the ſides of rocks, being as it were a large but tough moſs. It is the more to be noted, becauſe that there be but few ſubſtances, plant-like, that grow deep within the ſea; for they are gathered ſometimes fifteen fathom deep: and when they are laid on ſhore, they ſeem to be of great bulk; but cruſhed together, will be tranſported in a very ſmall room.

Experiment ſolitary touching ſea-fiſh put in freſh waters.

703. IT ſeemeth, that fiſh that are uſed to the ſalt water, do nevertheleſs delight more in freſh. We ſee, that ſalmons and ſmelts love to get into rivers, though it be againſt the ſtream. At the haven of Conſtantinople you ſhall have great quantities of fiſh that come from the Euxine ſea, that when they come into the freſh water, do inebriate and turn up their bellies, ſo as you may take them with your hand. I doubt there hath not been ſufficient experiment made of putting ſea-fiſh into freſh water, ponds, and pools. It is a thing of great uſe and pleaſure; for ſo you may have them new at ſome good diſtance from the ſea: and beſides, it may be, the fiſh will eat the pleaſanter, and may fall to breed. And it is ſaid, that Colcheſter oiſters, which are put into pits, where the ſea goeth and cometh, but yet ſo that there is a freſh water coming alſo to them when the ſea voideth, become by that means fatter, and more grown.

Experiment ſolitary touching attraction by ſimilitude of ſubſtance.

704. THE Turkiſh bow giveth a very forcible ſhoot; inſomuch as it hath been known, that the arrow hath pierced a ſteel target, or a piece of braſs of two inches thick: but that which is more ſtrange, the arrow, if it be headed with wood, hath been known to pierce 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, ſave 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

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 loadſtone. But this ſame motion of weight or gravity, which is a mere motion of the matter, and hath no affinity with the form or kind, doth kill the other motion, except itſelf be killed by a violent motion, as in theſe inſtances of arrows; for then the motion of attraction by ſimilitude of ſubſtance beginneth to ſhew itſelf. But we ſhall handle this point of nature fully in due place.

Experiment ſolitary touching certain drinks in Turkey.

705. THEY have in Turkey and the eaſt certain confections, which they call ſervets, which are like to candied conſerves, and are made of ſugar and lemons, or ſugar and citrons, or ſugar and violets, and ſome other flowers; and ſome mixture of amber for the more delicate perſons: and thoſe they diſſolve in water, and thereof make their drink, becauſe they are forbidden wine by their law. But I do much marvel, that no Engliſhman, or Dutchman, or German, doth ſet up brewing in Conſtantinople; conſidering they have ſuch quantity of barley. For as for the general ſort of men, frugality may be the cauſe of drinking water; for that it is no ſmall ſaving to pay nothing for one's drink; but the better ſort might well be at the coſt. And yet I wonder the leſs at it, becauſe I ſee France, Italy, or Spain, have not taken into uſe beer or ale; which, perhaps, if they did, would better both their healths and their complexions. It is likely it would be matter of great gain to any that ſhould begin it in Turkey.

Experiments in conſort touching ſweat.

706. IN bathing in hot water, ſweat, nevertheleſs, cometh not in the parts under the water. The cauſe is; firſt, for that ſweat is a kind of colliquation; and that kind of colliquation is not made either by an over-dry heat, or an over-moiſt heat: for over-moiſture doth ſomewhat extinguiſh the heat, as we ſee that even hot water quencheth fire; and over-dry heat ſhutteth the pores: and therefore men will ſooner ſweat covered before the ſun or fire, than if they ſtood naked: and earthen bottles, filled with hot water, do provoke in bed a ſweat more daintily than brick-bats hot. Secondly, hot water doth cauſe evaporation from the ſkin; ſo as it ſpendeth the matter in thoſe parts under the water, before it iſſueth in ſweat. Again, ſweat cometh more plentifully, if the heat be increaſed by degrees, than if it be greateſt at firſt or equal. The cauſe is, for that the pores are better opened by a gentle heat, than by a more violent; and by their opening, the ſweat iſſueth more abundantly. And therefore phyſicians may do well when they provoke ſweat in bed by bottles, with a 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.

707. SWEAT is ſalt in taſte; the cauſe is, for that that part of the nouriſhment which is freſh and ſweet, turneth into blood and fleſh; and the ſweat is only that part which is ſeparate and excerned. Blood alſo raw hath ſome ſaltneſs more than fleſh; becauſe the aſſimilation into fleſh is not without a little and ſubtile excretion from the blood.

708. SWEAT cometh forth more out of the upper parts of the body than the lower; the reaſon is, becauſe thoſe parts are more repleniſhed with ſpirits; and the ſpirits are they that put forth ſweat: beſides, they are leſs fleſhy, and ſweat iſſueth, chiefly, out of the parts that are leſs fleſhy, and more dry; as the forehead and breaſt.

709. MEN ſweat more in ſleep than waking; and yet ſleep doth rather ſtay other flux-

fluxions, than cauſe them; as rheums, looſeneſs of the body, *etc.* The cauſe is, for that in ſleep the heat and ſpirits do naturally move inwards, and there reſt. But when they are collected once within, the heat becometh more violent and irritate; and thereby expelleth ſweat.

710. COLD ſweats are, many times, mortal, and near death; and always ill, and ſuſpected; as in great fears, hypochondriacal paſſions, *etc.* The cauſe is, for that cold ſweats come by a relaxation or forſaking of the ſpirits, whereby the moiſture of the body, which heat did keep firm in the parts, ſevereth and iſſueth out.

711. IN thoſe diſeaſes which cannot be diſcharged by ſweat, ſweat is ill, and rather to be ſtayed; as in diſeaſes of the lungs, and fluxes of the belly: but in thoſe diſeaſes which are expelled by ſweat, it eaſeth and lighteneth; as in agues, peſtilences, *etc.* The cauſe is, for that ſweat in the latter ſort is partly critical, and ſendeth forth the matter that offendeth; but in the former, it either proceedeth from the labour of the ſpirits, which ſheweth them oppreſſed; or from motion of conſent, when nature not able to expel the diſeaſe where it is ſeated, moveth to an expulſion indifferent over all the body.

Experiment ſolitary touching the glow-worm.

712. THE nature of the glow-worm is hitherto not well obſerved. Thus much we ſee; that they breed chiefly in the hotteſt months of ſummer; and that they breed not in champain, but in buſhes and hedges. Whereby it may be conceived, that the ſpirit of them is very fine, and not to be refined but by ſummer heats: and again, that by reaſon of the fineneſs, it doth eaſily exhale. In Italy, and the hotter countries, there is a fly they call *Lucciole*, that ſhineth as the glow-worm doth; and it may be is the flying glow-worm. But that fly 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 ſedge, or other green of the fens, give as good ſhade as buſhes. It may be the glow-worms of the cold countries ripen not ſo far as to be winged.

Experiments in conſort touching the impreſſions, which the paſſions of the mind make upon the body.

713. THE paſſions of the mind work upon the body the impreſſions following. Fear cauſeth paleneſs, trembling, the ſtanding of the hair upright, ſtarting and ſhrieking. The paleneſs is cauſed, for that the blood runneth inward to ſuccour the heart. The trembling is cauſed, for that through the flight of the ſpirits inward, the outward parts are deſtituted, and not ſuſtained. Standing upright of the hair is cauſed, for that by the ſhutting of the pores of the ſkin, the hair that lieth aſlope muſt needs riſe. Starting is both an apprehenſion of the thing feared, and in that kind it is a motion of ſhrinking, and likewiſe an inquiſition in the beginning, what the matter ſhould be, and in that kind it is a motion of erection, and therefore when a man would liſten ſuddenly to any thing, he ſtarteth; for the ſtarting is an erection of the ſpirits to attend. Shrieking 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.

714. 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 laboureth; like

like a great draught when one is thirſty. Sobbing is the ſame thing ſtronger. Groaning and ſcreaming, and roaring, are cauſed by an appetite of expulſion, as hath been ſaid: for when the ſpirits cannot expel the thing that hurteth, in their ſtrife to do it, by motion of conſent, they expel the voice. And this is when the ſpirits yield, and give over to reſiſt: for if one do conſtantly reſiſt pain, he will not groan. Tears are cauſed by a contraction of the ſpirits of the brain; which contraction by conſequence aſtringeth the moiſture of the brain, and thereby ſendeth tears into the eyes. And this contraction or compreſſion, cauſeth alſo wringing of the hands; for wringing is a geſture of expreſſion of moiſture. The diſtorting of the face is cauſed by a contention, firſt to bear and reſiſt, and then to expel; which maketh the parts knit firſt, and afterwards open. Grinding of the teeth is cauſed, likewiſe, by a gathering and ſerring of the ſpirits together to reſiſt, which maketh the teeth alſo to ſit hard one againſt another. Sweating is alſo a compound motion, by the labour of the ſpirits, firſt to reſiſt, and then to expel.

715. JOY cauſeth a chearfulneſs and vigour 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 cauſed preſent death, while the ſpirits did ſpread ſo much as they could not retire again. As for tears, they are the effects of compreſſion of the moiſture of the brain, upon dilatation of the ſpirits. For compreſſion of the ſpirits worketh an expreſſion of the moiſture of the brain by conſent, as hath been ſaid in grief. But then in joy, it worketh it diverſly; namely, 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 ſending 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 gills; which is by the ſending forth of the ſpirits in an appetite to revenge. Trembling in anger is likewiſe by a calling in of the ſpirits; and is commonly when anger is joined with fear. Swelling is cauſed, both by a dilatation of the ſpirits by over-heating, and by a liquefaction or boiling of the humours thereupon. Foaming at the mouth is from the ſame cauſe, being an ebullition. Stamping, and bending of the fiſt, are cauſed by an imagination of the act of revenge.

717. LIGHT diſpleaſure or diſlike cauſeth ſhaking of the head, frowning and knitting of the brows. Theſe effects ariſe from the ſame cauſes that trembling and horror do; namely, from the retiring of the ſpirits, but in a leſs degree. For the ſhaking of the head is but a flow and definite trembling; and is a geſture of ſlight refuſal: and we ſee alſo, that a diſlike cauſeth, often, that geſture of the hand, which we uſe when we refuſe a thing, or warn it away. The frowning and knitting of the 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.

718. SHAME cauſeth bluſhing, and caſting down of the eyes. Bluſhing is the reſort of blood to the face; which in the paſſion of ſhame is the part that laboureth moſt. And although the bluſhing will be ſeen in the whole breaſt if it be naked, yet that is but in paſſage to the face. As for the caſting down of the eyes, it proceedeth

ceedeth of the reverence a man beareth to other men; whereby, when he is aſhamed, he cannot indure to look firmly upon others: and we ſee, that bluſhing, and the caſting down of the eyes both, are more when we come before many; *ore Pompeii quid mollius? nunquam non coram pluribus erubuit*: and likewiſe when we come before great or reverend perſons.

719. PITY cauſeth ſometimes tears; and a flexion or caſt of the eye aſide. Tears come from the ſame cauſe that they do in grief: for pity is but grief in another's behalf. The caſt of the eye is a geſture of averſion, or lothneſs to behold the object of pity.

720. WONDER cauſeth aſtoniſhment, or an immoveable poſture of the body; caſting up of the eyes to heaven, and lifting up of the hands. For aſtoniſhment, it is cauſed by the fixing of the mind upon one object of cogitation, whereby it doth not ſpatiate and tranſcur, 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 caſting 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.

721. 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 breaſts and ſides; running of the eyes with water, if it be violent and continued. Wherein firſt it is to be underſtood, that laughing is ſcarce, properly, a paſſion, but hath its ſource from the intellect; for in laughing there ever precedeth a conceit of ſomewhat ridiculous. And therefore it is proper to man. Secondly, that the cauſe of laughing is but a light touch of the ſpirits, and not ſo deep an impreſſion as in other paſſions. And therefore, that which hath no affinity with the paſſions of the 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 joined with ſome degree of delight: and therefore exhilaration hath ſome affinity with joy, though it be a much lighter motion: *res ſevera eſt verum gaudium*. Fourthly, that the object of it is deformity, abſurdity, ſhrewd turns, and the like. Now to ſpeak of the cauſes of the effects before mentioned, whereunto theſe general notes give ſome light. For the dilatation of the mouth and lips, continued expulſion of the breath and voice, and ſhaking of the breaſt and ſides, they proceed, all, from the dilatation of the ſpirits; eſpecially being ſudden. So likewiſe, the running of the eyes with water, as hath been formerly touched, where we ſpake of the tears of joy and grief, is an effect of dilatation of the ſpirits. And for ſuddenneſs, it is a great part of the matter: for we ſee, that any ſhrewd turn that lighteth upon another; or any deformity, *etc.* moveth laughter in the inſtant; which after a little time it doth not. So we cannot laugh at any thing after it is ſtale, but whilſt it is new: and even in tickling, if you tickle the ſides, and give warning; or give a hard or continued touch, it doth not move laughter ſo much.

722. LUST cauſeth a flagrancy in the eyes and priapiſm. The cauſe of both theſe is, for that in luſt, the ſight and the touch are the things deſired; and therefore the ſpirits reſort to thoſe parts which are moſt affected. And note well in general, for that great uſe may be made of the obſervation, that, evermore, the ſpirits, in all paſſions, reſort moſt to the parts that labour moſt, or are moſt affected. As in the laſt which hath been mentioned, they reſort to the eyes and venereous parts: in fear and anger to the heart: in ſhame to the face: and in light diſlikes to the head.

Experiments

Experiments in conſort touching drunkenneſs.

723. IT hath been obſerved by the ancients, and is yet believed, that the ſperm of drunken men is unfruitful. The cauſe is, for that it is over-moiſtened, and wanteth ſpiſſitude: and we have a merry ſaying, that they that go drunk to bed get daughters.

724. DRUNKEN men are taken with a plain defect, or deſtitution in voluntary motion. They reel; they tremble; they cannot ſtand, nor ſpeak ſtrongly. The cauſe is, for that the ſpirits of the wine 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 ſtupefactives, as poppy, henbane, hemlock, *etc.* induce a kind of drunkenneſs by the groſſneſs of their vapour; as wine doth by the quantity of the vapour. Beſides, they rob the ſpirits animal of their matter whereby they are nouriſhed: for the ſpirits of the wine prey upon it as well as they: and ſo they make the ſpirits leſs ſupple and apt to move.

725. DRUNKEN men imagine every thing turneth round; they imagine alſo that things come upon them; they ſee not well things afar off; thoſe things that they ſee near hand, they ſee out of their place; and, ſometimes, they ſee things double. The cauſe of the imagination that things turn round is, for that the ſpirits themſelves turn, being compreſſed by the vapour of the wine, for any liquid body upon compreſſion turneth, as we ſee in water, and it is all one to the ſight, whether the viſual ſpirits move, or the object moveth, or the medium moveth. And we ſee that long turning round breedeth the ſame imagination. The cauſe of the imagination that things come upon them is, for that the ſpirits viſual themſelves draw back; which maketh the object ſeem to come on; and beſides, when they ſee things turn round and move, fear maketh them think they come upon them. The cauſe that they cannot ſee things afar off, is the weakneſs of the ſpirits; for in every megrim or vertigo, there is an obtenebration joined with a ſemblance of turning round; which we ſee alſo in the lighter ſort of ſwoonings. The cauſe of ſeeing things out of their place, is the refraction of the ſpirits viſual; for the vapour is as an unequal medium; and it is as the ſight of things out of place in water. The cauſe of ſeeing things double is the ſwift and 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 lute-ſtring, it ſheweth double or treble.

726. MEN are ſooner drunk with ſmall draughts than with great. And again, wine ſugared inebriateth leſs than wine pure. The cauſe of the former is, for that the wine deſcendeth not ſo faſt to the bottom of the ſtomach, but maketh longer ſtay in the upper part of the ſtomach, and ſendeth vapours faſter to the head; and therefore inebriateth ſooner. And for the ſame reaſon, ſops in wine, quantity for quantity, inebriate more than wine of itſelf. The cauſe of the latter is, for that the ſugar doth inſpiſſate the ſpirits of the wine, and maketh them not ſo eaſy to reſolve into vapour. Nay farther, it is thought to be ſome remedy againſt inebriating, if wine ſugared be taken after wine pure. And the ſame effect is wrought either by oil or milk, taken upon much drinking.

Experiment ſolitary touching the help or hurt of wine, though moderately uſed.

727. THE uſe of wine in dry and conſumed bodies is hurtful; in moiſt and full bodies it is good. The cauſe is, for that the ſpirits of the wine do prey upon the

dew or radical moiſture, as they term it, of the body, and ſo deceive the animal ſpirits. But where there is moiſture enough or ſuperfluous, there wine helpeth to digeſt, and deſiccate the moiſture.

Experiment ſolitary touching caterpillers.

728. THE caterpiller is one of the moſt general of worms, and breedeth of dew and leaves; for we ſee infinite number of caterpillers which breed upon trees and hedges, by which the leaves of the trees or hedges are in great part conſumed; as well by their breeding out of the leaf, as by their feeding upon the leaf. They breed in the ſpring chiefly, becauſe then there is both dew and leaf. And they breed commonly when the eaſt winds have much blown; the cauſe whereof is, the 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 ſlimy dryneſs; as we ſee upon the ground, whereupon, by dew and ſun, cobwebs breed all over. We ſee alſo the green caterpiller breedeth in the inward parts of roſes, eſpecially not blown, where the dew ſticketh; but eſpecially caterpillers, both the greateſt, and the moſt, breed upon cabbages, which have a fat leaf, and apt to putrify. The caterpiller towards the end of ſummer waxeth volatile, and turneth to a butterfly, or perhaps ſome other fly. There is a caterpiller that hath a fur or down upon it, and ſeemeth to have affinity with the ſilk-worm.

Experiment ſolitary touching the flies cantharides.

729. THE flies *cantharides* are bred of a worm or caterpiller, but peculiar to certain fruit-trees; as are the fig-tree, the pine-tree, and the wild brier; all which bear ſweet fruit, and fruit that hath a kind of ſecret biting or ſharpneſs: for the fig hath a milk in it that is ſweet and corroſive; the pine apple hath a kernel that is ſtrong and abſterſive: the fruit of the brier is ſaid to make children, or thoſe that eat them, ſcabbed. And therefore, no marvel though *cantharides* have ſuch a corroſive and cauteriſing quality; for there is not any other of the *inſecta*, but is bred of a duller matter. The body of the *cantharides* is bright coloured; and it may be, that the delicate-coloured dragon-flies may have likewiſe ſome corroſive quality.

Experiments in conſort touching laſſitude

730. LASSITUDE is remedied by bathing, or anointing with oil and warm water. The cauſe is, for that all laſſitude is a kind of contuſion, and compreſſion of the parts; and bathing and anointing give a relaxation or emollition; and the mixture of oil and water is better than either of them alone; becauſe water entereth better into the pores, and oil after entry ſoftneth better. It is found alſo, that the taking of tobacco doth help and diſcharge laſſitude. The reaſon whereof is, partly, becauſe by chearing or comforting of the ſpirits, it openeth the parts compreſſed or contuſed; and chiefly, becauſe it refreſheth the ſpirits by the opiate virtue thereof, and ſo diſchargeth wearineſs, as ſleep likewiſe doth.

731. IN going up a hill the knees will be moſt weary; in going down a hill, the 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.

Experiment

Experiment ſolitary touching the caſting of the ſkin and ſhell in ſome creatures.

732. THE caſting of the ſkin is by the ancients compared to the breaking of the ſecundine or caul, 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 graſhopper, the lizard, the ſilk-worm, *etc.* Thoſe that caſt their ſhell are, the lobſter, the crab, the crawfiſh, the hodmandod or dodman, the tortoiſe, *etc.* 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 ſometimes by the freſhneſs of the colour of it. The cauſe of the caſting of ſkin and ſhell ſhould ſeem to be the great quantity of matter in thoſe creatures that is fit to make ſkin or ſhell: and again, the looſeneſs of the ſkin or ſhell, that ſticketh not cloſe to the fleſh. For it is certain, that it is the new ſkin or ſhell that putteth off the old: ſo we ſee, that in deer it is the young horn that putteth off the old; and in birds, the young feathers put off the old: and ſo birds that have much matter for their beak, caſt their beaks, the new beak putting off the old.

Experiments in conſort touching the poſtures of the body.

733. LYING not erect, but hollow, which is in the making of the bed; or with the legs gathered up, which is in the poſture of the body, is the more wholeſome. The reaſon is, the better comforting of the ſtomach, which is by that leſs 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 galley-ſlaves, notwithſtanding their miſery otherwiſe, are commonly fat and fleſhy; and the reaſon is, becauſe the ſtomach is ſupported ſomewhat in ſitting, and is penſile in ſtanding or going. And therefore, for prolongation of life, it is good to chooſe thoſe exerciſes where the limbs move more than the ſtomach and belly; as in rowing, and in ſawing being ſet.

734. MEGRIMS and giddineſs are rather when we riſe after long ſitting, than while we ſit. The cauſe is, for that the vapours, which were gathered by ſitting, by the ſudden motion fly more up into the head.

735. LEANING long upon any part maketh it numb, and as we call it, aſleep. The cauſe is, for that the compreſſion of the part ſuffereth not the ſpirits to have free acceſs; and therefore when we come out of it, we feel a ſtinging or pricking, which is the re-entrance of the ſpirits.

Experiment ſolitary touching peſtilential years.

736. IT hath been noted, that thoſe years are peſtilential and unwholſom, when there are great numbers of frogs, flies, locuſts, *etc.* The cauſe is plain; for that thoſe creatures being engender'd of putrefaction, when they abound, ſhew a general diſpoſition of the year, and conſtitution of the air, to diſeaſes of putrefaction. And the ſame prognoſtic, as hath been ſaid before, holdeth, if you find worms in oak-apples: for the conſtitution of the air appeareth more ſubtilly in any of theſe things, than to the ſenſe of man.

Experiment ſolitary touching the prognoſtics of hard winters.

737. IT is an obſervation amongſt country people, that years of ſtore of haws and hips do commonly portend cold winters; and they aſcribe it to God's providence,

that, as the Scripture ſaith, reacheth even the falling of a ſparrow; and much more is like to reach to the preſervation of birds in ſuch ſeaſons. The natural cauſe alſo may be the want of heat, and abundance of moiſture, in the ſummer precedent; which putteth forth thoſe fruits, and muſt needs leave great quantity of cold vapours not diſſipated; which cauſeth the cold of the winter following.

Experiment ſolitary touching medicines that condenſe and relieve the ſpirits.

738. THEY have in Turkey a drink called coffee, made of a berry of the ſame name, as black as ſoot, and of a ſtrong ſcent, but not aromatical; which they take, beaten into powder, in water, as hot as they can drink it: and they take it, and ſit 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 beetle, the leaf tobacco, and the tear of poppy, *opium*, of which the Turks are great takers, ſuppoſing it expelleth all fear, do all condenſe the ſpirits, and make them ſtrong and aleger. But it ſeemeth they are taken after ſeveral manners; for coffee and *opium* are taken down, tobacco but in ſmoke, and beetle 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. *Query*, of henbane-ſeed; of mandrake; of ſaffron, root and flower; of *folium indicum*; of ambergreeſe; of the *Aſſyrian amomum*, if it may be had; and of the ſcarlet powder which they call *kermes*; and, generally, of all ſuch things as do inebriate and provoke ſleep. Note, that tobacco is not taken in root or ſeed, which are more forcible ever than leaves.

Experiment ſolitary touching paintings of the body.

739. THE Turks have a black powder made of a mineral called alcohol, 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 find that Xenophon maketh mention, that the Medes 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, find means to make their hair black, by combing it, as they ſay, with a leaden comb, or the like. As for the Chineſes, who are of an ill complexion, being olivaſter, they paint their cheeks ſcarlet, eſpecially their king and grandees. Generally, barbarous people, that go naked, do not only paint themſelves, but they pounce and raiſe their ſkin, that the painting may not be taken forth; and make it into works. So do the Weſt-Indians; and ſo did the ancient Picts and Britons; ſo that it ſeemeth men would have the colours of birds feathers, if they could tell how; or at leaſt, they will have gay ſkins inſtead of gay clothes.

Experiment ſolitary touching the uſe of bathing and anointing.

740. IT is ſtrange, that the uſe of bathing, as a part of diet, is left. With the Romans and Grecians it was as uſual as eating or ſleeping; and ſo is it amongſt the Turks at this day; whereas with us it remaineth but as a part of phyſic. I am of opinion, that the uſe of it, as it was with the Romans, was hurtful to health; for that it made the body ſoft, and eaſy to waſte. For the Turks it is more proper, becauſe that 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

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ſhould make them frothy. Beſides, the Turks are great ſitters, 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.

Experiment ſolitary touching cambleting of paper.

741. THE Turks have a pretty art of cambleting of paper, which is not with us in uſe. They take divers oiled 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 camblet or marble.

Experiment ſolitary touching cuttle-ink.

742. 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 cauſe ſhould be the high concoction of that blood; for we ſee in ordinary puddings, that the boiling turneth the blood to be black; and the cuttle is accounted a delicate meat, and is much in requeſt.

Experiment ſolitary touching increaſe of weight in earth.

743. IT is reported of credit, that if you take earth from land adjoining to the river of Nile, and preſerve it that manner that it neither come to be wet nor waſted; and weigh it daily, it will not alter weight until the ſeventeenth of June, which is the day when the river beginneth to riſe; and then it will grow more and more ponderous, till the river cometh to its height. Which if it be true, it cannot be cauſed but by the air, which then beginneth to condenſe; and ſo turneth within that ſmall mold into a degree of moiſture, which produceth weight. So it hath been obſerved, that tobacco cut, and weighed, and then dried by the fire, loſeth weight; and after being laid in the open air, recovereth weight again. And it ſhould ſeem, that as ſoon as ever the river beginneth to increaſe, the whole body of the air thereabouts ſuffereth a change: for, that which is more ſtrange, it is credibly affirmed, that upon that very day when the river firſt riſeth, great plagues in Cairo uſe ſuddenly to break up.

Experiments in conſort touching ſleep.

744. THOSE that are very cold, and eſpecially in their feet, cannot get to ſleep: the cauſe may be, for that in ſleep is required a free reſpiration, which cold doth ſhut in and hinder; for we ſee, that in great colds one can ſcarce draw his breath. Another cauſe may be, for that cold calleth the ſpirits to ſuccour; and therefore they cannot ſo well cloſe, and go together in the head; which is ever requiſite to ſleep. And for the ſame cauſe, pain and noiſe hinder ſleep; and darkneſs, contrariwiſe, furthereth ſleep.

745. SOME noiſes, whereof we ſpake in the hundred and twelfth experiment, help ſleep; as the blowing of the wind, the trickling of water, humming of bees, ſoft ſinging, reading, *etc.* The cauſe is, for that they move in the ſpirits a gentle attention; and whatſoever moveth attention without too much labour, ſtilleth the natural and diſcurſive motion of the ſpirits.

746. SLEEP

746. SLEEP nouriſheth, or at leaſt preſerveth bodies, a long time, without other nouriſhment. Beaſts that ſleep in the winter, as it is noted of wild bears, during their ſleep wax very fat, though they eat nothing. Bats have been found in ovens, and other hollow cloſe places, matted one upon another; and therefore it is likely that they ſleep in the winter time, and eat nothing. *Query*, whether bees do not ſleep all winter, and ſpare their honey? Butterflies, and other flies, do not only ſleep, but lie as dead all winter; and yet with a little heat of ſun or fire, revive again. A dormouſe, both winter and ſummer, will ſleep ſome days together, and eat nothing.

Experiments in conſort touching teeth and hard ſubſtances in the bodies of living creatures.

To reſtore teeth in age, were *magnale naturae*. It may be thought of. But howſoever, the nature of the teeth deſerveth to be inquired of, as well as the other parts of living creatures bodies.

747. THERE be five parts in the bodies of living creatures, that are of hard ſubſtance; 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 intire bone; there are the teeth; there are the maxillary bones; there is the hard bone that is the inſtrument of hearing; and thence iſſue the 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 like matter with the teeth; for no birds have teeth: the ſhell of the egg: and their quills: for as for their ſpur, it is but a nail. But no living creatures, that have ſhells very hard, as oiſters, cockles, muſcles, ſcallops, crabs, lobſters, craw-fiſh, ſhrimps, and eſpecially the tortoiſe, have bones within them, but only little griſtles.

748. 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.

749. MOST of the hard ſubſtances fly to the extremes of the body: as ſkull, horns, teeth, nails, and beaks: only the bones are more inward, and clad with fleſh. 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 creature.

750. 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 ſevered, but a little pulp of marrow diffuſed. Teeth likewiſe are thought to have a kind of marrow diffuſed, which cauſeth the ſenſe of pain; but it is rather ſinew; for marrow hath no ſenſe; no more than blood. Horn is alike throughout; and ſo is the nail.

751. NONE other of the hard ſubſtances have ſenſe, but the teeth; and the teeth have ſenſe, not only of pain but of cold.

But we will leave the inquiries of other hard ſubſtances to their ſeveral places; and now inquire only of the teeth.

752. THE teeth are, in men, of three kinds: ſharp, as the fore-teeth; broad, as the back-teeth, which we call the molar-teeth, or grinders; and pointed teeth, or canine,

canine, which are between both. But there have been ſome men, that have had their teeth undivided, as of one whole bone, with ſome little mark in the place of the diviſion; as Pyrrhus had. Some creatures have over-long or out-growing teeth, which we call fangs, or tuſks; as boars, pikes, ſalmons, and dogs, though leſs. Some living creatures have teeth againſt teeth; as men and horſes; and ſome have teeth, eſpecially their maſter-teeth, indented one within another like ſaws, as lions; and ſo again have dogs. Some fiſhes have divers rows of teeth in the roofs of their mouths; as pikes, ſalmons, trouts, *etc.* And many more in ſalt-waters. Snakes, and other ſerpents have venomous teeth; which are ſometimes miſtaken for their ſting.

753. No beaſt that hath horns hath upper teeth; and no beaſt that hath teeth above wanteth them below: but yet if they be of the ſame kind, it followeth not, that if the hard matter goeth not into upper teeth, it will go into horns; nor yet *e converſo*; for does, that have no horns, have no upper teeth.

754. HORSES have, at three years old, a tooth put forth, which they call the colt's tooth; and at four years old there cometh the mark tooth, which hath a hole as 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.

755. THE teeth of men breed firſt, when the child is about a year and half old: and then they caſt them, and new come about ſeven years old. But divers have backward teeth come forth at twenty, yea ſome at thirty and forty. *Query*, of the manner of the coming of them forth. They tell a tale of the old counteſs of Deſmond, who lived till ſhe was ſevenſcore years old, that ſhe did dentite twice or thrice; caſting her old teeth, and others coming in their place.

756. TEETH are much hurt by ſweetmeats; 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.

757. CONCERNING teeth, theſe things are to be conſidered. 1. The preſerving of them. 2. The keeping of them white. 3. The drawing of them with leaſt pain. 4. The ſtaying and eaſing of the tooth-ach. 5. The binding in of artificial teeth, where teeth have been ſtrucken out. 6. And laſt of all, that great one of reſtoring teeth in age. The inſtances that give any likelihood of reſtoring teeth in age, are the late coming of teeth in ſome; and the renewing of the beaks in birds, which are commaterial with teeth. *Query*, 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 trial 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 a greater head of horns? And whether the head of a dear, 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 waſh, or ſomething to make their teeth better and ſtronger? Coral is in uſe as an help to the teeth of children.

Experiments

Experiments in conſort touching the generation and bearing of living creatures in the womb.

758. SOME living creatures generate but at certain ſeaſons of the year; as deer, ſheep, wild conies, *etc.* and moſt ſorts of birds and fiſhes: others at any time of the year, as men; and all domeſtic creatures, as horſes, hogs, dogs, cats, *etc.* The cauſe of generation at all ſeaſons ſeemeth to be fulneſs: for generation is from redundance. This fulneſs ariſeth from two cauſes; either from the nature of the creature, if it be hot, and moiſt, and ſanguine; or from plenty of food. For the firſt, men, horſes, dogs, *etc.* which breed at all ſeaſons, are full of heat and moiſture; doves are the fulleſt of heat and moiſture amongſt birds, and therefore breed often; the tame dove almoſt continually. But deer are a melancholy dry creature, as appeareth by their fearfulneſs, and the hardneſs of their fleſh. Sheep are a cold creature, as appeareth by their mildneſs, and for that they ſeldom drink. Moſt ſort of birds are of a dry ſubſtance in compariſon of beaſts. Fiſhes are cold. For the ſecond cauſe, fulneſs of food; men, kine, ſwine, dogs, *etc.* feed full; and we ſee that thoſe creatures, which being wild, generate ſeldom, being tame, generate often; which is from warmth, and fulneſs of food. We find, that the time of going to rut of deer is in September; for that they need the whole ſummer's 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 ſhe is buſy in ſitting, or rearing her young. And therefore it is found by experience, that if you take the eggs, or young ones, out of the neſts of birds, they will fall to generate again three or four times one after another.

759. OF living creatures, ſome are longer time in the womb, and ſome ſhorter. Women go commonly nine months; the cow and the ewe about ſix months; does go about nine months; mares eleven months; bitches nine weeks; elephants are ſaid to go two years; for the received tradition of ten years is fabulous. For birds there is double inquiry; the diſtance between the treading or coupling, and the laying of the egg; and again, between the egg laid, and the diſcloſing or hatching. And amongſt birds, there is leſs diverſity of time, than amongſt other creatures; yet ſome there is; for the hen ſitteth but three weeks; the turky-hen, gooſe, and duck, a month: *Query*, of others. The cauſe of the great difference of times amongſt living creatures, is, either from the nature of the kind; or from the conſtitution of the womb. For the former, thoſe that are longer in coming to their maturity or growth, are longer in the womb; as is chiefly ſeen in men: and ſo elephants, which are long in the womb, are long time in coming to their full growth. But in moſt other kinds, the conſtitution of the womb, that is, the hardneſs or dryneſs thereof, is concurrent with the former cauſe. For the colt hath about four years of growth; and ſo the fawn; and ſo the calf. But whelps, which come to their growth, commonly, within three quarters of a year, are but nine weeks in the womb. As for birds, as there is leſs diverſity in the time of their bringing forth;

ſo

ſo there is leſs diverſity in the time of their growth; moſt of them coming to their growth within a twelvemonth.

760. SOME creatures bring forth many young ones at a burden: as bitches, hares, conies, *etc.* Some ordinarily but one; as women, lioneſſes, *etc.* 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 number; if more, fewer: or by the partitions and cells of the womb, which may ſever the ſperm.

Experiments in conſort touching ſpecies viſible.

761. THERE is no doubt, but light by refraction will ſhew greater, as well as things coloured. For like as a ſhilling in the bottom of the water will ſhew greater; ſo will a candle in a lanthorn, in the bottom of the water. I have heard of a practice, that glow-worms 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 groſſer, things ſhew greater; but contrariwiſe, when the eye is placed in the groſſer medium, and the object in the finer, how it worketh I know not.

762. IT would be well bolted out, whether great refractions may not be made upon reflexions, as well as upon direct beams. For example, we ſee, that take an empty baſon, put an angel of gold, or what you will into it; then go ſo far from the baſon, till you cannot ſee the angel, becauſe it is not in a right line; then fill the baſon with water, and you ſhall ſee it out of its place becauſe of the reflexion. To proceed therefore, put a looking-glaſs into a baſon of water; I ſuppoſe you ſhall not ſee the image in a right line, or at equal angles, but aſide. I know not whether this experiment may not be extended ſo, as you might ſee the image, and not the glaſs; which for beauty and ſtrangeneſs were a fine proof: for then you ſhall ſee the image like a ſpirit in the air. As for example, if there be a ciſtern or pool of water, you ſhall place over-againſt it a picture of the devil, or what you will, ſo as you do not ſee the water. Then put a looking-glaſs in the water: now if you can ſee the devil's picture aſide, not ſeeing the water, it would look like a devil indeed. They have an old tale in Oxford, that frier Bacon walked between two ſteeples: which was thought to be done by glaſſes, when he walked upon the ground.

Experiments in conſort touching impulſion and percuſſion.

763. A WEIGHTY body put into motion, is more eaſily impelled, than at firſt when it reſteth. The cauſe is partly becauſe motion doth diſcuſs the torpor of ſolid bodies; which, beſide their motion of gravity, have in them a natural appetite not to move at all; and partly, becauſe a body that reſteth, doth get, by the reſiſtance of the body upon which it reſteth, a ſtronger compreſſion of parts than it hath of itſelf: and therefore needeth more force to be put in motion. For if a weighty body be penſile, and hang but by a thread, the percuſſion will make an impulſion very near as eaſily as if it were already in motion.

764. A BODY over great or over ſmall, will not be thrown ſo far as a body of a middle ſize: ſo that, it ſeemeth, there muſt be a commenſuration, or proportion between the body moved and the force, to make it move well. The cauſe is, becauſe to the impulſion there is requiſite the force of the body that moveth, and the reſiſtance

ſiſtance of the body that is moved: and if the body be too great, it yieldeth too little; and if it be too ſmall, it reſiſteth too little.

765. 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 part in furthering the percuſſion; but the chief cauſe I take to be, for that the parts of the body moved have by impulſion, or by the motion of gravity continued, a compreſſion in them, as well downwards, as they have when they are thrown, or ſhot through the air, forwards. I conceive alſo, that the quick loſs of that motion preventeth the reſiſtance of the body below; and priority of the force, always, is of great efficacy, as appeareth in infinite inſtances.

Experiment ſolitary touching titillation.

766. TICKLING is moſt in the ſoles of the feet, and under the arm-holes, and on the ſides. The cauſe is the thinneſs of the ſkin in thoſe parts, joined with the rareneſs of being touched there: for all tickling is a light motion of the ſpirits, which the thinneſs of the ſkin and ſuddenneſs and rareneſs of touch do further: for we ſee a feather, or a ruſh, drawn along the lip or cheek, doth tickle; whereas a thing more obtuſe, or a touch more hard, doth not. And for ſuddenneſs, we ſee no man can tickle himſelf: we ſee alſo that the palm of the hand, though it hath as thin a ſkin as the other parts mentioned, yet is not tickliſh, becauſe it is accuſtomed to be touched. Tickling alſo cauſeth laughter. The cauſe may be the emiſſion of the ſpirits, and ſo of the breath, by a flight from titillation; for upon tickling we ſee there is ever a ſtarting or ſhrinking away of the part to avoid it; and we ſee alſo, that if you tickle the noſtrils with a feather, or ſtraw, it procureth ſneezing; which is a ſudden emiſſion of the ſpirits that do likewiſe expel the moiſture. And tickling is ever painful, and not well endured.

Experiment ſolitary touching the ſcarcity of rain in Ægypt.

767. IT is ſtrange, that the river of Nilus overflowing, as it doth, the country of Ægypt, there ſhould be nevertheleſs little or no rain in that country. The cauſe muſt be either in the nature of the water, or in the nature of the air, or of both. In the water, it may be aſcribed either unto the long race of the water; for ſwift running waters vapour not ſo much as ſtanding waters; or elſe to the concoction of the water; for waters well concocted vapour not ſo much as waters raw; no more than waters upon the fire do vapour ſo much after ſome time of boiling as at the firſt. And it is true, that the water of Nilus is ſweeter than other waters in taſte; and it is excellent good for the ſtone, and hypochondriacal melancholy, which ſheweth it is lenifying; and it runneth through a country of a hot climate, and flat, without ſhade, either of woods or hills, whereby the ſun muſt needs have great power to concoct it. As for the air, from whence I conceive this want of ſhowers cometh chiefly, the cauſe muſt be, for that the air is of itſelf thin and thirſty; and as ſoon as ever it getteth any moiſture from the water, it imbibeth and diſſipateth it in the whole body of the air, and ſuffereth it not to remain in vapour, whereby it might breed rain.

Experiment ſolitary touching clarification.

768. IT hath been touched in the title of percolations, namely, ſuch as are inwards, that the whites of eggs and milk do clarify; and it is certain, that in Ægypt they

they prepare and clarify the water of Nile, by putting it into great jars of ſtone, and ſtirring it about with a few ſtamped almonds, wherewith they alſo beſmear the mouth of the veſſel; and ſo draw it off, after it hath reſted ſome time. It were good to try this clarifying with almonds in new beer, or muſte, to haſten and perfect the clarifying.

Experiment ſolitary touching plants without leaves.

769. THERE be ſcarce to be found any vegetables, that have branches and no leaves, except you allow coral for one. But there is alſo in the deſerts of S. Maccaria in Ægypt, a plant which is long, leafleſs, brown of colour, and branched like coral, ſave that it cloſeth at the top. This being ſet in water within a houſe, ſpreadeth and diſplayeth ſtrangely; and the people thereabout have a ſuperſtitious belief, that in the labour of women it helpeth to the eaſy deliverance.

Experiment ſolitary touching the materials of glaſs.

770. The cryſtalline Venice glaſs is reported to be a mixture in equal portions of ſtones brought from Pavia by the river Ticinum, and the aſhes of a weed, called by the Arabs kal, which is gathered in a deſert between Alexandria and Roſetta; and is by the Ægyptians uſed firſt for fuel; and then they cruſh the aſhes into lumps like a ſtone, and ſo ſell them to the Venetians for their glaſs-works.

Experiment ſolitary touching prohibition of putrefaction, and the long conſervation of bodies.

771. IT is ſtrange, and well to be noted, how long carcaſes have continued uncorrupt, and in their former dimenſions, as appeareth in the mummies of Ægypt; having laſted, as is conceived, ſome of them, three thouſand years. It is true, they find means to draw forth the brains, and to take forth the entrails, which are the parts apteſt to corrupt. But that is nothing to the wonder: for we ſee what a ſoft and corruptible ſubſtance the fleſh of all the other parts of the body is. But it ſhould ſeem, that, according to our obſervation and axiom in our hundredth experiment, putrefaction, which we conceive to be ſo natural a period of bodies, is but an accident; and that matter maketh not that haſte to corruption that is conceived. And therefore bodies in ſhining amber, in quick-ſilver, in balms, whereof we now ſpeak, in wax, in honey, in gums, and, it may be, in conſervatories of ſnow, *etc.* are preſerved very long. It need not go for repetition, if we reſume again that which we ſaid in the aforeſaid experiment concerning anniſilation; namely, that if you provide againſt three cauſes of putrefaction, bodies will not corrupt: the firſt is, that the air be excluded, for that undermineth the body, and conſpireth with the ſpirit of the body to diſſolve it. The ſecond is, that the body adjacent and ambient be not commaterial, but merely heterogeneal towards the body that is to be preſerved; for if nothing can be received by the one, nothing can iſſue from the other; ſuch are quick-ſilver and white amber, to herbs, and flies, and ſuch bodies. The third is, that the body to be preſerved be not of that groſs that it may corrupt within itſelf, although no part of it iſſue into the body adjacent: and therefore it muſt be rather thin and ſmall, than of bulk. There is a fourth remedy alſo, which is, that if the body to be preſerved be of bulk, as a corps is, then the body that incloſeth it muſt have a virtue to draw forth, and dry the moiſture of the inward body; for elſe the putrefaction will play within, though

nothing iſſue forth. I remember Livy doth relate, that there were found at a time two coffins of lead in a 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 pontifs; and that in the coffin that had the body, there was nothing at all to be ſeen, but a little light cinders about the ſides; but in the coffin that had the books, they were found as freſh as if they had been but newly written, being written on parchment, and covered over with watch-candles of wax three or four fold. By this it ſeemeth that the Romans in Numa's time were not ſo good embalmers as the Ægyptians were; which was the cauſe that the body was utterly conſumed. But I find in Plutarch, and others, that when Auguſtus Cæſar viſited the ſepulchre of Alexander the Great in Alexandria, he found the body to keep its dimenſion; but withal, that notwithſtanding all the embalming, which no doubt was of the beſt, the body was ſo tender, as Cæſar touching but the noſe of it defaced it. Which maketh me find it very ſtrange, that the Ægyptian mummies ſhould be reported to be as hard as ſtone-pitch; for I find no difference but one, which indeed may be very material; namely, that the ancient Ægyptian mummies were ſhrowded in a number of folds of linen, beſmeared with gums, in manner of ſear-cloth, which it doth not appear was practiſed upon the body of Alexander.

Experiment ſolitary touching the abundance of nitre in certain ſea-ſhores.

772. NEAR the caſtle of Caty, and by the wells of Aſſan, in the land of Idumæa, a great part of the way you would think the ſea were near at hand, though it be a good diſtance off: and it is nothing but the ſhining of the nitre upon the ſea ſands, ſuch abundance of nitre the ſhores there do put forth.

Experiment ſolitary touching bodies that are born up by water.

773. THE dead-ſea, which vomiteth up bitumen, is of that craſſitude, as living bodies bound hand and foot caſt into it have been born up, and not ſunk; which ſheweth, that all ſinking into water is but an 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 impoſture. We ſee alſo, that all metals, except gold, for the ſame reaſon, ſwim upon quickſilver.

Experiment ſolitary touching fuel that conſumeth little or nothing.

774. IT is reported, that at the foot of a hill near the *mare mortuum* there is a black ſtone, whereof pilgrims make fires, which burneth like a coal, and diminiſheth not, but only waxeth brighter and whiter. That it ſhould do ſo is not ſtrange; for we ſee iron red-hot burneth, and conſumeth not; but the ſtrangeneſs is, that it ſhould continue any time ſo: for iron, as ſoon as it is out of the fire, deadneth ſtraightways. Certainly it were a thing of great uſe and profit, if you could find 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 ſalamander's wool; being a kind of mineral, which whiteneth alſo in the burning, and conſumeth not. The queſtion is this; flame muſt be made of ſomewhat, and commonly it is made of ſome tangible body which hath weight: but it is not impoſſible perhaps that it ſhould be made of ſpirit, or vapour, in a body, which ſpirit or vapour hath no weight,

weight, ſuch as is the matter of *ignis fatuus*. But then you will ſay, that that vapour alſo can laſt but a ſhort time: to that it may be anſwered, that by the help of oil, and wax, and other candle-ſtuff, the flame may continue, and the wick not burn.

Experiment ſolitary œconomical touching cheap fuel.

775. SEA-COAL laſts longer than charcoal; and charcoal of roots, being coaled into great pieces, laſts longer than ordinary charcoal. Turf and peat, and cow-ſheards, are cheap fuels, and laſt long. Small-coal, or brier-coal, poured upon charcoal, make them laſt longer. Sedge is a cheap fuel to brew or bake with; the rather becauſe it is good for nothing elſe. Trial ſhould 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 ſaving.

Experiment ſolitary touching the gathering of wind for freſhneſs.

776. IT is at this day in uſe in Gaza, to couch potſherds 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 freſhneſs in great heats: and it is ſaid, there are ſome rooms in Italy and Spain for freſhneſs, and gathering the winds and air in the heats of ſummer: but they be but pennings of the winds, and enlarging them again, and making them reverberate, and go round in circles, rather than this device of ſpouts in the wall.

Experiment ſolitary touching the trials of airs.

777. THERE ſhould be uſed much diligence in the choice of ſome bodies and places, as it were, for the taſting of air; to diſcover the wholeſomeneſs or unwholeſomeneſs, as well of ſeaſons, as of the ſeats of dwellings. It is certain, that there be ſome houſes wherein confitures and pies will gather mould more than in others. And I am perſuaded, that a piece of raw fleſh or fiſh will ſooner corrupt in ſome airs than in others. They be noble experiments that can make this diſcovery; for they ſerve for a natural divination of ſeaſons, better than the aſtronomers can by their figures: and again, they teach men where to chooſe their dwelling for their better health.

Experiment ſolitary touching increaſing of milk in milch beaſts.

778. THERE is a kind of ſtone about Bethlehem, which they grind to powder, and put into water, whereof cattle drink, which maketh them give more milk. Surely there ſhould be ſome better trials 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 beſt.

Experiment ſolitary touching ſand of the nature of glaſs.

779. 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 glaſs: inſomuch as other minerals laid in it turn to a glaſſy ſubſtance without the fire; and again, glaſs put into it turneth into the mother ſand. The thing is very ſtrange, if it be true: and it is likelieſt to be cauſed by ſome natural furnace or heat in the earth: and yet they do not

not ſpeak of any eruption of flames. It were good to try in glaſs-works, whether the crude materials of glaſs, mingled with glaſs already made, and remolten, do not facilitate the making of glaſs with leſs heat.

Experiment ſolitary touching the growth of coral.

780. IN the ſea, upon the ſouth-weſt of Sicily, much coral is found. It is a ſubmarine plant. It hath no leaves: it brancheth only when it is under water; it is ſoft, and green of colour; but being brought into the air, it becometh hard and ſhining red, as we ſee. It is ſaid alſo to have a white berry; but we find it not brought over with the coral. Belike it is caſt away as nothing worth: inquire better of it, for the diſcovery of the nature of the plant.

Experiment ſolitary touching the gathering of manna.

781. The manna of Calabria is the beſt, and in moſt plenty. They gather it from the leaf of the mulberry-tree; but not of ſuch mulberry-trees as grow in the valleys. And manna falleth upon the leaves by night, as other dews do. It ſhould ſeem, that before thoſe dews come upon trees in the valleys, they diſſipate and cannot hold out. It ſhould ſeem alſo, the mulberry-leaf itſelf hath ſome coagulating virtue, which inſpiſſateth the dew, for that it is not found upon other trees: and we ſee by the ſilk-worm which feedeth upon that leaf, what a dainty ſmooth juice it hath; and the leaves alſo, eſpecially of the black mulberry, are ſomewhat briſtly, which may help to preſerve the dew. Certainly it were not amiſs to obſerve a little better the 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 May-dew for medicine, ſhould gather it from the hills.

Experiment ſolitary touching the correcting of wine.

782. IT is ſaid they have a manner to prepare their Greek wines, to keep them from fuming and inebriating, by adding ſome ſulphur or alum: whereof the one is unctuous, and the other is aſtringent. And certain it is, that thoſe two natures do beſt repreſs fumes. This experiment ſhould be transferred unto other wine and ſtrong beer, by putting in ſome like ſubſtances while they work; which may make them both to fume leſs, and to inflame leſs.

Experiment ſolitary touching the materials of wild-fire.

783. IT is conceived by ſome, not improbably, that the reaſon why wild-fires, whereof the principal ingredient is bitumen, do not quench with water, is, for that the firſt concretion of bitumen is a mixture of a fiery and watry ſubſtance; ſo is not ſulphur. This appeareth, for that in the place near Puteoli, which they call the court of Vulcan, you ſhall hear under the earth a horrible thundring of fire and water conflicting together: and there break forth alſo ſpouts of boiling water. Now that place yieldeth great quantities of bitumen; whereas Ætna and Veſuvius, and the like, which conſiſt upon ſulphur, ſhoot forth ſmoke, 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.

Experiment

Experiment ſolitary touching plaiſter growing as hard as marble.

784. THERE is a cement, compounded of flour, whites of eggs, and ſtone powdered, that becometh hard as marble: wherewith Piſcina Mirabilis, near Cuma, is ſaid to have the walls plaiſtered. And it is certain and tried, that the powder of loadſtone and flint, by the addition of whites of eggs and gum-dragon, made into paſte, will in a few days harden to the hardneſs of a ſtone.

Experiment ſolitary touching judgment of the cure in ſome ulcers and hurts.

785. IT hath been noted by the ancients, that in full or impure bodies, ulcers or hurts in the legs are hard to cure, and in the head more eaſy. The cauſe is, for that ulcers or hurts in the legs require deſiccation, which by the defluxion of humours to the lower parts is hindred; whereas hurts and ulcers in the head require it not; but contrariwiſe dryneſs maketh them more apt to conſolidate. And in modern obſervation, the like difference hath been found between Frenchmen and Engliſhmen; whereof the one's conſtitution is more dry, and the other's more moiſt. And therefore a hurt of the head is harder to cure in a Frenchman, and of the leg in an Engliſhman.

Experiment ſolitary touching the healthfulneſs or unhealthfulneſs of the ſouthern wind.

786. IT hath been noted by the ancients, that ſouthern winds, blowing much, without rain, do cauſe a feverous diſpoſition of the year; but with rain, not. The cauſe is, for that ſouthern winds do of themſelves qualify the air, to be apt to cauſe fevers; but when ſhowers are joined, they do refrigerate in part, and check the ſultry heat of the ſouthern wind. Therefore this holdeth not in the ſea-coaſts, becauſe the vapour of the ſea, without ſhowers, doth refreſh.

Experiment ſolitary touching wounds.

787. IT hath been noted by the ancients, that wounds which are made with braſs heal more eaſily than wounds made with iron. The cauſe is, for that braſs hath in itſelf a ſanative virtue; and ſo in the very inſtant helpeth ſomewhat: but iron is cotroſive, and not ſanative. And therefore it were good, that the inſtruments which are uſed by chirurgeons about wounds, were rather of braſs than iron.

Experiment ſolitary touching mortification by cold.

788. IN the cold countries, 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 complete. But ſnow put upon them helpeth; for that it preſerveth thoſe ſpirits that remain, till they can revive; and beſides, ſnow hath in it a ſecret warmth: as the monk proved out of the text; *qui dat nivem ſicut lanam, gelu ſicut cineres ſpargit.* Whereby he did infer, that ſnow did warm like wool, and froſt did fret like 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 to the cure of gangrenes, either coming of themſelves, or induced by too much applying of opiates: wherein you muſt beware of dry heat, and reſort to things that are refrigerant, with an inward warmth and virtue of cheriſhing.

Experiment

Experiment ſolitary touching weight.

789. WEIGH iron and *aqua fortis* ſeverally; then diſſolve the iron in the *aqua fortis*, and weigh the diſſolution; and you ſhall find it to bear as good weight as the bodies did ſeverally; notwithſtanding a good deal of waſte by a thick vapour that iſſueth during the working: which ſheweth that the opening of a body doth increaſe the weight. This was tried once or twice, but I know not whether there were any error in the trial.

Experiment ſolitary touching the ſuper-natation of bodies.

790. TAKE of *aqua fortis* two ounces, of quickſilver two drams, 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 will increaſe its power of bearing; as we ſee brine, when it is ſalt enough, will bear an egg. And I remember well a phyſician, that uſed to give ſome mineral baths for the gout, *etc.* 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 than the weight of a ſtone, doth not compenſe the weight of a ſtone more than the weight of the *aqua fortis*.

Experiment ſolitary touching the flying of unequal bodies in the air.

791. LET there be a body of unequal weight, as of wood and lead, or bone and lead, if you throw it from you with the light end forward, it will turn, and the weightier end will recover to be forwards; unleſs the body be over-long. The cauſe is, for that the more denſe body hath a more violent preſſure of the parts from the firſt impulſion; which is the cauſe, though heretofore not found out, as hath been often ſaid, of all violent motions: and when the hinder part moveth ſwifter, for that it leſs endureth preſſure of parts, than the forward part can make way for it, it muſt needs be that the body turn over: for, turned, it can more eaſily draw forward the lighter part. Galilæus noteth it well, that if an open trough wherein water is, be driven faſter than 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.

Experiment ſolitary touching water, that it may be the medium of ſounds.

792. IT is certain, as it hath been formerly in part touched, that water may be the medium of ſounds. If you daſh a ſtone againſt a ſtone in the bottom of the water, it maketh a ſound. So a long pole ſtruck upon gravel in the bottom of the water, maketh a ſound. Nay, if you ſhould think that the ſound cometh up by the pole, and not by the water, you ſhall find that an anchor let down by a rope maketh a ſound; and yet the rope is no ſolid body whereby the ſound can aſcend.

Experiment

Experiment ſolitary of the flight of the ſpirits upon odious objects.

793. 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, deſtitute; and ſo there is induced in them a trepidation and horror. For ſounds, we ſee that the grating of a ſaw, or any very harſh noiſe, will ſet the teeth on edge, and make all the body ſhiver. For taſtes, we ſee that in the taking of a potion or pills, the head and the neck ſhake. For odious ſmells, the like effect followeth, which is 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 ſmell of a carrion, eſpecially of a dead horſe, maketh them fly away, and take on almoſt as if they were mad. For feeling, if you come out of the ſun ſuddenly into a ſhade, there followeth a chilneſs or ſhivering in all the body. And even in ſight, which hath in effect no odious object, coming into ſudden darkneſs, induceth an offer to ſhiver.

Experiment ſolitary touching the ſuper-reflexion of echos.

794. THERE is in the city of Ticinum 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 voice twelve or thirteen 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 Pont-Charenton doth. And the voice ſoundeth, as if it came from above the door. And if you ſtand at the lower end, or on either ſide of the door, the echo holdeth; but if you ſtand in the door, or in the midſt juſt over-againſt the door, not. Note, that all echos ſound better againſt old walls than new; becauſe they are more dry and hollow.

Experiment ſolitary touching the force of imagination, imitating that of the ſenſe.

795. THOSE effects which are wrought by the percuſſion of the ſenſe, and by things in fact, are produced likewiſe in ſome degree by the imagination. Therefore if a man ſee another eat ſour or acid things, which ſet the teeth on edge, this object tainteth the imagination. So that he that ſeeth the thing done by another, hath his own teeth alſo ſet on edge. So if a man ſee another turn ſwiftly and long; or if he look upon wheels that turn, himſelf waxeth turn-ſick. So if a man be upon an high place without rails or good hold, except he be uſed to it, he is ready to fall: for imagining a fall, it putteth his ſpirits into the very action of a fall. So many upon the ſeeing of others bleed, or ſtrangled, or tortured, themſelves are ready to faint, as if they bled, or were in ſtrife.

Experiment ſolitary touching preſervation of bodies.

796. TAKE a ſtock-gilly-flower, and tie it gently upon a ſtick, and put them both into a ſtoop-glaſs full of quickſilver, ſo that the flower be covered: then lay a little weight upon the top of the glaſs, that may keep the ſtick down; and look upon them after four or five days; and you ſhall find 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 quickſilver; and not preſerve only, but by the coldneſs of the quickſilver indurate; for the freſhneſs of the flower may be merely conſervation; which is the more to be obſerved, becauſe the quickſilver preſſeth the flower; but

the ſtiffneſs of the ſtalk cannot be without induration, from the cold, as it ſeemeth, of the quickſilver.

Experiment ſolitary touching the growth or multiplying of metals.

797. IT is reported by ſome of the ancients, that in Cyprus there is a kind of iron, that being cut into little pieces, and put into the ground, if it be well watered, will increaſe into greater pieces. This is certain, and known of old, that lead will multiply and increaſe; 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; inſomuch as it hanged upon the ſtone like warts.

Experiment ſolitary touching the drowning of the more baſe metal in the more precious.

798. I CALL drowning of metals, when that the baſer metal is ſo incorporate with the more rich, as it can by no means be ſeparated again; which is a kind of verſion, though falſe: as if ſilver ſhould be inſeparably incorporated with gold; or copper and lead with ſilver. The ancient electrum had in it a fifth of ſilver to the gold, and made a compound metal, as fit for moſt uſes as gold, and more reſplendent, and more qualified in ſome other properties; but then that was eaſily ſeparated. This to do privily, or to make the compound paſs 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 incorporated with gold will not be recovered by any water of ſeparation, except you put a greater quantity of ſilver to draw to it the leſs; which, he ſaid, is the laſt refuge in ſeparations. But that is a tedious way, which no man, almoſt, will think on. This ſhould be better inquired; and the quantity of the fifteenth turned to a twentieth; and likewiſe with ſome little additional, that may further the intrinſic incorporation. Note, that ſilver in gold will be detected, by weight, compared with the dimenſion; but lead in ſilver, lead being the weightier metal, will not be detected, if you take ſo much the more ſilver, as will countervail the over-weight of the lead.

Experiment ſolitary touching fixation of bodies.

799. GOLD is the only ſubſtance, which hath nothing in it volatile, and yet melteth without much difficulty. The melting ſheweth that it is not jejune, or ſcarce in ſpirit. So that the fixing of it is not want of ſpirit to fly out, but the equal ſpreading of the tangible parts, and the cloſe coacervation of them: whereby they have the leſs appetite, and no means at all to iſſue forth. It were good therefore to try, whether glaſs remolten 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 eaſy admiſſion of light, heat, and cold; and by the ſmallneſs of the weight. There be other bodies fixed which have little or no ſpirit; ſo as there is nothing to fly out; as we ſee in the ſtuff whereof coppels are made, which they put into furnaces, upon which fire worketh not: ſo that there are three cauſes of fixation; the even ſpreading both of the ſpirits and tangible parts, the cloſeneſs of the tangible parts, and the jejuneneſs or extreme comminution of ſpirits: of which three, the two firſt may be joined with a nature liquefiable, the laſt not.

Experiment

Experiment ſolitary touching the reſtleſs nature of things in themſelves, and their deſire to change.

800. IT is a profound contemplation in nature, to conſider of 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 its own former conſiſtence; for elſe it would never receive them in ſo ſuddenly and eaſily. Water, and all liquors, do haſtily receive dry and more terreſtrial bodies, proportionable: and dry bodies, on the other ſide, drink in waters and liquors: ſo that, as it was well ſaid by one of the ancients, of earthy and watery ſubſtances, one is a glue to another. Parchment, ſkins, cloth, *etc.* drink in liquors, though themſelves be entire bodies, and not comminuted, as ſand and aſhes, nor apparently porous: metals themſelves do receive in readily ſtrong-waters; and ſtrong-waters likewiſe do readily pierce into metals and ſtones: and that ſtrong water will touch upon gold, that will not touch upon ſilver; and *è converſo*. And gold, which ſeemeth by the weight to be the cloſeſt and moſt ſolid body, doth greedily drink in quickſilver. And it ſeemeth, that this reception of other bodies is not violent: for it is many times reciprocal, and as it were with conſent. Of the cauſe of this, and to what axiom it may be referred, conſider attentively; for as for the pretty aſſertion, that matter is like a common ſtrumpet that deſireth all forms, it is but a wandring notion. Only flame doth not content itſelf to take in any other body, but either to overcome and turn another body into itſelf, as by victory; or itſelf to die, and go out.

NATURAL HISTORY.

CENTURY IX.

Experiments in conſort touching perception in bodies inſenſible, tending to natural divination or ſubtile trials.

IT is certain, that all bodies whatſoever, though they have no ſenſe, yet they have perception: for when one body is applied to another, there is a kind of election to embrace that which is agreeable, and to exclude or expel that which is ingrate: and whether the body be alterant or altered, evermore a perception precedeth operation; for elſe all bodies would be alike one to another. And ſometimes this perception, in ſome kind of bodies, is far more ſubtile than the ſenſe; ſo that the ſenſe is but a dull thing in compariſon of it: we ſee a weather-glaſs will find the leaſt difference of the weather, in heat, or cold, when men find it not. And this perception alſo is ſometimes at diſtance, as well as upon the touch; as when the load-ſtone draweth iron; or flame fireth naphtha of Babylon, a great diſtance off. It is therefore a ſubject of a very noble inquiry, to inquire of the more ſubtile 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 ſubtile trials; as to try whether ſeeds be old or new, the ſenſe cannot inform; but if you boil them in water, the new ſeeds will ſprout ſooner: and ſo of water, the taſte will not diſcover the beſt water; but the ſpeedy conſuming of it, and many other means, which we have heretofore ſet down, will diſcover it. So in all phyſiognomy, the lineaments of the body will diſcover thoſe natural inclinations of the mind which diſſimulation will conceal, or diſcipline will ſuppreſs. We ſhall therefore now handle only thoſe two perceptions, which pertain to natural divination and diſcovery; leaving the handling of perception in other things to be diſpoſed elſewhere. Now it is true, that divination is attained by other means; as if you know the cauſes, if you know the concomitants, you may judge of the effect to follow: and the like may be ſaid of diſcovery; but we tie ourſelves here to that divination and diſcovery chiefly, which is cauſed by an early or ſubtile perception.

The aptneſs or propenſion of air, or water, to corrupt or putrify, no doubt, is to be found before it break forth into manifeſt effects of diſeaſes, blaſtings, or the like. We will therefore ſet down ſome prognoſtics of peſtilential and unwholeſome 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, graſhoppers, flies, and the like creatures bred of putrefaction, doth portend peſtilential years.

802. GREAT

802. GREAT and early heats in the ſpring, and namely in May, without winds, portend the ſame; and generally ſo 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 peſtilent ſummer the year following: for about the end of Auguſt all the ſweetneſs of the earth, which goeth into plants and trees, is exhaled, and much more if the Auguſt be dry, ſo that nothing then can breathe forth of the earth but a groſs vapour, which is apt to corrupt the air: and that vapour, by the firſt ſhowers, if they be gentle, is releaſed, and cometh forth abundantly. Therefore they that come abroad ſoon after thoſe ſhowers, are commonly taken with ſickneſs: and in Africa, no body will ſtir out of doors after the firſt ſhowers. But if the ſhowers come vehemently, then they rather waſh and fill the earth, than give it leave to breathe 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 frolty winter diſcharge it, which ſeldom ſucceedeth ſuch droughts.

804. THE leſſer infections, of the ſmall-pox, purple fevers, agues, in the ſummer precedent, and hovering all winter, do portend a great peſtilence in the ſummer following; for putrefaction doth not riſe to its height at once.

805. IT were good to lay a piece of raw fleſh or fiſh in the open air; and if it putrify quickly, it is a ſign of a diſpoſition in the air to putrefaction. And becauſe you cannot be informed whether the putrifaction 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 putrify, the fleſh, or fiſh, will ſooner putrify abroad where the air hath more power, than in the houſe, where it hath leſs, being many ways corrected. And this experiment ſhould 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 tincture and infuſion from the earth; it were good to try that expoſing of fleſh or fiſh, both upon a ſtake of wood ſome height above the earth, and upon the flat of the earth.

806. TAKE May-dew, and ſee whether it putrify quickly or no; for that likewiſe may diſcloſe the quality of the air, and vapour of the earth, more or leſs corrupted.

807. A DRY March and a dry May portend a wholeſome ſummer, if there be a ſhowering April between: but otherwiſe it is a ſign of a peſtilential year.

808. AS the diſcovery of the diſpoſition of the air is good for the prognoſtics 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.

809. 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 diverſly. We ſee that there be ſome houſes, wherein ſweet-meats will relent, and baked meats will mould, more than in others; and wainſcots will alſo ſweat more; ſo that they will almoſt run

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 than to find it after, take the experiments following.

810. 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, *etc.* more ponderous than the other: and if it do, you may judge of that place, as ſituate in a groſs and moiſt air.

811. 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 than in others; and inequality of air is ever an enemy to health; it were good to take two weather-glaſſes, matches in all things, and to ſet them, for the ſame hours of one day, in ſeveral places, where no ſhade is, nor incloſures; 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 find 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 be, of the aſcent or deſcent of the water, the greater is the inequality of the temper of the air.

812. 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 hips, and brier-berries, hath been ſpoken of before. If wainſcot, or ſtone, that have uſed to ſweat, be more dry in the beginning of winter, or the drops of the eaves of houſes come more ſlowly down than they uſe, it portendeth a hard and froſty winter. The cauſe is, for that it ſheweth an inclination of the air to dry weather; which in winter is ever joined with froſt.

813. GENERALLY a moiſt and cool ſummer portendeth a hard winter. The cauſe is, for that the vapours of the earth are not diſſipated in the ſummer by the ſun; and ſo they rebound upon the winter.

814. A HOT and dry ſummer, and autumn, and eſpecially if the heat and drought extend far into September, portendeth an open beginning of winter; and colds to ſucceed toward the latter part of the winter, and the beginning of the ſpring: for till then the former heat and drought bear the ſway, and the vapours are not ſufficiently multiplied.

815. AN open and warm winter portendeth a hot and dry ſummer: for the vapours diſperſe into the winter ſhowers; whereas cold and froſt keepeth them in, and tranſporteth them into the late ſpring, and ſummer following.

816. 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, feldfares, *etc.* 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, cuckooes, *etc.* that come towards ſummer, if they come early, ſhew a hot ſummer to follow.

817. THE prognoſtics, more immediate, of weather to follow ſoon after, are more certain than thoſe of ſeaſons. The reſounding of the ſea upon the ſhore; and the murmur of winds in the woods, without apparent wind, ſhew wind to follow; for ſuch winds breathing chiefly out of the earth, are not at the firſt perceived, except they be pent by water or wood. And therefore a murmur out of caves likewiſe portendeth as much.

818. THE

818. THE upper regions of the air perceive the collection of the matter of tempests and winds, before the air here below: and therefore the obscuring of the smaller stars, is a sign of tempest following. And of this kind you shall find a number of instances in our inquisition *De ventis*.

819. GREAT mountains have a perception of the disposition of the air to tempests, sooner than the valleys or plains below: and therefore they say in Wales, when certain hills have their night-caps on, they mean mischief. The cause is, for that tempests, which are for the most part bred above in the middle region, as they call it, are soonest perceived to collect in the places next it.

820. THE air, and fire, have subtile perceptions of wind rising, before men find it. We see the trembling of a candle will discover a wind that otherwise we do not feel; and the flexuous burning of flames doth shew the air beginneth to be unquiet; and so do coals of fire by casting off the ashes more than they use. The cause is, for that no wind at the first, till it hath struck and driven the air, is apparent to the sense: but flame is easier to move than 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 casting up grass, or chaff, or such light things into the air.

821. WHEN wind expireth from under the sea, as it causeth some resounding of the water, whereof we spake before, so it causeth some light motions of bubbles, and white circles of froth. The cause is, for that the wind cannot be perceived by the sense, until there be an eruption of a great quantity from under the water; and so it getteth into a body: whereas in the first putting up it cometh in little portions.

822. WE spake of the ashes that coals cast off; and of grass 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, fly to and fro in the air.

FOR prognostics 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, than men that live most within doors; and especially birds who live in the air freest and clearest; and are aptest by their voice to tell tales what they find; and likewise by the motion of their flight to express the same.

823. WATER-fowls, as sea-gulls, moor-hens, *etc.* when they flock and fly together from the sea towards the shores; and contrariwise, land-birds, as crows, swallows, *etc.* when they fly from the land to the waters, and beat the waters with their wings, do foreshew rain and wind. The cause is, pleasure that both kinds take in the moistness and density of the air; and so desire to be in motion, and upon the wing, whithersoever they would otherwise go: for it is no marvel, that water-fowl do joy most in that air which is likest water; and land-birds also, many of them, delight in bathing, and moist air. For the same reason also, many birds do prune their feathers; and geese do gaggle; and crows seem to call upon rain: all which is but the comfort they seem to receive in the relenting of the air.

824. THE heron, when she soareth high, so as sometimes she is seen to pass over a cloud, sheweth winds: but kites flying aloft, shew fair and dry weather. The cause may be, for that they both mount most into the air of that temper wherein they delight: and the heron being a water-fowl, taketh pleasure in the air that is condensed; and besides, being but heavy of wing, needeth the help of the grosser air. But the kite affecteth not so much the grossness of the air, as the cold and freshness thereof; for being a bird of prey, and therefore hot, she delighteth in the fresh air; and, many times, flyeth against the wind; as trouts and salmons swim against the stream.

ſtream. And yet it is true alſo, that all birds find an eaſe in the depth of the air; as ſwimmers do in a deep water. And therefore when they are aloft, they can uphold themſelves with their wings ſpread, ſcarce moving them.

825. FISHES, when they play towards the top of the water, do commonly foretel 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 fly it, and ſwim lower.

826. BEASTS 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 conies, will feed hard before rain; and a heifer will put up her noſe, and ſnuff in the air againſt rain.

827. THE trefoil 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 wincopipe; which if it open in the morning, you may be ſure of a fair day to follow.

828. EVEN in men, aches, and hurts, and corns, do engrieve either towards rain, or towards froſt: for the one maketh the humours more to abound; and the other maketh them ſharper. So we ſee both extremes bring the gout.

829. WORMS, vermin, *etc.* do foreſhew likewiſe rain: for earth-worms will come forth, and moles will caſt up more, and fleas bite more, againſt rain.

830. SOLID bodies likewiſe foreſhew rain. As ſtones and wainſcot when they ſweat: 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 itſelf; but the latter is an inward ſwelling of the body of the wood itſelf.

Experiment ſolitary touching the nature of appetite in the ſtomach.

831. 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 ſo is dryneſs: and therefore all four things, as vinegar, juice of lemons, oil of vitriol, *etc.* provoke appetite. And the diſeaſe which they call *appetitus caninus*, conſiſteth in the matter of an acid and glaſſy phlegm in the mouth of the ſtomach. 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 onions, 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 abſterſion. So as there be four principal cauſes of appetite; the refrigeration of the ſtomach joined with ſome dryneſs, contraction, vellication, and abſterſion; beſides hunger; which is an emptineſs: and yet over-faſting doth, many times, cauſe the appetite to ceaſe; for that want of meat maketh the ſtomach draw humours, and ſuch humours as are light and choleric, which quench appetite moſt.

Experiment ſolitary touching ſweetneſs of odour from the rainbow.

832. IT hath been obſerved by the ancients, that where a rainbow ſeemeth to hang over, or to touch, there breatheth forth a ſweet ſmell. The cauſe is, for that this happeneth but in certain matters, which have in themſelves ſome ſweetneſs; which the gentle dew of the rainbow doth draw forth: and the like do ſoft ſhowers; for they alſo make the ground ſweet: but none are ſo delicate as the dew of the rainbow where

it

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 itſelf may not have ſome degree of ſweetneſs. It is true, that we find it ſenſibly in no pool, river, nor fountain; but good earth newly turned up, hath a freſhneſs and good ſcent; which water, if it be not too equal, for equal objects never move the ſenſe, may alſo have. Certain it is, that bay-ſalt, which is but a kind of water congealed, will ſometimes ſmell like violets.

Experiment ſolitary touching ſweet ſmells.

833. To ſweet ſmells heat is requiſite to concoct the matter; and ſome moiſture to ſpread the breath of them. For heat, we ſee that woods and ſpices are more odorate in the hot countries than in the cold: for moiſture, we ſee that things too much dried loſe their ſweetneſs: and flowers growing, ſmell better in a morning or evening than at noon. Some ſweet ſmells are deſtroyed by approach to the fire; as violets, wall-flowers, gilly-flowers, pinks; and generally all flowers that have cool and delicate ſpirits. Some continue both on the fire, and from the fire; as roſe-water, *etc.* Some do ſcarce come forth, or at leaſt not ſo pleaſantly, as by means of the fire; as juniper, ſweet gums, *etc.* and all ſmells that are encloſed in a faſt body: but generally thoſe ſmells are the moſt grateful, where the degree of heat is ſmall; or where the ſtrength of the ſmell is allayed; for theſe things do rather woo the ſenſe, than ſatiate it. And therefore the ſmell of violets and roſes exceedeth in ſweetneſs that of ſpices and gums; and the ſtrongeſt ſort of ſmells are beſt in a weft afar off.

Experiment ſolitary touching the corporeal ſubſtance of ſmells.

834. It is certain, that no ſmell iſſueth but with emiſſion of ſome corporeal ſubſtance; not as it is in light, and colours, and in ſounds. For we ſee plainly, that ſmell doth ſpread nothing that diſtance that the other do. It is true, that ſome woods of oranges, and heaths of roſemary, will ſmell a great way into the ſea, perhaps twenty miles; but what is that, ſince a peal of ordnance will do as much, which moveth in a ſmall compaſs? Whereas thoſe woods and heaths are of vaſt ſpaces; beſides, we ſee that ſmells do adhere to hard bodies; as in perfuming of gloves, *etc.* which ſheweth them corporeal; and do laſt a great while, which ſounds and light do not.

Experiment ſolitary touching fetid and fragrant odours.

835. The excrements of moſt creatures ſmell ill; chiefly to the ſame creature that voideth them: for we ſee, beſides that of man, that pigeons and horſes thrive beſt, if their houſes and ſtables be kept ſweet; and ſo of cage-birds: and the cat burieth that which ſhe voideth: and it holdeth chiefly in thoſe beaſts which feed upon fleſh. Dogs almoſt only of beaſts delight in fetid odours; which ſheweth there is ſomewhat in their ſenſe of ſmell differing from the ſmells of other beaſts. But the cauſe why excrements ſmell ill, is manifeſt; for that the body itſelf 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 leſs ill; as urine: and thoſe that are from the third, yet leſs; for ſweat is not ſo bad

as the other two; especially of some persons, that are full of heat. Likewise most putrefactions are of an odious smell: for they smell either fetid or mouldy. The cause may be, for that putrefaction doth bring forth such a consistence, as is most contrary to the consistence of the body whilst it is sound: for it is a mere dissolution of that form. Besides, there is another reason, which is profound: and it is, that the objects that please any of the senses have all some equality, and as it were order in their composition; but where those are wanting, the object is ever ingrate. So mixture of many disagreeing colours is ever unpleasant to the eye: mixture of discordant sounds is unpleasant to the ear: mixture, or hotch-potch of many tastes, is unpleasant to the taste: harshness and ruggedness of bodies is unpleasant to the touch: now it is certain, that all putrefaction, being a dissolution of the first form, is a mere confusion and unformed mixture of the part. Nevertheless it is strange, and seemeth to cross the former observation, that some putrefactions and excrements do yield excellent odours, as civet and musk; and, as some think, ambergrease: for divers take it, though improbably, to come from the sperm of a fish: and the moss we spake of from apple-trees, is little better than an excretion. The reason may be, for that there passeth in the excrements, and remaineth in the putrefactions, some good spirits; especially where they proceed from creatures that are very hot. But it may be also 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 ingrate. 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 herrings, caviary, parmesan, *etc.* And it may be the same holdeth in smells: for those kind of smells that we have mentioned, are all strong, and do pull and vellicate the sense. And we find also, that places where men urine, commonly have some smell of violets: and urine, if one hath eaten nutmeg, hath so too.

THE slothful, general, and indefinite contemplations, and notions of the elements and their conjugations; of the influences of heaven; of heat, cold, moisture, drought, qualities active, passive, and the like; have swallowed up the true passages, and processes, and affects, and consistences of matter and natural bodies. Therefore they are to be set aside, being but notional and ill-limited; and definite axioms are to be drawn out of measured instances: and so assent to be made to the more general axioms by scale. And of these kinds of processes of natures and characters of matter, we will now set down some instances.

Experiment solitary touching the causes of putrefaction.

836. ALL putrefactions come chiefly from the inward spirits of the body; and partly also from the ambient body, be it air, liquor, or whatsoever else. And this last, by two means: either by ingress of the substance of the ambient body into the body putrified; or by excitation and solicitation of the body putrified, and the parts thereof, by the body ambient. As for the received opinion, that putrefaction is caused, either by cold, or peregrine and preternatural heat, it is but nugation: for cold in things inanimate, is the greatest enemy that is to putrefaction; though it extinguisheth vivification, which ever consisteth in spirits attenuate, which the cold doth congeal and coagulate. And as for the peregrine heat, it is thus far true, that if the proportion of the adventive heat be greatly predominant to the natural heat and spirits of the body, it tendeth to dissolution, or notable alteration. But this is wrought by

by emiſſion, or ſuppreſſion, or ſuffocation, of the native ſpirits; and alſo by the diſordination and diſcompoſure of the tangible parts, and other paſſages of nature, and not by a conflict of heats.

Experiment ſolitary touching bodies unperfectly mixed.

837. IN verſions, or main alterations of bodies, there is a medium between the body, as it is at firſt, and the body reſulting; which medium is *corpus imperfecte miſtum*, and is tranſitory, and not durable; as miſts, ſmokes, vapours, chylus in the ſtomach, living creatures in the firſt vivification: and the middle action, which produceth ſuch imperfect bodies, is fitly called, by ſome of the ancients, inquination or inconcoction, which is a kind of putrefaction: for the parts are in confuſion, till they ſettle one way or other.

Experiment ſolitary touching concoction and crudity.

838. THE word concoction, or digeſtion, is chiefly taken into uſe from living creatures and their organs; and from thence extended to liquors and fruits, *etc.* 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 altered is too ſtrong for the efficient that ſhould convert or alter it, whereby it reſiſteth 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 reſt, mixture of a body already concocted, *etc.* are alſo means to concoction. And there are of concoction two periods; the one aſſimilation, or abſolute converſion and ſubaction; the other maturation; whereof the former is moſt conſpicuous in the bodies of living creatures; in which there is an abſolute converſion and aſſimilation of the nouriſhment into the body: and likewiſe in the bodies of plants: and again in metals, where there is a full tranſmutation. The other, which is maturation, is ſeen in liquors and fruits; wherein there is not deſired, nor pretended, an utter converſion, but only an alteration to that form which is moſt ſought for man's uſe; as in clarifying of drinks, ripening of fruits, *etc.* But note, that there be two kinds of abſolute converſions; the one is, when a body is converted into another body, which was before; as when nouriſhment is turned into fleſh; that is it which we call aſſimilation. The other is, when the converſion is into a body merely new, and which was not before; as if ſilver ſhould be turned to gold, or iron to copper: and this converſion is better called, for diſtinction ſake, tranſmutation.

Experiment ſolitary touching alterations, which may be called majors.

839. 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 *alteratio major*; as when meat is boiled,

boiled, or roſted, or fried, *etc.* 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 at hand and occur, and not excited from a ſufficient number of inſtances, and thoſe well collated.

THE conſiſtences of bodies are very divers: denſe; rare, tangible, pneumatical; volatile, fixed; determinate, not determinate; hard, ſoft; cleaving, not cleaving; congelable, not congelable; liquefiable, not liquefiable; fragile, tough; flexible, inflexible; tractile, or to be drawn forth in length, intractile; porous, ſolid; equal and ſmooth, unequal; venous, and fibrous, and with grains, entire; and divers others; all which to refer to heat, and cold, and moiſture, and drought, is a compendious and inutile ſpeculation. But of theſe ſee principally our *Abecedarium naturæ*; and otherwiſe *ſparſim* in this our *Sylva Sylvarum*: nevertheleſs, in ſome good part, we ſhall handle divers of them now preſently.

Experiment ſolitary touching bodies liquefiable, and not liquefiable.

840. LIQUEFIABLE, and not liquefiable, proceed from theſe cauſes: liquefaction is ever cauſed by the detention of the ſpirits, which play within the body and open it. Therefore ſuch bodies as are more turgid of ſpirit; or that have their ſpirits more ſtraitly impriſoned; or, again, that hold them better pleaſed and content, are liquefiable: for theſe three diſpoſitions of bodies do arreſt the emiſſion of the ſpirits. An example of the firſt two properties is in metals; and of the laſt in greaſe, pitch, ſulphur, butter, wax, *etc.* The diſpoſition not to liquefy proceedeth from the eaſy emiſſion of the ſpirits, whereby the groſſer parts contract; and therefore bodies jejune of ſpirits, or which part with their ſpirits more willingly, are not liquefiable; as wood, clay, free-ſtone, *etc.* But yet even many of thoſe bodies that will not melt, or will hardly melt, will notwithſtanding ſoften; as iron in the forge; and a ſtick bathed in hot aſhes, which thereby becometh more flexible. Moreover there are ſome bodies which do liquefy or diſſolve by fire; as metals, wax, *etc.* and other bodies which diſſolve in water; as ſalt, ſugar, *etc.* The cauſe of the former proceedeth from the dilatation of the ſpirits by heat: the cauſe of the latter proceedeth from the opening of the tangible parts, which deſire to receive the liquor. Again, there are ſome bodies that diſſolve with both; as gum, *etc.* And thoſe be ſuch bodies, as on the one ſide have good ſtore of ſpirit; and on the other ſide, have the tangible parts indigent of moiſture; for the former helpeth to the dilating of the ſpirits by fire; and the latter ſtimulateth the parts to receive the liquor.

Experiment ſolitary touching bodies fragile and tough.

841. OF bodies, ſome are fragile; and ſome are tough, and not fragile; and in the breaking, ſome fragile bodies break but where the force is; ſome ſhatter and fly in many places. Of fragility, the cauſe is an impotency to be extended: and therefore ſtone is more fragile than metal; and ſo fictile 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

tion of bodies, and it is ever concomitant with porosity, and with dryness in the tangible parts: contrariwise, tough bodies have more spirit, and fewer pores, and moister tangible parts: therefore we see that parchment or leather will stretch, paper will not; woollen cloth will tenter, linen scarcely.

Experiment solitary touching the two kinds of pneumaticals in bodies.

842. 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 desiccate by heat or age: for in them, when the native spirit goeth forth, and the moisture with it, the air with time getteth into the pores. And those bodies are ever the more fragile; for the native spirit is more yielding and extensive, especially to follow the parts, than air. The native spirits also admit great diversity; as hot, cold, active, dull, *etc.* whence proceed most of the virtues and qualities, as we call them, of bodies: but the air intermixed is without virtues, and maketh things insipid, and without any extimulation.

Experiment solitary touching concretion and dissolution of bodies.

843. THE concretion of bodies is commonly solved by the contrary; as ice, which is congealed by cold, is dissolved by heat; salt and sugar, which are excocted by heat, are dissolved by cold and moisture. The cause is, for that these operations are rather returns to their former nature, than alterations; so that the contrary cureth. As for oil, it doth neither easily congeal with cold, nor thicken with heat. The cause of both effects, though they be produced by contrary efficients, seemeth to be the same; and that is, because the spirit of the oil 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 congealed in a cup, the ice will swell instead of contracting, and sometimes rift.

Experiment solitary touching hard and soft bodies.

844. OF bodies, some we see are hard, and some soft: the hardness is caused chiefly by the jejuneness of the spirits, and their imparity with the tangible parts: both which, if they be in a greater degree, make them not only hard, but fragile, and less enduring of pressure; as steel, stone, glass, dry wood, *etc.* Softness cometh contrariwise, by the greater quantity of spirits, which ever helpeth to induce yielding and cession, and by the more equal spreading of the tangible parts, which thereby are more sliding and following; as in gold, lead, wax, *etc.* But note, that soft bodies, as we use the word, are of two kinds; the one, that easily giveth place to another body, but altereth not 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 give place indeed easily, but then they rise all over; which is a false cession; for it is in place, and not in body.

Experiment

Experiment ſolitary touching bodies ductile and tenſile.

845. ALL bodies ductile and tenſile, 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 forſake their own body. Viſcous bodies likewiſe, as pitch, wax, bird-lime, cheeſe toaſted, will draw forth and rope. But the difference between bodies fibrous and bodies viſcous is plain; for all wool, and tow, and cotton, and ſilk, eſpecially raw-ſilk, have, beſides their deſire of continuance, in regard of the tenuity of their thread, a greedineſs of moiſture; and by moiſture to join and incorporate with other thread; eſpecially if there be a little wreathing; as appeareth by the twiſting of thread, and the practice of twirling about of ſpindles. And we ſee alſo, that gold and ſilver thread cannot be made without twiſting.

Experiment ſolitary touching other paſſions of matter, and characters of bodies.

846. THE differences of impreſſible and not impreſſible, figurable and not figurable; mouldable and not mouldable; ſciſſile and not ſciſſile; and many other paſſions of matter, are plebeian notions, applied unto the inſtruments and uſes which men ordinarily practiſe; but they are all but the effects of ſome of theſe cauſes following, which we will enumerate without applying them, becauſe that will 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 fly 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 diffuſed. The tenth is the denſity or rarity of the tangible parts. The eleventh is the equality or inequality of the tangible parts. The twelfth is the digeſtion, or crudity of the tangible parts. The thirteenth is the nature of the matter, whether ſulphureous or mercurial, watery or oily, dry and terreſtrial, or moiſt and liquid; which natures of ſulphureous and mercurial, ſeem to be natures radical and principal. The fourteenth is the placing of the tangible parts in length or tranſverſe, as it is in the warp and the woof of textiles, more inward or more outward, *etc.* The fifteenth is the poroſity or imporoſity betwixt the tangible parts, and the greatneſs or ſmallneſs of the pores. The ſixteenth is the collocation and poſture of the pores. There may be more cauſes; but theſe do occur for the preſent.

Experiment ſolitary touching induration by ſympathy.

847. TAKE lead and melt it, and in the midſt of it, when it beginneth to congeal, make a little dint or hole, and put quickſilver wrapped in a piece of linen into that hole, and the quickſilver 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

tion of excitation to imitate; for to aſcribe it only to the vapour of lead, is leſs probable. *Query*, whether the fixing may be in ſuch a degree, as it will be figured like other metals? For if ſo, you may make works of it for ſome purpoſes, ſo they come not near the fire.

Experiment ſolitary touching honey and ſugar.

848. SUGAR hath put down the uſe of honey, inſomuch 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 tear or blood iſſuing from the tree: inſomuch as one of the ancients relateth, that in Trebiſond there was honey iſſuing from the box-trees, which made men mad. Again, in ancient time there was a kind of honey, which either of its 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 boiled it in a copper to the half; then they poured it into earthen veſſels for a ſmall time; and after tunned 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 ſeaſoned, is a good wholeſome drink, and very clear. They uſe alſo in Wales a compound drink of mead, with herbs and ſpices. But mean while it were good, in recompence of that we have loſt in honey, there were brought in uſe a ſugar-mead, for ſo we may call it, though without any mixture at all of honey; and to brew it, and keep it ſtale, as they uſe mead: for certainly, though it would not be ſo abſterſive, and opening, and ſolutive a drink as mead; yet it will be more grateful to the ſtomach, and more lenitive and fit to be uſed in ſharp diſeaſes: for we ſee, that the uſe of ſugar in beer and ale hath good effects in ſuch caſes.

Experiment ſolitary touching the finer ſort of baſe metals.

849. IT is reported by the ancients, that there was a kind of ſteel in ſome places, which would poliſh almoſt as white and bright as ſilver. And that there was in India a kind of braſs, which, being poliſhed, could ſcarce be diſcerned from gold. This was in the natural uſe; 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 to ſuch a fineneſs, as ſerveth the ordinary uſe, they try no farther.

Experiment ſolitary touching cements and quarries.

850. THERE have been found certain cements under earth that are very ſoft; and yet, taken forth into the ſun, harden as hard as marble: there are alſo ordinary quarries in Somerſetſhire, which in the quarry cut ſoft to any bigneſs, and in the building prove firm and hard.

Experiment ſolitary touching the altering of the colour of hairs and feathers.

851. 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 griſly; and many others. So do ſome birds; as cygnets from gray turn white; hawks from brown turn more white. And ſome birds there be that upon their moulting do turn colour; as robin-red-breaſts, after their moulting, grow to be red again by degrees; ſo do goldfinches upon

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 dryer: 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 colour of birds, and the retardation of hoary hairs. But of this ſee in the fifth experiment.

Experiment ſolitary touching the differences of living creatures, male and female.

852. THE difference between male and female, in ſome creatures, is not to be diſcerned, otherwiſe than in the parts of generation: as in horſes and mares, dogs and bitches, doves he and 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 manes: the ſhe-lions 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 males in birds have the faireſt feathers. Some differ in divers features; as bucks have horns, does none; rams have more wreathed horns than ewes; cocks have great combs and ſpurs, hens little or none; boars have great fangs, ſows much leſs: the turkey-cock hath great and ſwelling gills, the hen hath leſs; men have generally deeper and ſtronger voices than women. Some differ in faculty; as the cocks amongſt ſinging-birds are the beſt ſingers. The chief cauſe of all theſe, no doubt, is, for that the males have more ſtrength of heat than the females; which appeareth manifeſtly in this, that all young creatures males are like females; and ſo are eunuchs, and gelt creatures of all kinds, liker females. Now heat cauſeth greatneſs of growth, generally, where there is moiſture enough to work upon: but if there be found in any creature, which is ſeen rarely, an over-great heat in proportion to the moiſture, in them the female is the greater: as in hawks and ſparrows. And if the heat be balanced with the moiſture, then there is no difference to be ſeen between male and female; as in the inſtances of horſes and dogs. We ſee alſo, that the horns of oxen and cows, for the moſt part, are larger than the bulls; which is cauſed by abundance of moiſture, which in the horns of the bull faileth. Again, heat cauſeth piloſity and criſpation, and ſo likewiſe beards in men. It alſo expelleth finer moiſture, which want of heat cannot expel; and that is the cauſe of the beauty and variety of feathers. Again, heat doth put forth many excreſcences, and much ſolid matter, which want of heat cannot do: and this is the cauſe of horns, and of the greatneſs of them: and of the greatneſs of the combs and ſpurs of cocks, gills of turkey-cocks, and fangs of boars. Heat alſo dilateth the pipes and organs, which cauſeth the deepneſs of the voice. Again, heat refineth the ſpirits, and that cauſeth the cock ſinging-bird to excel the hen.

Experiment ſolitary touching the comparative magnitude of living creatures.

853. 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 ſucked by the air and ſun-beams. Alſo they reſt always in a manner, and are ſupported by the water;

water; whereas motion and labour do conſume. As for the greatneſs of beaſts more than of birds, it is cauſed, for that beaſts ſtay longer time in the womb than birds, and there nouriſh and grow; whereas in birds, after the egg laid, there is no further growth or nouriſhment from the female; for the ſetting doth vivify, and not nouriſh.

Experiment ſolitary touching exoſſation of fruits.

854. WE have partly touched before the means of producing fruits without cores or ſtones. And this we add farther, that the cauſe muſt be abundance of moiſture; for that the core 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 into fruit without ſtone or cores. It is reported, that a cion of an apple, grafted upon a colewort-ſtalk, ſendeth forth a great apple without a core. It is not unlikely, that if the inward pith of a tree were taken out, ſo that the juice came 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 cion be grafted the ſmall end downwards, it will make fruit have little or no cores and ſtones.

Experiment ſolitary touching the melioration of tobacco.

855. TOBACCO is a thing of great price, if it be in requeſt: for an acre of it will be worth, as is affirmed, two hundred pounds by the year towards charge. The charge of making the ground and otherwiſe is great, but nothing to the profit; but the Engliſh tobacco hath ſmall credit, as being too dull and earthy: nay, the Virginian tobacco, though that be in a hotter climate, can get no credit for the ſame cauſe: ſo that a trial to make tobacco more aromatical, and better 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 toys; for nothing that is once perfect, and hath run its race, can receive much amendment. You muſt ever reſort to the beginnings of things for melioration. The way of maturation of tobacco muſt, as in other plants, be from the heat either of the earth or of the ſun: we ſee ſome leading of this in muſk-melons, which are ſown upon a hot bed dunged below, upon a bank turned upon the ſouth ſun, to give heat by reflexion; laid upon tiles, which increaſeth the heat, and covered with ſtraw to keep them from cold. They remove them alſo, which addeth ſome life: and by theſe helps they become as good in England, as in Italy or Provence. Theſe, and the like means, may be tried in tobacco. Inquire alſo of the ſteeping of the roots in ſome ſuch liquor as may give them vigour to put forth ſtrong.

Experiment ſolitary touching ſeveral heats working the ſame effects.

856. HEAT of the ſun for the maturation of fruits; yea, and the heat of viviſication of living creatures, are both repreſented and ſupplied by the heat of fire; and likewiſe the heats of the ſun, and life, are repreſented one by the other. Trees ſet upon the backs of chimneys do ripen fruit ſooner. Vines, that have been drawn in at the window of a kitchen, have ſent forth grapes ripe a month at leaſt before others. Stoves at the back of walls bring forth oranges 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 oſtrich layeth her eggs under ſand, where the heat of the ſun diſcloſeth them.

Experiment ſolitary touching ſwelling and dilatation in boiling.

857. BARLEY in the boiling ſwelleth not much; wheat ſwelleth more; rice extremely; inſomuch as a quarter of a pint unboiled, will ariſe to a pint boiled. The cauſe no doubt is, for that the more cloſe and compact the body is, the more it will dilate: now barley is the moſt hollow; wheat more ſolid than that; and rice moſt ſolid of all. It may be alſo that ſome bodies have a kind of lentour, and more depertible nature than others; as we ſee it evident in coloration; for a ſmall quantity of ſaffron will tincture more than a very great quantity of braſil or wine.

Experiment ſolitary touching the dulcoration of fruits.

858. FRUIT groweth ſweet by rolling, or preſſing them gently with the hand; as rolling pears, damaſcenes, *etc.* by rottenneſs; as medlars, ſervices, ſloes, hips, *etc.* by time; as apples, wardens, pomgranates, *etc.* by certain ſpecial maturations; as by laying them in hay, ſtraw, *etc.* and by fire; as in roſting, ſtewing, baking, *etc.* The cauſe of the ſweetneſs by rolling and preſſing, is emollition, which they properly induce; as in beating of ſtock-fiſh, fleſh, *etc.* by rottenneſs is, for that the ſpirits of the fruit by putrefaction gather heat, and thereby digeſt the harder part, for in all putrefactions there is a degree of heat: by time and keeping is, becauſe the ſpirits of the body do ever feed upon the tangible parts, and attenuate them: by ſeveral maturations is, by ſome degree of heat: and by fire is, becauſe it is the proper work of heat to refine and to incorporate; and all ſourneſs conſiſteth in ſome groſſneſs of the body; and all incorporation doth make the mixture of the body more equal in all the parts; which ever induceth a milder taſte.

Experiment ſolitary touching fleſh edible, and not edible.

859. OF fleſhes, ſome are edible; ſome, except it be in famine, not. For thoſe that are not edible, the cauſe is, for that they have commonly too much bitterneſs of taſte; and therefore thoſe creatures, which are fierce and choleric, are not edible; as lions, wolves, ſquirrels, dogs, foxes, horſes, *etc.* As for kine, ſheep, goats, deer, ſwine, conies, hares, *etc.* we ſee they are mild and fearful. Yet it is true, that horſes, which are beaſts of courage, have been, and are eaten by ſome nations; as, the Scythians were called Hippophagi; and the Chineſes eat horſe-fleſh at this day; and ſome gluttons have uſed to have colts-fleſh baked. In birds, ſuch as are *carnivoræ*, and birds of prey, are commonly no good meat; but the reaſon is, rather the choleric nature of thoſe birds, than their feeding upon fleſh: for pewets, gulls, ſhovellers, ducks, do feed upon fleſh, and yet are 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, rooks out of the neſt, owls, *etc.* Man's fleſh is not eaten. The reaſons are three: firſt, becauſe men in humanity do abhor it: ſecondly, becauſe no living creature that dieth of itſelf is good to eat: and therefore the cannibals themſelves eat no man's fleſh of thoſe that die of themſelves, but of ſuch as are ſlain. The third is, becauſe there muſt be generally ſome diſparity between the nouriſhment and the body nouriſhed; and they muſt not be over-near, or like: yet we ſee, that in great weakneſſes and conſumptions men have been ſuſtained with woman's milk: and Ficinus fondly, as I conceive, adviſeth, for the prolongation of life, that a vein be

be opened in the arm of ſome wholeſome young man, and the blood to be ſucked. It is ſaid, that witches do greedily eat man's fleſh; which if it be true, beſides a deviliſh appetite in them, it is likely to proceed, for that man's fleſh may ſend up high and pleaſing vapours, which may ſtir the imagination; and witches felicity is chiefly in imagination, as hath been ſaid.

Experiments ſolitary touching the ſalamander.

860. There is an ancient received tradition of the ſalamander, that it liveth in the fire, and hath force alſo to extinguiſh it. 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 egg, and then *aquavitæ* be poured upon it, and inflamed, yet one may endure the flame a pretty while. The other is ſome extreme cold, and quenching virtue in the body of that creature, which choketh the fire. We ſee that milk quencheth wild-fire better than water, becauſe it entreth better.

Experiment ſolitary touching the contrary operations of time, upon fruits and liquors.

861. TIME doth change fruit, as apples, pears, pomegranates, *etc.* from more ſour to more ſweet: but contrariwiſe liquors, even thoſe that are of the juice of fruit, from more ſweet to more ſour; as wort, muſt, new verjuice, *etc.* 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 maſtered by the groſſer parts, which the ſpirits do but digeſt: but in drinks the ſpirits do reign, and finding leſs oppoſition of the parts, become themſelves more ſtrong; which cauſeth alſo more ſtrength in the liquor; ſuch as if the ſpirits be of the hotter ſort, the liquor becometh apt to burn: but in time, it cauſeth likewiſe, when the higher ſpirits are evaporated, more ſourneſs.

Experiment ſolitary touching blows and bruiſes.

862. IT 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 humectation or entrance of any body: for the plate hath only a virtual cold, which doth not ſearch into the hurt; whereas all plaiſters and ointments do enter. Surely, the cauſe that blows and bruiſes induce ſwellings, is, for that the ſpirits reſorting to ſuccour the part that laboureth, draw alſo the humours with them: for we ſee, that it is not the repulſe and the return of the humour in the part ſtrucken that cauſeth it; for that gouts and tooth-aches cauſe ſwelling, where there is no percuſſion at all.

Experiment ſolitary touching the orrice root.

863. THE nature of the orrice 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 orrice is not ſweet in the leaf; neither is the flower any thing ſo ſweet as the root. The root ſeemeth to have a tender dainty heat; which when it cometh above ground to the ſun and the air, vaniſheth: for it is a great mollifier; and hath a ſmell like a violet.

Experiment ſolitary touching the compreſſion of liquors.

864. 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 compreſs it ſo that it doth not open again.

Experiment ſolitary touching the working of water upon air contiguous.

865. WATER, being contiguous with air, cooleth it, but moiſteneth it not, except it vapour. The cauſe is, for that heat and cold have a virtual tranſition, without communication of ſubſtance; but moiſture not: and to all madefaction there is required an imbibition: but where the bodies are of ſuch ſeveral levity and gravity as they mingle not, there can follow no imbibition. And therefore, oil likewiſe lieth at the top of the water without commixture: and a drop of water running ſwiftly over a ſtraw or ſmooth body, wetteth not.

Experiment ſolitary touching the nature of air.

866. STAR-light nights, yea and bright moon-ſhine nights, are colder than cloudy nights. The cauſe is, the dryneſs and fineneſs of the air, which thereby becometh more piercing and ſharp; and therefore great continents are colder than iſlands: and as for the moon, though itſelf inclineth the air to moiſture, yet when it ſhineth bright, it argueth the air is dry. Alſo cloſe air is warmer than open air; which, it may be, is, for that the true cauſe of cold is an expiration from the globe of the earth, which in open places is ſtronger; and again, air itſelf, if it be not altered by that expiration, is not without ſome ſecret degree of heat; as it is not likewiſe without ſome ſecret degree of light: for otherwiſe cats and owls could not ſee in the night; but that air hath a little light, proportionable to the viſual ſpirits of thoſe creatures.

Experiments in conſort touching the eyes and ſight.

867. 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 conſent, which in the ſpirits and parts ſpiritual is ſtrong. But yet uſe will induce the contrary; for ſome can ſquint when they will: and the common tradition is, that if children be ſet upon a table with a candle behind them, both eyes will move outwards, as affecting to ſee the light, and ſo induce ſquinting.

868. WE ſee more exquiſitely with one eye ſhut, than with both open. The cauſe is, for that the ſpirits viſual unite themſelves more, and ſo become ſtronger. For you may ſee, by looking in a glaſs, that when you ſhut one eye, the pupil of the other eye that is open dilateth.

869. THE eyes, if the ſight meet not in one angle, ſee things double. The cauſe is, for that ſeeing two things, and ſeeing one thing twice, worketh the ſame effect: and therefore a little pellet held between two fingers laid acroſs, ſeemeth double.

870. PORE-

870. PORE-BLIND men ſee beſt in the dimmer lights; 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 viſual in thoſe that are pore blind, are thinner and rarer than in others; and therefore the greater light diſperſeth them. For the ſame cauſe they need contracting; but being contracted, are more ſtrong than the viſual ſpirits of ordinary eyes are; as when we ſee through a level, the ſight is the ſtronger; and ſo is it when you gather the eye-lids ſomewhat cloſe: and it is commonly ſeen in thoſe that are pore-blind, that they do much gather the eye lids together. But old men, when they would ſee to read, put the paper ſomewhat afar off: the cauſe is, for that old mens ſpirits viſual, contrary to thoſe of pore-blind men, unite not, but when the object is at ſome good diſtance from their eyes.

871. MEN ſee better, when their eyes are over-againſt the 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 dazzle; 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 miſt before their eyes, and ſee worſe than they ſhall do after they have ſtayed a little while, either in the light or in the dark. The cauſe is, for that the ſpirits viſual are, upon a ſudden change, diſturbed and put out of order; and till they be recollected, do not perform their function well. For when they are much dilated by light, they cannot contract ſuddenly; and when they are much contracted by darkneſs, they cannot dilate ſuddenly. And exceſs of both theſe, that is, of the dilatation and contraction of the ſpirits viſual, if it be long, deſtroyeth the eye. For as long looking againſt the ſun or fire hurteth the eye by dilatation; ſo curious painting in ſmall volumes, and reading of ſmall letters, do hurt the eye by contraction.

872. 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 tranſlucid; though withal it maketh both the cheeks and the gills red; but in bluſhing, it is true the ſpirits aſcend likewiſe to ſuccour both the eyes and the face, which are the parts that labour: but then they are repulſed by the eyes, for that the eyes, in ſhame, 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.

873. 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 glimpſes and beams of diamonds that ſtrike the eye; Indian feathers, that have glorious colours; the coming into a fair garden; the coming 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 the moſt ſpiritual of the ſenſes; whereby it hath no object groſs enough to offend it. But the cauſe chiefly is, for that there be no active objects to offend the eye. For harmonical ſounds, and diſcordant ſounds, are both active and poſitive: ſo are ſweet ſmells and ſtinks: ſo are bitter and ſweet in taſtes: ſo are over-hot and over-cold in touch; but blackneſs and darkneſs are indeed but privatives; and therefore have little or no activity. Somewhat they do contriſtate, but very little.

Experiment

Experiment ſolitary touching the colour of the ſea, or other water.

874. WATER of the ſea, or otherwiſe, looketh blacker when it is moved, and whiter when it reſteth. The cauſe is, for that by means of the motion, the beams of light paſs not ſtraight, and therefore muſt be darkened; whereas, when it reſteth, 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 deſerveth to be driven farther, in trying by what means motion may hinder ſight.

Experiment ſolitary touching ſhell-fiſh.

875. SHELL-FISH have been, by ſome of the ancients, compared and ſorted with the *inſecta*; but I ſee no reaſon why they ſhould; for they have male and female as other fiſh have: neither are they bred of putrefaction; eſpecially ſuch as do move. Nevertheleſs it is certain, that oiſters, and cockles, and muſſels, which move not, have no diſcriminate ſex. *Query*, in what time, and how they are bred? It ſeemeth that ſhells of oiſters are bred where none were before; and it is tried, that the great horſe-muſſel, with the fine ſhell that breedeth in ponds, hath bred within thirty years: but then, which is ſtrange, it hath been tried, that they do not only gape and ſhut as the oiſters do, but remove from one place to another.

Experiment ſolitary touching the right ſide and the left.

876. 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 habilities of moving, are ſomewhat holpen from the liver, which lieth on the right ſide. It may be alſo, for that the ſenſes are put in exerciſe indifferently on both ſides from the time of our birth; but the 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.

Experiment ſolitary touching frictions.

877. FRICTIONS make the parts more fleſhy and full; as we ſee both in men, and in currying of horſes, *etc.* The cauſe is, for that they draw greater quantity of ſpirits and blood to the parts: and again, becauſe they draw the aliment more forcibly from within: and again, becauſe they relax the pores, and ſo make better paſſage for the ſpirits, blood, and aliment: laſtly, becauſe they diſſipate and digeſt any inutile or excrementitious moiſture which lieth in the fleſh; all which help aſſimilation. Frictions alſo do more fill and impinguate the body, than exerciſe. The cauſe is, for that in frictions the inward parts are at reſt; which in exerciſe are beaten, many times, too much: and for the ſame reaſon, as we have noted heretofore, galley-ſlaves are fat and fleſhy, becauſe they ſtir the limbs more, and the inward parts leſs.

Experiment ſolitary touching globes appearing flat at diſtance.

878. ALL globes afar off appear flat. The cauſe is, for that diſtance, being a ſecondary object of ſight, is not otherwiſe diſcerned, than by more or leſs light; which diſparity, when it cannot be diſcerned, all ſeemeth one: as it is, generally, in objects not diſtinctly diſcerned; for ſo letters, if they be ſo far off as they cannot be

be diſcerned, ſhew but as a duſkiſh paper: and all engravings and emboſſings, afar off, appear plain.

Experiment ſolitary touching ſhadows.

879. THE uttermoſt parts of ſhadows ſeem ever to tremble. The cauſe is, for that the little motes 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.

Experiment ſolitary touching the rolling and breaking of the ſeas.

880. SHALLOW and narrow ſeas break more than deep and large. The cauſe is, for that the impulſion being the ſame in both, where there is greater quantity of water, and likewiſe ſpace enough, there the water rolleth and moveth, both more ſlowly, and with a ſloper riſe and fall: but where there is leſs water, and leſs ſpace, and the water daſheth more againſt the bottom, there it moveth more ſwiftly, and more in precipice; for in the breaking of the waves there is ever a precipice.

Experiment ſolitary touching the dulcoration of ſalt water.

881. IT hath been obſerved by the ancients, that ſalt water boiled, or boiled and cooled again, is more potable, than of 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 vapour; and ſo is a bitter taſte likewiſe; for ſimple diſtilled waters, of wormwood, and the like, are not bitter.

Experiment ſolitary touching the return of ſaltneſs in pits upon the ſea-ſhore.

882. IT hath been ſet down before, that pits upon the ſea-ſhore turn into freſh water, by percolation of the ſalt through the ſand: but it is farther noted, by ſome of the ancients, that in ſome places of Africa, after a time, the water in ſuch pits will become brackiſh again. The cauſe is, for that after a time, the very ſands through which the ſalt water paſſeth, become ſalt; and ſo the ſtrainer itſelf is tinctured with ſalt. The remedy therefore is, to dig ſtill new pits, when the old wax brackiſh; as if you would change your ſtrainer.

Experiment ſolitary touching attraction by ſimilitude of ſubſtance.

883. IT hath been obſerved by the ancients, that ſalt water will diſſolve ſalt put into it, in leſs time than freſh water will diſſolve it. The cauſe may be, for that the ſalt in the precedent water doth, by ſimilitude of ſubſtance, draw the ſalt new put in unto it; whereby it diffuſeth in the liquor more ſpeedily. This is a noble experiment, if it be true, for it ſheweth means of more quick and eaſy infuſions; and it is likewiſe a good inſtance of attraction by ſimilitude of ſubſtance. Try it with ſugar put into water formerly ſugared, and into other water unſugared.

Experiment ſolitary touching attraction.

884. PUT ſugar into wine, part of it above, part under the wine, and you ſhall find, that which may ſeem ſtrange, that the ſugar above the wine will ſoften and diſſolve

diſſolve ſooner than that within the wine. The cauſe is, for that the wine entereth 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 infuſions, by help of attraction.

Experiments ſolitary touching heat under earth.

885. WATER in wells is warmer in winter than in ſummer; and ſo air in caves. The cauſe is, for that in the hither parts, under the earth, there is a degree of ſome heat, as appeareth in ſulphureous veins, *etc.* which ſhut cloſe in, as in winter, is the more; but if it perſpire, as it doth in ſummer, it is the leſs.

Experiment ſolitary touching flying in the air.

886. 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; tying about him with ſtrings, at ſome diſtance, many great fowls; and fixing unto his body divers feathers, ſpread to break the fall. Certainly many birds of good wing, as kites, and the like, would bear up a good weight as they fly; and ſpreading of feathers thin and cloſe, and in great breadth, will likewiſe bear up a great weight, being even laid, without tilting upon the ſides. The farther extenſion of this experiment for flying may be thought upon.

Experiment ſolitary touching the dye of ſcarlet.

887. THERE is in ſome places, namely in Cephalonia, a little ſhrub which they call holly-oak, or dwarf-oak: upon the leaves whereof there riſeth 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 they kill with wine, as is reported, when they begin to quicken: with this duſt they dye ſcarlet.

Experiments ſolitary touching maleficiating.

888. IN Zant it is very ordinary to make men impotent to accompany with their wives. The like is practiſed in Gaſcony; where it is called *nouër l'eguillette.* It is practiſed always upon the wedding-day. And in Zant the mothers themſelves do it, by way of prevention; becauſe thereby they hinder other charms, and can undo their own. It is a thing the civil law taketh knowledge of; and therefore is of no light regard.

Experiment ſolitary touching the riſe of water by means of flame.

889. 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 baſon 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 *nexe*, which they call *ne detur vacuum*; and it proceedeth thus. The flame of the candle, as ſoon as it is covered, being ſuffocated by the cloſe air, leſſeneth by little and little; during which time there is ſome little aſcent of water, but not much: for the flame occupying leſs and leſs room, as it leſſeneth, the water ſucceedeth. But upon the inſtant of

of the candle's 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 the water ſucceed. It worketh the ſame effect, if inſtead of water you put flour or ſand into the baſon: which ſheweth, that it is not the flame's drawing the liquor as nouriſhment, as it is ſuppoſed; for all bodies are alike unto it, as it is ever in motion of *nexe*; inſomuch as I have ſeen the glaſs, being held by the hand, hath lifted up the baſon and all; the motion of *nexe* did ſo claſp the bottom of the baſon. That experiment, when the baſon was lifted up, was made with oil, and not with water: nevertheleſs this is true, that at the very firſt ſetting of the mouth of the glaſs upon the bottom of the baſon, it draweth up the water a little, and then ſtandeth at a ſtay, almoſt till the candle's going out, as was ſaid. This may ſhew ſome attraction at firſt: but of this we will ſpeak more, when we handle attractions by heat.

Experiment in conſort touching the influences of the moon.

OF the power of the celeſtial bodies, and what more ſecret influences they have, beſides the two manifeſt influences of heat and light, we ſhall ſpeak when we handle experiments touching the celeſtial bodies: mean while we will give ſome directions for more certain trials of the virtue and influences of the moon, which is our neareſt neighbour.

The influences of the moon, moſt obſerved, are four; the drawing forth of heat; the inducing of putrefaction; the increaſe of moiſture; the exciting of the motions of ſpirits.

890. FOR the drawing forth of heat, we have formerly preſcribed to take water warm, and to ſet part of it againſt the moon-beams, and part of it with a ſcreen between; and to ſee whether that which ſtandeth expoſed to the beams will not cool ſooner. But becauſe this is but a ſmall interpoſition, though in the ſun we ſee a ſmall ſhade doth much, it were good to try it when the moon ſhineth, and when the moon ſhineth not at all; and with water warm in a glaſs-bottle, as well as in a diſh; and with cinders; and with iron red-hot, *etc.*

891. FOR the inducing of putrefaction, it were good to try it with fleſh or fiſh expoſed to the moon-beams; and again expoſed to the air when the moon ſhineth not, for the like time; to ſee whether will corrupt ſooner: and try it alſo with capon, or ſome other fowl, laid abroad, to ſee whether it will mortify and become tender ſooner; try it alſo with dead flies, or dead worms, having a little water caſt upon them to ſee whether will putrify 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 cheeſe, having wine put into it, whether will breed mites ſooner or greater.

892. FOR the increaſe of moiſture, the opinion received is; that ſeeds will grow ſooneſt; and hair, and nails, and hedges, and herbs cut, *etc.* will grow ſooneſt, if they be ſet or cut in the increaſe of the moon. Alſo that brains in rabbits, woodcocks, calves, *etc.* are fulleſt in the full of the moon: and ſo of marrow in the bones: and ſo of oiſters and cockles, which of all the reſt are the eaſieſt tried if you have them in pits.

893. TAKE ſome ſeeds or roots, as onions, *etc.* and ſet ſome of them immediately after the change; and others of the ſame kind immediately after the full: let them be as like as can be; the earth alſo the ſame as near as may be; and therefore beſt in pots. Let the pots alſo ſtand where no rain or ſun may come to them, leſt

leſt the difference of the weather confound the experiment: and then ſee in what time the ſeeds ſet in the increaſe of the moon come to a certain height; and how they differ from thoſe that are ſet in the decreaſe of the moon.

894. IT is like, that the brain of man waxeth moiſter and fuller upon the full of the moon: and therefore it were good for thoſe that have moiſt brains, and are great drinkers, to take fume of *lignum aloës*, roſemary, frankincenſe, *etc.* about the full of the moon. It is like alſo, that the humours in mens bodies increaſe and decreaſe as the moon doth: and therefore it were good to purge ſome day or two after the full; for that then the humours will not repleniſh ſo ſoon again.

895. As for the exciting of the motion of the ſpirits, you muſt note that the growth of hedges, herbs, hair, *etc.* is cauſed from the moon, by exciting of the ſpirits, as well as by increaſe of the moiſture. But for ſpirits in particular, the great inſtance is in lunacies.

896. THERE may be other ſecret effects of the influence of the moon, which are not yet brought into obſervation. It may be, that if it ſo fall out that the wind be north, or north eaſt, in the full of the moon, it increaſeth cold; and if ſouth, or ſouth-weſt, it diſpoſeth the air for a good while to warmth and rain; which ſhould be obſerved.

897. IT may be, that children, and young cattle, that are brought forth in the full of the moon, are ſtronger and larger than thoſe that are brought forth in the wane; and thoſe alſo which are begotten in the full of the moon: ſo that it might be good huſbandry to put 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. *Query* alſo, whether great thunders and earthquakes be not moſt in the full of the moon.

Experiment ſolitary touching vinegar.

898. THE turning of wine to vinegar is a kind of putrefaction: and in making of vinegar, they uſe to ſet veſſels of wine over-againſt the noon ſun; which calleth out the more 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 ſoureth. It were good to ſet a rundlet of verjuice over againſt the ſun in ſummer, as they do vinegar, to ſee whether it will ripen and ſweeten.

Experiment ſolitary touching creatures that ſleep all winter.

899. THERE be divers creatures that ſleep all winter, as the bear, the hedge-hog, the bat, the bee, *etc.* Theſe all wax fat when they ſleep, and egeſt not. The cauſe of their fattening during their ſleeping time, may be the want of aſſimilating; for whatſoever aſſimilateth not to fleſh turneth either to ſweat or fat. Theſe creatures, for part of their ſleeping time, have been obſerved not to ſtir at all; and for the other part, to ſtir, but not to remove. And they get warm and cloſe places to ſleep in. When the 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 breedeth, and lyeth in with her young, during that time of reſt: and that a bear big with young hath ſeldom been ſeen.

Experiment

Experiment ſolitary touching the generating of creatures by copulation, and by putrefaction.

900. SOME living creatures are procreated by copulation between male and female: ſome by putrefaction; and of thoſe which come by putrefaction many do, nevertheleſs, afterwards procreate by copulation. For the cauſe of both generations: firſt, it is moſt certain, that the cauſe of all vivification is a gentle and proportionable heat, working upon a glutinous and yielding ſubſtance: for the heat doth bring forth ſpirit in that ſubſtance: and the ſubſtance being glutinous produceth two effects; the one, that the ſpirit is detained, and cannot break forth: the other, that the matter being gentle and yielding, is driven forwards by the motion of the ſpirits, after ſome ſwelling, into ſhape and members. Therefore all ſperm, all menſtruous ſubſtance, all matter whereof creatures are produced by putrefaction, have evermore a cloſeneſs, lentor, and ſequacity. It ſeemeth therefore, that the generation by ſperm only, and by putrefaction, have two different cauſes. The firſt is, for that creatures which have a definite and exact ſhape, as thoſe have which are procreated by copulation, cannot be produced by a weak and caſual heat; nor out of matter which is not exactly prepared according to the ſpecies. The ſecond is, for that there is a greater time required for maturation of perfect creatures; for if the time required in vivification be of any length, then the ſpirit will exhale before the creature be mature; except it be incloſed in a place where it may have continuance of the heat, acceſs of ſome nouriſhment to maintain it, and cloſeneſs that may keep it from exhaling: and ſuch places are 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 incloſure, 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 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.

NATURAL HISTORY.

CENTURY X.

Experiments in conſort touching the tranſmiſſion and influx of immateriate virtues, and the force of imagination.

THE philoſophy of Pythagoras, which was full of ſuperſtition, did firſt plant a monſtrous imagination, which afterwards was, by the ſchool of Plato and others, watered and nouriſhed. It was, that the world was one entire perfect living creature; inſomuch as Apollonius of Tyana, a Pythagorean prophet, affirmed, that the ebbing and flowing of the ſea was the reſpiration of the world, drawing in water as breath, and putting it forth again. They went on, and inferred, that if the world were a living creature, it had a ſoul and ſpirit; which alſo they held, calling it *ſpiritus mundi*, the ſpirit or ſoul of the world: by which they did not intend God, for they did admit of a Deity beſides, but only the ſoul or eſſential 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 tranſcurſion throughout the whole body: ſo that by this they did inſinuate, that no diſtance of place, nor want of indiſpoſition of matter, could hinder magical operations; but that, for example, we might here in Europe have ſenſe and feeling of that which was done in China: and likewiſe we might work any effect without and againſt matter; and this not holpen by the co-operation of angels or ſpirits, but only by the unity and harmony of nature. There were ſome alſo that ſtaid not here; but went farther, 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 magic, do aſcribe to imagination exalted the power of miracle-working faith. With theſe vaſt and bottomleſs follies men have been in part entertained.

But we, that hold firm to the works of God, and to the ſenſe, which is God's lamp, *lucerna Dei ſpiraculum hominis*, will inquire with all ſobriety and ſeverity, whether there be to be found in the footſteps of nature, any ſuch tranſmiſſion and influx of immateriate virtues; and what the force of imagination is; either upon the body imaginant, or upon another body: wherein it will be like that labour of Hercules, in purging the ſtable of Augeas, to ſeparate from ſuperſtitious and magical arts and obſervations, any thing that is clean and pure natural; and not to be either contemned or condemned. And although we ſhall have occaſion to ſpeak of this in more places than one, yet we will now make ſome entrance thereinto.

Experiments

Experiments in conſort, monitory, touching tranſmiſſion of ſpirits, and the force of imagination.

901. MEN are to be admoniſhed, that they do not withdraw 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 plague, and the like, it is moſt certain, that the infection is received, many times, by the body paſſive, but yet is by the ſtrength and good diſpoſition thereof repulſed and wrought out, before it be formed into a diſeaſe; ſo much more in impreſſions from mind to mind, or from ſpirit to ſpirit, the impreſſion taketh, but is encountred and overcome by the mind and ſpirit, which is paſſive, before it work any manifeſt effect. And therefore they work moſt upon weak minds and ſpirits: as thoſe of women; ſick perſons; ſuperſtitious and fearful perſons: children, and young creatures:

Neſcio quis teneros oculus mihi faſcinat agnos:

The poet ſpeaketh not of ſheep, but of lambs. As for the weakneſs 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 weakneſs 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.

902. MEN are to be admoniſhed, on the other ſide, that they do not eaſily give place and credit to theſe operations, becauſe they ſucceed many times; for the cauſe of this ſucceſs is oft to be truly aſcribed unto the force of affection and imagination upon the body agent; and then by a ſecondary means it may work upon a diverſe body: as for example; if a man carry a planet's ſeal, or a ring, or ſome part of a beaſt, believing ſtrongly that it will help him to obtain his love; or to keep him from ſome danger of hurt in fight; or to prevail in a ſuit, *etc.* it may make him more active and induſtrious: and again, more confident and perſiſting, than otherwiſe he would be. Now the great effects that may come of induſtry and perſeverance, eſpecially in civil buſineſs, who knoweth not? For we ſee audacity doth almoſt bind and mate the weaker ſort of minds; and the ſtate of human actions is ſo variable, that to try things oft, and never to give over, doth wonders: therefore it were a mere fallacy and miſtaking to aſcribe that to the force of imagination upon another body, which is but the force of imagination upon the proper body; for there is no doubt, but that imagination and vehement affection work greatly upon the body of the imaginant; as we ſhall ſhew in due place.

903. 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 the confeſſions of witches, nor yet the evidence againſt them. For the witches themſelves are imaginative, and believe oft-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 Theſſalian 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, *etc.* are ſtill reported to be wrought, not by incantations or ceremonies, but by ointments, and anointing themſelves all over. This may juſtly move a man

to

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, ſhutting in the vapours, and ſending 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 dead ſleeps: and if any man ſay that this effect would be better done by inward potions; anſwer may be made, that the medicines, which go to the ointments, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: and therefore they work potently, though outwards.

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

904. THE firſt is the tranſmiſſion or emiſſion of the thinner and more airy parts of bodies; as in odours and infections; and this is, of all the reſt, the moſt corporeal. But you muſt remember withal, that there be a number of thoſe emiſſions, both wholeſome and unwholeſome, that give no ſmell at all: for the plague, many times when it is taken, giveth no ſcent at all: and there be many good and healthful airs that do appear by habitation and other proofs, that differ not in ſmell from other airs. And under this head you may place all imbibitions of air, where the ſubſtance is material, odour-like; whereof ſome nevertheleſs are ſtrange, and very ſuddenly diffuſed; as the alteration which the air receiveth in Ægypt, almoſt immediately, upon the riſing of the river of Nilus, whereof we have ſpoken.

905. THE ſecond is the tranſmiſſion or emiſſion of thoſe things that we call ſpiritual ſpecies; as viſibles and ſounds: the one whereof we have handled, and the other we ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; but then they require a medium well diſpoſed, and their tranſmiſſion is eaſily ſtopped.

906. THE third is the emiſſions, which cauſe attraction of certain bodies at diſtance; wherein though the loadſtone be commonly placed in the firſt rank, yet we think good to except it, and refer it to another head: but the drawing of amber and jet, and other electric bodies, and the attraction in gold of the ſpirit of quickſilver at diſtance; and the attraction of heat at diſtance; and that of fire to naphtha; and that of ſome herbs to water, though at diſtance; and divers others; we ſhall handle, but yet not under this preſent title, but under the title of attraction in general.

907. THE fourth is the emiſſion of ſpirits, and immateriate powers and virtues, in thoſe things which work by the univerſal configuration and ſympathy of the world; not by forms or celeſtial influxes, as is vainly taught and received, but by the primitive nature of matter, and the ſeeds of things. Of this kind is, as we yet ſuppoſe, the working of the loadſtone, which is by conſent with the globe of the earth: of this kind is the motion of gravity, which is by conſent of denſe bodies with the globe of the earth: of this kind is ſome diſpoſition of bodies to rotation, and particularly from eaſt to weſt: of which kind we conceive the main ſtoat and refloat of the ſea is, which is by conſent of the univerſe, as part of the diurnal motion. Theſe immateriate virtues have this property differing from others; that the diverſity of the medium hindereth them not: but they paſs through all mediums, yet at determinate

terminate diſtances. And of theſe we ſhall ſpeak, as they are incident to ſeveral titles.

908. THE fifth is the emiſſion of ſpirits; and this is the principal in our intention to handle now in this place; namely, the operation of the ſpirits of the mind of man upon other ſpirits: and this is of a double nature; the operations of the affections, if they be vehement; and the operation of the imagination, if it be ſtrong. But theſe two are ſo coupled, as we ſhall handle them together; for when an envious or amorous aſpect doth infect the ſpirits of another, there is joined both affection and imagination.

909. THE ſixth is, the influxes of the heavenly bodies, beſides thoſe two manifeſt ones, of heat and light. But theſe we will handle where we handle the celeſtial bodies and motions.

910. THE ſeventh is the operations of ſympathy, which the writers of natural magic have brought into an art or precept: and it is this; that if you deſire to ſuperinduce 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 thoſe 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 conſiſteth. As if you would ſuperinduce courage and fortitude, take a lion or a cock; and take the heart, tooth, or paw of the lion; or the heart or ſpur of the cock: take thoſe parts immediately after the lion or the cock have been in fight; and let them be worn upon a man's heart or wriſt. Of theſe and ſuch like ſympathies, we ſhall ſpeak under this preſent title.

911. THE eighth and laſt is, an emiſſion of immateriate 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 ſet 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 tranſmiſſion of virtue from the one to the other: as between the weapon and the wound. Whereupon is blazed abroad the operation of *unguentum teli*: and ſo of a piece of lard, or ſtick of alder, *etc.* that if part of it be conſumed or putrefied, it will work upon the other part ſevered. Now we will purſue the inſtances themſelves.

Experiments in conſort touching emiſſion of ſpirits in vapour or exhalation, odour-like.

912. THE plague is many times taken without manifeſt ſenſe, as hath been ſaid. And they report, that where it is found, it hath a ſcent of the ſmell of a mellow apple; and, as ſome ſay, of May-flowers: and it is alſo received, that ſmells of flowers that are mellow and luſcious, are ill for the plague; as white lilies, cowſlips, and hyacinths.

913. THE plague is not eaſily received by ſuch as continually are about them that have the plague; as keepers of the ſick, and phyſicians; nor again by ſuch as take antidotes, either inward, as mithridate, juniper-berries, rue, leaf and ſeed, *etc.* or outward, as angelica, zedoary, and the like, in the mouth; tar, *galbanum*, and the like, in perfume; nor again by old people, and ſuch as are of a dry and cold complexion.

plexion. On the other ſide, the plague taketh ſooneſt hold of thoſe that come out of a freſh air, and of thoſe that are faſting, and of children; and it is likewiſe noted to go in a blood, more than to a ſtranger.

914. THE moſt pernicious infection, next to the plague, is the ſmell of the jail, when priſoners have been long, and cloſe, and naſtily kept; whereof we have had in our time experience twice or thrice; when both the judges that ſat upon the jail, and numbers of thoſe that attended the buſineſs or were preſent, ſickened upon it, and died. Therefore it were good wiſdom, that in ſuch caſes the jail were aired before they be brought forth.

915. OUT of queſtion, if ſuch foul ſmells be made by art, and by the hand, they conſiſt chiefly of man's fleſh or ſweat putrified; for they are not thoſe ſtinks which the noſtrils ſtraight abhor and expel, that are moſt pernicious; but ſuch airs as have ſome ſimilitude with man's body; and ſo inſinuate themſelves, and betray the ſpirits. There may be great danger in uſing ſuch compoſitions, in great meetings of people within houſes; as in churches, at arraignments, at plays and ſolemnities, and the like: for poiſoning of air is no leſs dangerous than poiſoning of water, which hath been uſed by the Turks in the wars, and was uſed by Emmanuel Comnenus towards the Chriſtians, when they paſſed through his country to the Holy Land. And theſe impoiſonments 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, where any ſuch thing is feared, it were good thoſe public places were perfumed, before the aſſemblies.

916. THE impoiſonment of particular perſons by odours, 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 find 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 danger of death to them that make them. But then again, they may have ſome antidotes to ſave themſelves; ſo that men ought not to be ſecure of it.

917. THERE have been in divers countries great plagues, by the putrefaction of great ſwarms of graſhoppers and locuſts, when they have been dead and caſt upon heaps.

918. IT happeneth often in mines, that there are damps which kill, either by ſuffocation, or by the poiſonous nature of the mineral: and thoſe that deal much in refining, or other works about metals and minerals, have their brains hurt and ſtupified by the metalline vapours. Amongſt which it is noted, that the ſpirits of quickſilver either 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 the quickſilver; which gold afterwards they find to be whitened. There are alſo certain lakes and pits, ſuch as that of Avernus, that poiſon birds, as is ſaid, which fly over them, or men that ſtay too long about them.

919. THE vapour 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 ſtealeth on by little and little, inducing only a faintneſs, without any manifeſt ſtrangling. When the Dutchmen wintered at Nova Zembla, and that they could gather no more ſticks, they

they fell to make fire of ſome ſea-coal they had, wherewith, at firſt, they were much refreſhed; but a little after they had ſat about the fire, there grew a general ſilence and lothneſs to ſpeak amongſt them; and immediately after, one of the weakeſt of the company fell down in a ſwoon; whereupon they doubting what it was, opened their door to let in air, and ſo ſaved themſelves. The effect, no doubt, is wrought by the inſpiſſation of air; and ſo of the breath and ſpirits. The like enſueth in rooms newly plaiſtered, if a fire be made in them; whereof no leſs a man than the emperor Jovinianus died.

920. VIDE the experiment 803. touching the infectious nature of the air, upon the firſt ſhowers, after a long drought.

921. IT hath come to paſs, that ſome apothecaries, upon ſtamping of colloquintida, have been put into a great ſcouring by the vapour only.

922. IT hath been a practice to burn a pepper they call Guiney-pepper, which hath ſuch a ſtrong ſpirit, that it provoketh a continual ſneezing in thoſe that are in the room.

923. IT is an ancient tradition, that blear-eyes infect ſound eyes; and that a menſtruous woman, looking upon a glaſs, doth ruſt it: nay, they have an opinion which ſeemeth fabulous; that menſtruous women going over a field or garden, do corn and herbs good by killing the worms.

924. THE tradition is no leſs ancient, that the baſiliſk killeth by aſpect; and that the wolf, if he ſee a man firſt, by aſpect ſtriketh a man hoarſe.

925. PERFUMES convenient do dry and ſtrenghthen the brain, and ſtay rheums and defluxions, as we find in fume of roſemary dried, and *lignum aloës*; 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 peels, violets, the leaves of vines ſprinkled with a little roſe-water, *etc.*

926. THEY do uſe in ſudden faintings and ſwoonings to put a handkerchief with roſe-water or a little vinegar to the noſe; which gathereth together again the ſpirits, which are upon point to reſolve and fall away.

927. TOBACCO comforteth the ſpirits, and diſchargeth wearineſs, which it worketh partly by opening, but chiefly by the opiate virtue, which condenſeth 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 wiſh trial be made of the drying fume of roſemary, and *lignum aloës*, before-mentioned, in pipe; and ſo of nutmeg, and *folium indum*, etc.

928. 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 has 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 ſeaſons, it is beſt to take the air of the earth new turned up, by digging with the ſpade, or ſtanding by him that diggeth. Gentlewomen may do themſelves much good by kneeling upon a cuſhion, and weeding. And theſe things you may practiſe in the beſt ſeaſons; which is ever the early ſpring, before the earth putteth forth the vegetables, and in the ſweeteſt earth you can chooſe. It ſhould be done alſo when the dew is a little off the ground, leſt the vapour be too moiſt. I knew a great man that lived long, who had a clean clod of earth brought to him every morning as he ſat in his bed; and he would hold his head over it a good pretty while. I commend alſo,

alſo, ſometimes, in digging of new earth, to pour in ſome Malmſey or Greek wine, that the vapour of the earth and wine together may comfort the ſpirits the more; provided always it be not taken for a heathen ſacrifice, or libation to the Earth.

929. THEY have in phyſic uſe of pomanders, and knots of powders, for drying of rheums, comforting of the heart, provoking of ſleep, *etc.* 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 breathe better of themſelves, than when they come to the fire; as *nigella romana*, the ſeed of *melanthium*, *amomum*, etc.

930. THERE be two things which, inwardly uſed, do cool and condenſe the ſpirits; and I wiſh the ſame to be tried outwardly in vapours. The one is nitre, which I would have diſſolved in Malmſey, or Greek wine, and ſo the ſmell of the wine taken; or if you would have it more forcible, pour of it upon a fire-pan, well heated, as they do roſe-water and vinegar. The other is the diſtilled water of wild 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 ſhould be done with the diſtilled water of ſaffron flowers.

931. SMELLS of muſk, and amber, and civet, are thought to further venereous appetite; which they may do by the refreſhing and calling forth of the ſpirits.

932. INCENSE and nidorous 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 ſadneſs, and contriſtation of the ſpirits; and partly alſo by heating and exalting them. We ſee that amongſt the Jews the principal perfume of the ſanctuary was forbidden all common uſes.

933. THERE be ſome perfumes preſcribed by the writers of natural magic, which procure pleaſant dreams: and ſome others, as they ſay, that procure prophetical dreams; as the ſeeds of flax, flea-wort, *etc.*

934. IT is certain, that odours do, in a ſmall degree, nouriſh; eſpecially the odour of wine: and we ſee men an hungred 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 odour of them, till the feaſt was paſt. I knew a gentleman that would faſt, ſometimes three or four yea five days, without meat, bread, or drink; but the ſame man uſed to have continually a great wiſp of herbs that he ſmelled on: and amongſt thoſe herbs, ſome eſculent herbs of ſtrong ſcent; as onions, garlic, leeks, and the like.

935. THEY do uſe, for the accident of the mother, to burn feathers and other things of ill odour: and by thoſe ill ſmells the riſing of the mother is put down.

936. THERE be airs which the phyſicians adviſe their patients to remove unto, in conſumptions or upon recovery of long ſickneſſes: which, commonly, are plain champains, but graſing, 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 Antiochia. There be alſo ſome ſoils that put forth odorate herbs of themſelves; as wild thyme, wild marjoram, penny-royal, camomile; and in which the brier roſes

ſmell

ſmell almoſt like muſk-roſes; which, no doubt, are ſigns that do diſcover an excellent air.

937. IT were good for men to think of having healthful air in their houſes; which will never be if the rooms be low roofed, or full of windows and doors; for the one maketh the air cloſe, and not freſh; and the other maketh it exceeding 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 dampiſhneſs.

Experiment ſolitary touching the emiſſions of ſpiritual ſpecies which affect the ſenſes.

938. THESE emiſſions, as we ſaid before, are handled, and ought to be handled by themſelves under their proper titles: that is, viſibles and audibles, 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 ſwiftly. Thirdly, they work at large diſtances. Fourthly, in curious varieties. Fifthly, they are not effective of any thing; nor leave no work behind them; but are energies merely: for their working upon mirrours and places of echo doth not alter any thing in thoſe bodies; but it is the ſame action with the original, only repercuſſed. And as for the ſhaking of windows, or rarifying the air by great noiſes; and the heat cauſed by burning-glaſſes; they are rather concomitants of the audible and viſible ſpecies, than the effects of them. Sixthly, they ſeem to be of ſo tender and weak a nature, as they effect only ſuch a rare and attenuate ſubſtance, as is the ſpirit of living creatures.

Experiment in conſort touching the emiſſion of immateriate virtues from the minds and ſpirits of men, either by affections, or by imaginations, or by other impreſſions.

939. IT is mentioned in ſome ſtories, that where children have been expoſed, or taken away young from their parents; and that afterwards they have approached to their parents preſence, the parents, though they have not known them, have had a ſecret joy or other alteration thereupon.

940. THERE was an Ægyptian ſoothſayer, that made Antonius believe, that his genius, which otherwiſe was brave and confident, was, in the preſence of Octavianus Cæſar, poor and cowardly: and therefore he adviſed him, to abſent himſelf as much as he could, and remove far from him. This ſoothſayer was thought to be ſuborned by Cleopatra, to make him live in Ægypt, and other remote places from Rome. Howſoever the conceit of a predominant or maſtering ſpirit of one man over another, is ancient, and received ſtill, even in vulgar opinion.

941. THERE are conceits, that ſome men that are of an ill and melancholy nature, do incline the company into which they come to be ſad and ill-diſpoſed; and contrariwiſe, that others that are of a jovial nature, do diſpoſe the company to be merry and chearful. 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 effluxions from ſpirit to ſpirit, when men are in preſence one with another, as well as from body to body.

942. IT hath been obſerved, that old men who have loved young company, and been converſant continually with them, have been of long life; their ſpirits, as it

ſeemeth, being recreated by ſuch company. Such were the ancient ſophiſts and rhetoricians; which ever had young auditors and diſciples; as Gorgias, Protagoras, Iſocrates, *etc.* who lived till they were an hundred years old. And ſo likewiſe did many of the grammarians and ſchool-maſters; ſuch as was Orbilius, *etc.*

943. AUDACITY and confidence doth, in civil buſineſs, ſo great effects, as a man may reaſonably doubt, that beſides the very daring and earneſtneſs, and perſiſting, and importunity, there ſhould be ſome ſecret binding, and ſtooping of other mens ſpirits to ſuch perſons.

944. THE affections, no doubt, do make the ſpirits more powerful and active; and eſpecially thoſe affections which draw the ſpirits into the eyes: which are two; love, and envy, which is called *oculus malus*. 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 of return into the body whence it was emitted: whereupon followeth that appetite of contact and conjunction which is in lovers. And this is obſerved likewiſe, that the aſpects which procure love, are not gazings, but ſudden glances and dartings of the eye. As for envy, that emitteth ſome malign and poiſonous ſpirit, which taketh hold of the ſpirit of another; and is likewiſe of greateſt force when the caſt of the eye is oblique. It hath been noted alſo, that it is moſt dangerous when an envious eye is caſt upon perſons in glory, and triumph, and joy. The reaſon whereof is, for that at ſuch times the ſpirits come forth moſt into the outward parts, and ſo meet the percuſſion of the envious eye more at hand: and therefore it hath been noted, that after great triumphs, men have been ill-diſpoſed for ſome days following. We ſee the opinion of faſcination is ancient, for both effects; of procuring love; and ſickneſs cauſed by envy: and faſcination is ever by the eye. But yet if there be any ſuch infection from ſpirit to ſpirit, there is no doubt but that it worketh by preſence, and not by the eye alone; yet moſt forcibly by the eye.

945. FEAR and ſhame are likewiſe infective; for we ſee that the ſtarting of one will make another ready to ſtart: and when one man is out of countenance in a company, others do likewiſe bluſh in his behalf.

Now we will ſpeak of the force of imagination upon other bodies; and of the means to exalt and ſtrengthen it. Imagination, in this place, I underſtand to be, the repreſentation of an individual thought. Imagination is of three kinds: the firſt joined with belief of that which is to come: the ſecond joined with memory of that which is paſt; and the third is of things preſent, or as if they were preſent; for I comprehend in this, imaginations feigned, and at pleaſure; as if one ſhould imagine ſuch a man to be in the veſtments of a pope; or to have wings. I ſingle out, for this time, that which is with faith or belief of that which is to come. The inquiſition of this ſubject in our way, which is by induction, is 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 hereafter declare.

THE power of imagination is of three kinds; the firſt upon the body of the imaginant, including likewiſe the child in the mother's womb; the ſecond is, the power of it upon dead bodies, as plants, wood, ſtone, metal, *etc.* the third is, the power of it upon the ſpirits of men and living creatures: and with this laſt we will only meddle.

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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 itſelf. And here again we muſt warily diſtinguiſh; for it is not meant, as hath been partly ſaid before, that it ſhould help by making a man more ſtout, or more induſtrious, in which kind a 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 myſelf to believe what I will, and ſo no trial 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 repreſenteth that oftner that he feareth, than the contrary.

THE help therefore is, for a man to work by another, in whom he may create belief, and not by himſelf; 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, be joined with a belief that his imagination may procure it.

946. FOR example; I related one time to a man, that was curious and vain enough in theſe things, that I ſaw a kind of jugler, that had a pair of cards, and would tell a man what card he thought. This pretended learned man told me, it was a miſtaking in me; "for, ſaid he, it was not the knowledge of the man's "thought, for that is proper to God, but it was the inforcing of a thought upon "him, and binding his imagination by a ſtronger, that he could think no other "card." And thereupon he aſked me a queſtion or two, which I thought he did but cunningly, knowing before what uſed to be the feats of the jugler. "Sir, ſaid "he, do you remember whether he told the card the man thought, himſelf, or bade "another to tell it?" I anſwered, as was true, that he bade another tell it. Whereunto he ſaid; "So I thought: for, ſaid he, himſelf could not have put on ſo ſtrong "an imagination; but by telling the other the card, who believed that the jugler was "ſome ſtrange man, and could do ſtrange things, that other man caught a ſtrong "imagination." I hearkened unto him, thinking for a vanity he ſpoke prettily. Then he aſked me another queſtion: ſaith he, "Do you remember, whether he bade "the man think the card firſt, and afterwards told the other man in his ear what "he ſhould think; or elſe that he did whiſper firſt in the man's ear that ſhould tell "the card, telling that ſuch a man ſhould think ſuch a card, and after bade the man "think a card?" I told him, as was true; that he did firſt whiſper the man in the ear, that ſuch a man ſhould think ſuch a card: upon this the learned man did much exult and pleaſe himſelf, ſaying; "Lo, you may ſee that my opinion is right: for "if the man had thought firſt, his thought had been fixed; but the other imagining "firſt, bound his thought." Which though it did ſomewhat ſink with me, yet I made it lighter than I thought, and ſaid; I thought it was confederacy between the jugler and the two ſervants: though, indeed, I had no reaſon ſo to think, for they were both my father's ſervants; and he had never played 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

HAVING told this relation, not for the weight thereof, but becauſe it doth handſomely open the nature of the queſtion, I return to that I ſaid; that experiments of imagination muſt be practiſed by others, and not by a man's ſelf. For there be three means to fortify belief: the firſt is experience; the ſecond is reaſon; and the third is authority: and that of theſe which is far the moſt potent, is authority; for belief upon reaſon, or experience, will ſtagger.

947. FOR authority, it is of two kinds; belief in an art; and belief in a man. And for things of belief in an art, a man may exerciſe them by himſelf; but for belief in a man, it muſt be by another. Therefore if a man believe in aſtrology, and find a figure proſperous; or believe in natural magic, and that a ring with ſuch a ſtone, or ſuch a piece of a living creature, carried, will do good; it may help his imagination: but the belief in a man is far the more active. But howſoever, all authority muſt be out of a man's ſelf, turned, as was ſaid, either upon an art, or upon a man: and where authority is from one man to another, there the ſecond muſt be ignorant, and not learned, or full of thoughts; and ſuch are, for the moſt part, all witches and ſuperſtitious perſons; whoſe beliefs, tied to their teachers and traditions, are no whit controlled either by reaſon or experience; and upon the ſame reaſon, in magic, they uſe for the moſt part boys and young people, whoſe ſpirits eaſilieſt take belief and imagination.

Now to fortify imagination, there be three ways: the authority whence the belief is derived; means to quicken and corroborate the imagination; and means to repeat it and refreſh it.

948. FOR the authority, we have already ſpoken: as for the ſecond, namely the means to quicken and corroborate the imagination; we ſee what hath been uſed in magic, if there be in thoſe practices any thing that is purely natural, as veſtments, characters, words, ſeals; ſome parts of plants, or living creatures; ſtones; choice of the hour; geſtures and motions; alſo incenſes and odours; choice of ſociety, which increaſeth imagination; 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 ſecond and feed the imagination: and this was ever as well in heathen charms, as in charms of latter times. There are uſed alſo Scripture words; for that the belief that religious texts and words have power, may ſtrengthen the imagination. And for the ſame reaſon, Hebrew words, which amongſt us is counted the holy tongue, and the words more myſtical, are often uſed.

949. FOR the refreſhing of the imagination, which was the third means of exalting it, we ſee the practices of magic, as in images of wax, and the like, that ſhould melt by little and little; or ſome other things buried in muck, that ſhould putrify by little and little; or the like: for ſo oft as the imaginant doth think of thoſe things, ſo oft doth he repreſent to his imagination the effect of that he deſireth.

950. IF there be any power in imagination, it is leſs credible that it ſhould be ſo incorporeal and immateriate a virtue as to work at great diſtances, or through all mediums, or upon all bodies: but that the diſtance muſt be competent, the medium not adverſe, and the body apt and proportionate. Therefore if there be any operation upon bodies in abſence by nature, it is like to be conveyed from man to man, as fame is; as if a witch, by imagination, ſhould hurt any afar off, it cannot be naturally; but by working upon the ſpirit of ſome that cometh to the witch; and from that party

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 reſort to new experiments; wherein we can give only directions of trials, and not any poſitive experiments. And if any man think that we ought to have ſtayed till we had made experiment of ſome of them ourſelves, as we do commonly in other titles, the truth is, that theſe effects of imagination upon other bodies have ſo little credit with us, as we ſhall 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 than another, that you did uſe the imagination of more than one, that ſo you may light upon a ſtrong one. As if a phyſician ſhould tell three or four of his patient's ſervants, that their maſter 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 ſtrength. To remedy this, you muſt pretend to him, whoſe imagination you uſe, ſeveral degrees of means, by which to operate: as to preſcribe him that every three days, if he find not the ſucceſs apparent, he do uſe another root, or part of a beaſt, or ring, *etc.* as being of more force; and if that fail, another; and if that, another, till ſeven times. Alſo you muſt preſcribe a good large time for the effect you promiſe; as if you ſhould tell a ſervant of a ſick man that his maſter ſhall recover, but it will be fourteen days ere he findeth it apparently, *etc.* All this to entertain the imagination that it waver leſs.

954. IT is certain, that potions, or things taken into the body; incenſes and perfumes taken at the noſtrils; and ointments of ſome parts, do naturally work upon the imagination of him that taketh them. And therefore it muſt needs greatly co-operate 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 ointment or oil: and you muſt chooſe, for the compoſition of ſuch pill, perfume or ointment, ſuch ingredients as do make the ſpirits a little more groſs or muddy; whereby the imagination will fix the better.

955. THE body paſſive, and to be wrought upon, I mean not of the imaginant, is better wrought upon, as hath been partly touched, at ſome times than at others: as if you ſhould preſcribe a ſervant about a ſick perſon, whom you have poſſeſſed that his maſter ſhall recover, when his maſter is faſt aſleep, to uſe ſuch a root, or ſuch a root. For imagination is like to work better upon ſleeping men, than men awake; as we ſhall ſhew when we handle dreams.

956. WE

956. We find in the art of memory, that images viſible work better than other conceits: as if you would remember the word philoſophy, you ſhall more ſurely do it, by imagining, that ſuch a man, for men are beſt places, is reading upon Ariſtotle's *Phyſics*; than if you ſhould imagine him to ſay, "I'll go ſtudy philoſophy." And therefore this obſervation ſhould 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, leſs fail, if you tell one that ſuch an one ſhall name one of twenty men, than if it were one of twenty cards. The experiment of binding of thoughts would be diverſified and tried to the full: and you are to note, whether it hit for the moſt part, though not always.

957. It is good to conſider, upon what things imagination hath moſt force: and the rule, as I conceive, is, that it hath moſt force upon things that have the lighteſt and eaſieſt motions. And therefore above all, upon the ſpirits of men: and in them, upon ſuch affections as move lighteſt; as upon procuring of love; binding of luſt, which is ever with imagination; upon men in fear; or men in irreſolution; and the like. Whatſoever is of this kind ſhould be thoroughly inquired. Trials likewiſe ſhould 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 uſual, that gameſters imagine, that ſome that ſtand by them bring them ill luck. There ſhould 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 ſo many times againſt the ſide of the glaſs, and no more; or of holding a key between two mens fingers, without a charm; and to tell thoſe that hold it, that at ſuch a name it ſhall go off their fingers: for theſe two are extreme light motions. And howſoever I have no opinion of theſe things, yet ſo much I conceive to be true; That ſtrong imagination hath more force upon things living, or that have been living, than things merely inanimate: and more force likewiſe upon light and ſubtile motions, than upon motions vehement or ponderous.

958. 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 parties murdered have 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 bringeth murders to light: but if it be natural, it muſt be referred to imagination.

959. The tying of the point upon the day of marriage, to make men impotent towards their wives, which, as we have formerly touched, is ſo frequent in Zant and Gaſcony, if it be natural, muſt be referred to the imagination of him that tieth the point. I conceive it to have the leſs affinity with witchcraft, becauſe not peculiar perſons only, ſuch as witches are, but any body may do it.

Experiments in conſort touching the ſecret virtue of ſympathy and antipathy.

960. There be many things that work upon the ſpirits of man 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

that ſtones have in them fine ſpirits, as appeareth by their ſplendor; and therefore they may work by conſent upon the ſpirits of men, to comfort and exhilarate them. Thoſe that are the beſt, for that effect, are the diamond, the emerald, the hyacinth 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 tinctured lanthorns, or tinctured ſcreens, of glaſs coloured into green, blue, carnation, crimſon, purple, *etc.* and to uſe them with candles in the night. So likewiſe to have round glaſſes, not only of glaſs coloured through, but with colours laid between cryſtals, with handles to hold in one's hand. Priſms are alſo comfortable things. They have of Paris-work, looking-glaſſes, bordered with broad borders of ſmall cryſtal, and great counterfeit precious ſtones of all colours, that are moſt glorious and pleaſant to behold; eſpecially in the night. The pictures of Indian feathers are likewiſe comfortable and pleaſant to behold. So alſo fair and clear pools do greatly comfort the eyes and ſpirits, eſpecially when the ſun is not glaring, but over-caſt; or when the moon ſhineth.

961. THERE be divers ſorts of bracelets fit to comfort the ſpirits; and they be of three intentions; refrigerant, corroborant, and aperient. For refrigerant, I wiſh them to be of pearl, or of coral, as is uſed; and it hath been noted that coral, if the party that weareth it be indiſpoſed, 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.

962. FOR corroboration and confortation, take ſuch bodies as are of aſtringent quality, without manifeſt cold. I commend bead-amber, which is full of aſtriction, but yet is unctuous, and not cold; and is conceived to impinguate thoſe that wear ſuch beads: I commend alſo beads of hartſhorn and ivory, which are of the like nature; alſo orange beads; alſo beads of *lignum aloës*, macerated firſt in roſe-water, and dried.

963. FOR opening, I commend beads, or pieces of the roots of *carduus benedictus*: alſo of the roots of piony the male; and of orrice; and of *calamus aromaticus*; and of rue.

964. THE cramp, no doubt, cometh of contraction of ſinews; which is manifeſt, in that it cometh either by cold or dryneſs; as after conſumptions, and long agues; for cold and dryneſs do, both of them, contract and corrugate. We ſee alſo, that chafing a little above the place in pain, eaſeth the cramp; which is wrought by the dilatation of the contracted ſinews by heat. There are in uſe, for the prevention of the cramp, two things; the one rings of ſea-horſe teeth worn upon the fingers; the other bands of green periwinkle, the herb, tied about the calf of the leg, or the thigh, *etc.* where the cramp uſeth to come. I do find this the more ſtrange, becauſe neither of theſe have any relaxing virtue, but rather the contrary. I judge therefore, that their working is rather upon the ſpirits, within the nerves, to make them ſtrive leſs, than upon the bodily ſubſtance of the nerves.

965. I would have trial made of two other kinds of bracelets, for comforting the heart and ſpirits; the one of the trochiſk 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 ſhould be trochiſk likewiſe made of ſnakes; whoſe fleſh dried is thought to have a very opening and cordial virtue. The other is, of beads made of the ſcarlet powder, which they call *kermes*; which is the principal ingredient in their cordial confection *alkermes:* the beads ſhould be made up with ambergreaſe, and ſome pomander.

966. IT hath been long received and confirmed by divers trials, that the root of the male-piony dried, tied to the neck, doth help the falling ſickneſs; and likewiſe the *incubus*, which we call the mare. The cauſe of both theſe diſeaſes, and eſpecially of the epilepſy from the ſtomach, is the groſſneſs of the vapours which riſe and enter into the cells of the brain: and therefore the working is by extreme and ſubtile attenuation; which that ſimple hath. I judge the like to be in *caſtoreum*, muſk, rue-ſeed, *agnus caſtus* ſeed, *etc.*

967. 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 aſtriction and cooling of the ſpirits. *Query*, if the ſtone taken out of the toad's head, be not of the like virtue; for the toad loveth ſhade and coolneſs.

968. LIGHT may be taken from the experiment of the horſe-tooth ring, and the garland of periwinkle, how that thoſe things which aſſuage the ſtrife of the ſpirits, do help diſeaſes contrary to the intention deſired: for in the curing of the cramp, the intention is to relax the ſinews; but the contraction of the ſpirits, that they ſtrive leſs, is the beſt help: ſo to procure eaſy travails of women, the intention is to bring down the child; but the beſt help is, to ſtay the coming down too faſt: whereunto they ſay, the toad-ſtone likewiſe helpeth. So in peſtilent fevers, the intention is to expel the infection by ſweat and evaporation: but the beſt means to do it is by nitre, diaſcordium, and other cool things, which do for a time arreſt the expulſion, till nature can do it more quietly. For as one ſaith prettily; "In the quenching of the "flame of a peſtilent ague, nature is like people that come to quench the fire of a "houſe; which are ſo buſy, as one of them letteth another." Surely it is an excellent axiom, and of manifold uſe, that whatſoever appeaſeth the contention of the ſpirits, furthereth their action.

969. THE writers of natural magic 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 caſting her ſpoil. They might as well take the beak of an eagle, or a piece of a hart's horn, becauſe thoſe renew.

970. IT hath been anciently received, for Pericles the Athenian uſed it, and it is yet in uſe, to wear little bladders of quickſilver, or tablets of arſenic, as preſervatives againſt the plague: not as they conceive for any comfort they yield to the ſpirits, but for that being poiſons themſelves, they draw the venom to them from the ſpirits.

791. VIDE the experiments 95, 96, and 97, touching the ſeveral ſympathies and antipathies for medicinal uſe.

792. IT is ſaid, that the guts or ſkin of a wolf being applied to the belly, do cure the colic. It is true, that the wolf is a beaſt of great edacity and digeſtion; and ſo it may be the parts of him comfort the bowels.

973. 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-houſe, will ſcare away vermin; ſuch as are weaſles, pole-cats, and the like. It may be

be the head of a dog will do as much; for thoſe vermin with us, know dogs better than wolves.

974. THE brains of ſome creatures, when their heads are roſted, taken in wine, are ſaid to ſtrengthen the memory; as the brains of hares, brains of hens, brains of deers, *etc.* And it ſeemeth to be incident to the brains of thoſe creatures that are fearful.

975. THE ointment that witches uſe, is reported to be made of the fat of children digged out of their graves; of the juices of ſmallage, wolf-bane, and cinquefoil, mingled with the meal of fine wheat. But I ſuppoſe, that the ſoporiferous medicines are likeſt to do it; which are henbane, hemlock, mandrake, moonſhade, tobacco, opium, ſaffron, poplar-leaves, *etc.*

976. 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 a ſtone bitten by a dog in anger, being thrown at him, drunk in powder, provoketh choler.

977. 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 vapours that aſcend to the brain, it will make the child ingenious: 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 muſing, all which ſend or draw vapours to the head, it endangereth the child to become lunatic, or of imperfect memory: and I make the ſame judgment of tobacco often taken by the mother.

978. THE writers of natural magic report, that the heart of an ape, worn near the heart, comforteth the heart, and increaſeth audacity. It is true, that the ape is a merry and bold beaſt. And that the ſame heart likewiſe of an ape, 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 cauſe of attenuation of vapours in the head. Yet it is ſaid to move dreams alſo. It may be the heart of a man would do more, but that it is more againſt mens minds to uſe it; except it be in ſuch as wear the reliques of ſaints.

979. THE fleſh of a hedge-hog, dreſſed and eaten, is ſaid to be a great drier: it is true, that the juice of a hedge-hog muſt needs be harſh and dry, becauſe it putteth forth ſo many prickles: for plants alſo that are full of prickles are generally dry; as briers, thorns, berberries; and therefore the aſhes of an hedge-hog are ſaid to be a great deſiccative of fiſtulas.

980. 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 partake of a ſecret propriety, in that the blood draweth man's fleſh. And it is approved, that the moſs which groweth upon the ſkull of a dead man unburied, will ſtanch blood potently: and ſo do the dregs, or powder of blood, ſevered from the water, and dried.

981. IT hath been practiſed, to make white ſwallows, by anointing of the eggs with oil. Which effect may be produced, by the ſtopping 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.

982. IT is reported, that the white of an egg, or blood, mingled with ſalt-water, doth gather the ſaltneſs, and maketh the water ſweeter. This may be by adheſion; as in the ſixth experiment of clarification: it may be alſo, that blood, and the white of an egg, which is the matter of a living creature, have ſome ſympathy with ſalt: for all life hath a ſympathy with ſalt. We ſee, that ſalt laid to a cut finger healeth it; ſo as it ſeemeth ſalt draweth blood, as well as blood draweth ſalt.

983. IT hath been anciently received, that the ſea-hare hath an antipathy with the lungs, if it cometh near the body, and erodeth them. Whereof the cauſe is conceived to be, a quality it hath of heating the breath and ſpirits; as cantharides have upon the watry parts of the body, as urine and hydropical water. And it is a good rule, that whatſoever hath an operation upon certain kinds of matters, that, in man's body, worketh moſt upon thoſe parts wherein that kind of matter aboundeth.

984. GENERALLY that which is dead or corrupted, or excerned, hath antipathy with the ſame thing when it is alive, and when it is ſound; and with thoſe parts which do excern: as a carcaſe of man is moſt infectious and odious to man; a carrion of an horſe to an horſe, *etc.* purulent matter of wounds, and ulcers, carbuncles, pocks, ſcabs, leproſy, to ſound fleſh; and the excrement of every ſpecies to that creature that excerneth them: but the excrements are leſs pernicious than the corruptions.

985. IT is a common experience, that dogs know the dog-killer; when, as in times of infection, ſome petty fellow is ſent out to kill the dogs; and that though they have never ſeen him before, yet they will all come forth, and bark, and fly at him.

986. 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, *etc.* There be many reports in hiſtory, that upon the death of perſons of ſuch nearneſs, men have had an inward feeling of it. I myſelf remember, that being in Paris, and my father dying in London, two or three days before my father's death, I had a dream, which I told to divers Engliſh gentlemen; that my father's houſe in the country was plaiſtered all over with black mortar. There is an opinion abroad, whether idle or no I cannot ſay, that loving and kind huſbands have a ſenſe of their wives breeding children, by ſome accident in their own body.

987. 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 Commineus, a grave writer, reporteth, that the archbiſhop of Vienna, a reverend prelate, ſaid one day after maſs to king Lewis the eleventh of France: "Sir, "your mortal enemy is dead;" what time duke Charles of Burgundy was ſlain at the battle of Granſon againſt the Switzers. Some trial alſo ſhould be made, whether pact or agreement do any thing; as if two friends ſhould agree, that ſuch a day in every week, they being in far diſtant places, ſhould pray one for another; or ſhould put on a ring or tablet one for another's ſake; whether if one of them

ſhould

ſhould break their vow and promiſe, the other ſhould have any feeling of it in abſence.

988. IF there be any force in imaginations and affections of ſingular perſons, it is probable the force is much more in the joint imaginations and affections of multitudes: as if a victory ſhould be won or loſt in remote parts, whether is there not ſome ſenſe thereof in the people whom it concerneth; becauſe of the great joy or grief that many men are poſſeſſed with at once? Pius Quintus, at the very time when that memorable victory was won by the Chriſtians againſt the Turks, at the naval battle of Lepanto, being then hearing of cauſes in conſiſtory, brake off ſuddenly, and ſaid to thoſe about him, "It is now more 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 merely his work to conclude that league. It may be that revelation was divine; but what ſhall we ſay then to a number of examples amongſt the Grecians and Romans? where the people being in theaters at 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.

989. WE have 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, *etc.* upon plants, and upon inanimate bodies: wherein you muſt ſtill obſerve, that your trials be upon ſubtle and light motions, and not the contrary; for you will ſooner by imagination bind a bird from ſinging, than from eating or flying: and I leave it to every man, to chooſe experiments, which himſelf thinketh moſt commodious; giving now but a few examples of every of the three kinds.

990. USE ſome imaginant, obſerving the rules formerly preſcribed, for binding of a bird from ſinging; and the like of a dog from barking. Try alſo the imagination of ſome, whom you ſhall accommodate with things to fortify it, in cock-fights, to make one cock more hardy, and the other more cowardly. It ſhould be tried alſo in flying of hawks; or in courſing of a deer, or hare, with grayhounds: or in horſe-races; and the like comparative motions: for you may ſooner by imagination quicken or ſlack a motion, than raiſe or ceaſe it; as it is eaſier to make a dog go ſlower, than to make him ſtand ſtill, that he may not run.

991. 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, *etc.*

992. FOR inanimate things, you may try the force of imagination, upon ſtaying the working of beer when the barm is put in; or upon the coming of butter or cheeſe, after the churning, or the rennet be put in.

993. IT is an ancient tradition every where alledged, for example of ſecret proprieties and influxes, that the *torpedo marina*, if it be touched with a long ſtick, doth ſtupify the hand of him that toucheth it. It is one degree of working at diſtance, to work by the continuance of a fit medium; as ſound will be conveyed

veyed to the ear, by ſtriking upon a bow-ſtring, if the horn of the bow be held to the ear.

994. THE writers of natural magic 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 creatures ſtill living did infuſe ſome immateriate virtue and vigour into the part ſevered. So much may be true; that any part taken from a living creature newly ſlain, may be of greater force, than if it were taken from the like creature dying of itſelf, becauſe it is fuller of ſpirit.

995. TRIAL ſhould 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 putrify, to ſee whether it will decay the reſt of the ſtock: or if you ſhould cut off part of the tail, or leg of a dog or a cat, and lay it to putrify, and ſo ſee whether it will feſter, or keep from healing the part which remaineth.

996. IT is received, that it helpeth to continue love, if one wear a ring, or a bracelet, of the hair of the party beloved. But that may be by the exciting of the imagination: and perhaps a glove, or other like favour, may as well do it.

997. THE ſympathy of individuals, that have been entire, or have touched, is of all others the moſt incredible: yet according to 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 my own experience. I had from my childhood a wart upon one of my fingers: afterwards when I was about ſixteen years old, being then at Paris, there grew upon both my hands a number of warts, at the leaſt an hundred, in a month's ſpace. The Engliſh ambaſſador's 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 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 away of that which had ſtayed ſo long doth yet ſtick with me. They ſay the like is done by the rubbing of warts with a green alder ſtick, and then burying the ſtick to rot in muck. It ſhould be tried with corns and wens, and ſuch other excreſcences. I would have it alſo tried with ſome parts of living creatures, that are neareſt the nature of excreſcences; as the combs of cocks, the ſpurs of cocks, the horns of beaſts, *etc.* And I would have it tried both ways; both by rubbing thoſe parts with lard, or alder, 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 conſumption of that part which was once joined with it.

998. IT is conſtantly received and avouched, that the anointing of the weapon that maketh the wound, will heal the wound itſelf. In this experiment, upon the relation of men of credit, though myſelf, as yet, am not fully inclined to believe it, you ſhall note the points following: firſt, the ointment wherewith this is done, is made of divers ingredients; whereof the ſtrangeſt and hardeſt to come by, are the moſs upon the ſkull of a dead man unburied; and the fats of a boar and a bear killed

killed in the act of generation. These two last I could easily suspect to be prescribed as a starting hole; that if the experiment proved not, it might be pretended that the beasts were not killed in the due time; for as for the moss, it is certain there is great quantity of it in Ireland, upon slain bodies, laid on heaps unburied. The other ingredients are, the blood-stone in powder, and some other things, which seem to have a virtue to stanch blood; as also the moss hath. And the description of the whole ointment is to be found in the chemical dispensatory of Crollius. Secondly, the same kind of ointment 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 ointment 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 has been tried, that the ointment, for experiment's sake, hath been wiped off the weapon, without the knowledge of the party hurt, and presently the party hurt has been in great rage of pain, till the weapon was re-anointed. Sixthly, it is affirmed, that if you cannot get the weapon, yet if you put an instrument of iron or wood, resembling the weapon, into the wound, whereby it bleedeth, the anointing of that instrument will serve and work the effect. This I doubt should be a device to keep this strange form of cure in request and use: because many times you cannot come by the weapon itself. Seventhly, the wound must be at first washed clean with white wine, or the party's own water; and then bound up close in fine linen, and no more dressing renewed till it be whole. Eighthly, the sword itself must be wrapped up close, as far as the ointment goeth, that it taketh no wind. Ninthly, the ointment, if you wipe it off from the sword and keep it, will serve again; and rather increase in virtue than diminish. Tenthly, it will cure in far shorter time, than ointments of wounds commonly do. Lastly, it will cure a beast as well as a man; which I like best of all the rest, because it subjecteth the matter to an easy trial.

Experiment solitary touching secret proprieties.

999. I would have men know, that though I reprehend the easy passing over 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 not only *in specie*, but *in individuo*. So in physic; if you will cure the jaundice, 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, *etc.* But you must receive from experience that powder of *Chamaepytis*, or the like, drunk in beer, is good for the jaundice. 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 jaundice, stone, agues, *etc.* that will do good in one body, which will

will not do good in another; according to the correſpondence the medicine hath to the individual body.

Experiment ſolitary touching the general ſympathy of mens ſpirits.

1000. The delight which men have in popularity, fame, honour, ſubmiſſion, and ſubjection of other mens minds, wills, or affections, although theſe things may be deſired for other ends, ſeemeth to be a thing in 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 ſhould men be ſo much affected with that which others think or ſay? The beſt temper of minds deſireth good name and true honour: the lighter, popularity and applauſe: the more depraved, ſubjection and tyranny; as is ſeen in great conquerors and troublers of the world: and yet more in arch-heretics; for the introducing of new doctrines is likewiſe an affectation of tyranny over the underſtandings and beliefs of men.

N E W

A T L A N T I S.

A Work unfiniſhed.

TO THE

READER.

THIS 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 Solomon's 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 foreſeeing it would be a long work, his deſire of collecting the Natural Hiſtory diverted him, which he preferred many degrees before it.

This work of the New Atlantis, *as much as concerneth the Engliſh edition, his lordſhip deſigned for this place; in regard it hath ſo near affinity, in one part of it, with the preceding Natural Hiſtory.*

W. RAWLEY.

NEW

NEW ATLANTIS.

WE ſailed 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 months; and had good winds from the eaſt, though ſoft and weak, for five months ſpace and more. But then the wind came about, and ſettled 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 ourſelves in the midſt of the greateſt wilderneſs of waters in the world, without victual, we gave ourſelves for loſt men, and prepared for death. Yet we did lift up our hearts and voices to God above, who ſheweth *his wonders in the deep*; beſeeching him of his mercy, that as in the beginning he diſcovered the face of the deep, and brought forth dry land; 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 thick 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 boſcage, which made it ſhew the more dark. And after an hour and a half's ſailing, we entered into a good haven, being the port of a fair city; not great indeed, but well built, and that gave a pleaſant view from the ſea: and we thinking every minute long till we were on land, came cloſe to the ſhore, and offered to land. But ſtraightways we ſaw divers of the people with baſtons in their hands, as it were, forbidding us to land; yet without any cries or fierceneſs, but only as warning us off by ſigns that they made. Whereupon being not a little diſcomforted, we were adviſing with ourſelves what we ſhould do. During which time there made forth to us a ſmall boat, with about eight perſons in it; whereof one of them had in his hand a tipſtaff of a yellow cane, tipped at both ends with blue, who came aboard our ſhip, without any ſhew of diſtruſt at all. And when he ſaw one of our number preſent himſelf ſomewhat afore the reſt, he drew forth a little ſcroll of parchment, ſomewhat yellower than our parchment, and ſhining like the leaves of writing tables, but otherwiſe ſoft 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; "Land ye not, none of you, and provide to be gone from this "coaſt within ſixteen days, except you have farther time given you: mean while, "if you want freſh water, or victual, or help for your ſick, or that your ſhip need-"eth repair, write down your wants, and you ſhall have that which belongeth to "mercy." This ſcroll was ſigned with a ſtamp of cherubims wings, not ſpread, 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 ourſelves, we were much perplexed. The denial of landing, and haſty warning us away, troubled us much; on the other ſide, to find that the people had languages, and were ſo full of humanity, did comfort us not a little. And above all, the ſign of the croſs to that inſtrument was to us a great rejoicing, and as it were a certain preſage of good. Our anſwer was in the Spaniſh tongue; "That for our ſhip, it was well; for we had rather met with calms and contrary "winds than any tempeſts. For our ſick, they were many, and in very ill caſe; ſo "that if they were not permitted to land, they ran in danger of their lives." Our other wants we ſet down in particular; adding, "that we had ſome little ſtore of "merchandiſe, which if it pleaſed them to deal for, it might ſupply our wants with-"out being chargeable unto them." We offered ſome reward in piſtolets unto the ſervant, and a piece of crimſon velvet to be preſented to the officer: but the ſervant took them not, nor would ſcarce look upon them; and ſo left us, and went back in another little boat which was ſent for him.

About three hours after we had diſpatched our anſwer, there came towards us a perſon, as it ſeemed, of place. He had on him a gown with wide ſleeves, of a kind of water camlet, of an excellent azure colour, far more gloſſy than ours; his under-apparel was green, and ſo was his hat, being in the form of a turban, daintily made, and not ſo huge as the Turkiſh turbans; and the locks of his hair came down below the brims of it. A reverend man was he to behold. He came in a boat, gilt in ſome part of it, with four perſons more only in that boat; and was followed by another boat, wherein were ſome twenty. When he was come within a flight 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 ſave 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 farther; 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 ye will ſwear, all of you, by the merits of the Saviour, that ye are no pirates; "nor have ſhed blood lawfully nor unlawfully within forty days paſt; you may have "licence 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 act. Which done, another of the attendants of the great perſon, which was with him in the ſame boat, after his lord had ſpoken a little to him, ſaid aloud; "My lord would have you know, that it is not of pride or greatneſs, that he com-"eth 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 towards him, and anſwered, "we were his humble ſervants; and accounted for great honour, and ſingular hu-"manity towards us, that which was already done; but hoped well, that the nature "of the ſickneſs of our men was not infectious." So he returned; and a while after came the notary to us aboard our ſhip; holding in his hand a fruit of that country, like an orange, but of colour between orange-tawny and ſcarlet, which caſt a moſt excellent odour. He uſed it, as it ſeemeth, for a preſervative againſt infection.

tion. 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 with things, both for our whole, and for our ſick. So he left us; and when we offered him ſome piſtolets, he ſmiling, ſaid; " he muſt not be twice paid for " one labour:" meaning, as I take it, that he had ſalary ſufficient of the ſtate for his ſervice. For, as I afterwards learned, they call an officer that taketh rewards, Twice-paid.

The next morning early, there came to us the ſame officer that come 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 conveni- " ent for you; and then you may ſend for your ſick, and the reſt of your number, " which ye will bring on land." We thanked him, and ſaid, that his care, which he took of deſolate ſtrangers, God would reward. And ſo ſix of us went on land with him: and when we were on land, he went before us, and turned to us, and ſaid; " he was but our ſervant, and our guide." He led us through three fair ſtreets; and all the 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 at us, but to welcome us; and divers of them, as we paſſed by them, put their arms a little abroad; which is their geſture, when they bid any welcome. The Strangers houſe is a fair and ſpacious houſe, built of brick, of ſomewhat a bluer colour than our brick; and with handſome windows, ſome of glaſs, ſome of a kind of cambric oiled. He brought us firſt into a fair parlour above ſtairs, and then aſked us, " What number of perſons we were? And how many ſick?" We anſwered, " we " were in all, ſick and whole, one and fifty perſons, whereof our ſick were ſeven- " teen." He deſired us to have patience a little, and to ſtay till he came back to us, which was about an hour after; and then he led us to ſee the chambers, which were provided for us, being in number nineteen: They having caſt it, as it ſeemeth, that four of thoſe chambers, which were better than the reſt, might receive four of the principal men of our company, and lodge them alone by themſelves; and the other fifteen chambers, were to lodge us two and two together. The chambers were handſome and chearful 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 forty, many more than we needed, were inſtituted as an infirmary for ſick perſons. And he told us withal, that as any of our ſick waxed well, he might be removed from his cell to a chamber: for which purpoſe there were ſet forth ten ſpare chambers, beſides the number we ſpake of before. This done, he brought us back to the parlour, and lifting up his cane a little, as they do when they give any charge or command, ſaid to us, " Ye are to " know that the cuſtom of the land requireth, that after this day and to-morrow, " which we give you for removing of your people from your ſhip, you are to keep " within doors for three days. But let it not trouble you, nor do not think yourſelves " reſtrained, but rather left to your reſt and eaſe. You ſhall want nothing, and there " are ſix of our people appointed to attend you, for any buſineſs you may have abroad." We gave him thanks, with all affection and reſpect, and ſaid; " God ſurely is ma-

" nifeſted

" nifeſted in this land." We offered him alſo twenty piſtolets; but he ſmiled, and only 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 than any collegiate diet that I have known in Europe. We had alſo drink of three ſorts, all wholſom and good; wine of the grape; a drink of grain, ſuch as is with us our ale, but more clear: and a kind of cider 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 ſettled and quiet, I thought good to call our company together; and when they were aſſembled, ſaid unto them; " My dear friends, let us know ourſelves, and how it ſtand-
" eth with us. We are men caſt on land, as Jonas was, out of the whale's belly,
" when we were as buried in the deep: and now we are on land, we are but be-
" tween 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 among a chriſtian people, full of piety and humanity: let us not bring that
" confuſion of face upon ourſelves, as to ſhew our vices or unworthineſs before
" them. Yet there is more: for they have by commandment, though in form of
" courteſy, cloiſtered us within theſe walls for three days: who knoweth whether it
" be not to take ſome taſte of our manners and conditions? And if they find them
" bad, to baniſh us ſtraightways; if good, to give us farther time. For theſe men,
" that they have given us for attendance, may withal have an eye upon us. There-
" fore for God's love, and as we love the weale of our ſouls and bodies, let us ſo be-
" have ourſelves as we may be at peace with God, and may find 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 the amendment of our ſick; who thought themſelves caſt into ſome divine pool of healing; they mended ſo kindly and ſo faſt.

The morrow after our three days were paſt, there came to us a new man, that we had not ſeen before, clothed in blue as the former was, ſave that his turban was white, with a ſmall red croſs on the top. He had alſo a tippet of fine linen. At his coming in he did bend to us a little, and put his arms abroad. We of our parts ſaluted him in a very lowly and ſubmiſſive manner; as looking that from him we ſhould receive ſentence of life or death. He deſired to ſpeak with ſome few of us: whereupon ſix of us only ſtayed, 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 farther
" time,

" time, for the law in this point is not preciſe; and I do not doubt but myſelf ſhall " be able to obtain for you ſuch farther time as may be convenient. Ye ſhall alſo " underſtand, that the Strangers houſe is at this time rich, and much aforehand; " for it hath laid up revenue theſe thirty ſeven years; for ſo long it is ſince any " ſtranger arrived in this part: and therefore take ye no care; the ſtate will defray " you all the time you ſtay; neither ſhall you ſtay one day the leſs for that. As for " any merchandiſe you have brought, ye ſhall be well uſed, and have your return " either in merchandiſe, or in gold and ſilver: for to us it 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 fall by the anſwer ye ſhall receive. Only this I muſt tell you, " that none of you muſt go above a *karan*, that is with them a mile and an half, " from the walls of the city without ſpecial leave." We anſwered, after we had looked awhile one upon 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 awhile 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 farther 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 his reverend perſon, or this whole na- " tion 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 kindneſs, ſaying amongſt ourſelves, " that we were come into a land of angels, which did appear to us daily, and " prevent us with comforts which we thought not of, much leſs expected."

The next day about ten of the clock the 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 ſome ten of us, the reſt were of the meaner ſort, or elſe gone abroad, ſat down with him. And when we were ſet, he began thus: " We of " this iſland of Benſalem, for ſo they call it in their language, have this; that by " means of their 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 ourſelves unknown. Therefore becauſe he that know- " eth leaſt is fitteſt to aſk queſtions, it is more reaſon for the entertainment of the " time, that ye aſk me queſtions, than that I aſk you." We anſwered; " That we " humbly thanked him that he would give us leave ſo to do: and that we con- " ceived by the taſte we had already, that there was no worldly thing on earth " more worthy to be known than the ſtate of that happy land. But above all, we " ſaid, ſince that we were met from the ſeveral ends of the world, and hoped aſſuredly " that we ſhould meet one day in the kingdom of heaven, for that we were both " parts Chriſtians, we deſired to know, in reſpect that land was ſo remote, and ſo " divided by vaſt and unknown ſeas, from the land where our Saviour walked on " earth, who was the Apoſtle of that nation, and how it was converted to the " faith?" It appeared in his face that he took great contentment in this our queſtion:

he

he ſaid, " Ye knit my heart to you, by aſking this queſtion in the firſt place; for " it ſheweth that you *firſt ſeek the kingdom of heaven*; and I ſhall gladly and briefly " ſatisfy your demand.

" About twenty years after the aſcenſion of our Saviour, it came to paſs, that " there was ſeen by the people of Renfuſa, a city upon the eaſtern coaſt of our " iſland, within night, the night was cloudy and calm, as it might be ſome mile " into the ſea, a great pillar of light; not ſharp, but in form of a column or cylin- " der 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 ſo ſtrange a ſpectacle, the people of the city gathered apace " together upon the ſands to wonder; and ſo after put themſelves into a number of " ſmall boats, to go nearer to this marvellous ſight. But when the boats were " come within about ſixty yards of the pillar, they found themſelves all bound, and " could go no farther, yet ſo as they might move to go about, but might not ap- " proach nearer: ſo as the boats ſtood all as in a theatre, beholding this light as " an heavenly ſign. It ſo fell out, that there was in one of the boats one of the " wiſe men of the ſociety of Solomon'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 or-* " *der, to know thy works of creation, and the ſecrets of them; and to diſcern, as far as ap-* " *pertaineth 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 be-* " *fore this people, that the thing which we now ſee before our eyes, is thy finger, and a* " *true miracle; and foraſmuch as we learn in our books, that thou never workeſt miracles,* " *but to a divine and excellent end, for the laws of nature are thine own laws, and thou* " *exceedeſt them not but upon great cauſe, we moſt humbly beſeech thee to proſper this great* " *ſign, and to give us the interpretation and uſe of it in mercy; which thou doſt in ſome* " *part ſecretly promiſe by ſending it unto us.*

" When he had made his prayer, he preſently found the boat he was in move- " able 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 ſoftly and with ſi- " lence rowed towards the pillar. But ere he came near it, the pillar and croſs " of light brake up, and caſt 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 ſwam. And " in the fore-end of it which was towards him, grew a ſmall green branch of palm; " and when the wiſe man had taken it with all reverence into his boat, it opened of " itſelf, and there were found in it a book and a letter; both written in fine parch- " ment, and wrapped in ſindons of linen. 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 Bartholomew, a ſervant of the Higheſt, and Apoſtle of Jeſus Chriſt, was warned* " *by an angel that appeared to me in a viſion of glory, that I ſhould commit this ark to the*

" *floods*

" *floods 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 Apoſtles 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 the book and letter, as if they had been written " in his own language. And thus was this land ſaved from infidelity, as the re- " main of the old world was from water, by an ark, through the apoſtolical and mi- " raculous evangeliſm of St. Bartholomew." And here he pauſed, and a meſ- ſenger came, and called him from us. So this was all that paſſed in that con- ference.

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 ſo agree- " able and pleaſing to us, as we forgot both dangers paſt and fears to come, for " the time we heard him ſpeak; and that we thought an hour ſpent with him, was " worth years of our former life." He bowed himſelf a little to us, and after we were ſet again, he ſaid; " Well, the queſtions are on your part." One of our number ſaid, after a little pauſe; " that there was a matter we were no leſs deſirous " to know than fearful to aſk, leſt we might preſume too far. But encouraged " by his rare humanity towards us, that could ſcarce think ourſelves ſtrangers, be- " ing his vowed and profeſſed ſervants, we would take the hardineſs to propound it: " humbly beſeeching him, if he thought it not fit to be anſwered, that he would " pardon it, though he rejected it." We ſaid; " we well obſerved thoſe his words, " which he formerly ſpake, that this happy iſland where we now ſtood, was known " to few, and yet knew 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 the leaſt inkling or glimpſe of " this iſland. This we found wonderful ſtrange; for that all nations have inter- " knowledge one of another, either by voyage into foreign parts, or by ſtrangers that " come to them: and though the traveller into a foreign country doth commonly " know more by the eye, than he that ſtayeth at home can by relation of the tra- " veller; yet both ways ſuffice to make a mutual knowledge, in ſome degree, on " both parts. But for this iſland, we never heard tell of any ſhip of theirs, that had " been ſeen to arrive upon any ſhore of Europe; no, nor of either the Eaſt or Weſt " Indies, nor yet of any ſhip of any other part of the world, that had made return " from them. And yet the marvel reſted not in this. For the ſituation of it, as " his lordſhip ſaid, in the ſecret conclave of ſuch a vaſt ſea might cauſe it. But " then, that they ſhould have knowledge of the languages, books, affairs of thoſe " that lie ſuch a diſtance from them, it was a thing we could not tell what to make " of; for that it ſeemed to us a condition and propriety of divine powers and beings, " to be hidden and unſeen to others, and yet to have others open, and as in a light " to them." At this ſpeech the governor gave a gracious ſmile, and ſaid; " that " we did well to aſk pardon for this queſtion we now aſked; for that it 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 merrily, " That we were apt enough to think there " was ſomething ſupernatural in this iſland, but yet rather as angelical than magi- " cal. But to let his lordſhip know truly, what it was that made us tender and " doubtful to aſk this queſtion, it was not any ſuch conceit, but becauſe we re- " membered, he had given a touch in his former ſpeech, that this land had laws of " ſecrecy touching ſtrangers." To this he ſaid; " You remember it aright; " and therefore in that I ſhall ſay to you, I muſt reſerve ſome particulars, which " it is not lawful for me to reveal; but there will be enough left to give you ſa- " tisfaction.

" You ſhall underſtand, that which perhaps you will ſcarce think credible, that " about three thouſand years ago, or ſomewhat more, the navigation of the world, " eſpecially for remote voyages, was greater than at this day. Do not think with " yourſelves, that I know not how much it is increaſed with you within theſe ſix- " ſcore years: I know it well; and yet I ſay greater then than now: whether it " was, that the example of the ark, that ſaved the remnant of men from the univer- " ſal deluge, gave men confidence to adventure upon the waters, or what it was, " but ſuch is the truth. The Phœnicians, and eſpecially the Tyrians, had great " fleets. So had the Carthaginians their colony, which is yet farther weſt. To- " ward the eaſt, the ſhipping of Ægypt, and of Palæſtine, was likewiſe great. " China alſo, and the great Atlantis, that you call America, which have now but " junks and canoes, 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 ſparing memory, or none; but we have " large knowledge thereof.

" At that time, this land was known and frequented by the ſhips and veſſels of " all the nations before named. And, as it cometh to paſs, they had many times " men of other countries, that were no ſailors, that came with them; as Perſians, " Chaldæans, Arabians, ſo as almoſt all nations of might and fame reſorted hither; " of whom we have ſome ſtirps and little tribes with us at this day. And for our " own ſhips, they went ſundry voyages, as well to your Straits, which you call the " pillars of Hercules, as to other parts in the Atlantic and Mediterranean ſeas; as to " Peguin, which is the ſame with Cambaline, and Quinzy, upon the oriental ſeas, " as far as to the borders of the eaſt Tartary.

" At the ſame time, and an age after, or more, the inhabitants of the great At- " lantis did flouriſh. For though the narration and deſcription which is made by a " great man with you, that the deſcendents of Neptune planted there; and of the " magnificent temple, palace, city, and hill; and the manifold ſtreams of goodly " navigable rivers, which, as ſo many chains, environed the ſame ſite and temple; " and the ſeveral degrees of aſcent, whereby men did climb up to the ſame, as if it " had been a *ſcali cæli*; be all poetical and fabulous: yet ſo much is true, that the " ſaid country of Atlantis, as well that of Peru then called Coya, as that of Mexico " then named Tyrambel, were mighty and proud kingdoms, in arms, ſhipping, " and riches: ſo mighty, as at one time, or at leaſt within the ſpace of ten years, " they both made two great expeditions, they of Tyrambel, through the Atlantic " to the Mediterranean Sea; and they of Coya, through the South Sea upon this " our iſland: and for the former of theſe, which was into Europe, the ſame author

" amongſt

" amongſt you, as it ſeemeth, had ſome relation from the Ægyptian prieſt whom
" he citeth. For aſſuredly, ſuch a thing there was, but whether it were the an-
" cient Athenians that had the glory of the repulſe and reſiſtance of thoſe forces, I
" can ſay nothing: but certain it is, there never came back either ſhip, or man,
" from that voyage. Neither had the other voyage of thoſe of Coya upon us had
" better fortune, if they had not met with enemies of greater clemency. For the
" king of this iſland, by name Altabin, a wiſe man, and a great warrior; knowing
" well both his own ſtrength, and that of his enemies; handled the matter ſo, as
" he cut off their land forces from their ſhips, and entoiled both their navy, and
" their camp, with a greater power than theirs, both by ſea and land; and com-
" pelled them to render themſelves without ſtriking ſtroke: and after they were at
" his mercy, contenting himſelf only with their oath, that they ſhould no more
" bear arms againſt him, diſmiſſed them all in ſafety. But the divine revenge over-
" took not long after thoſe proud enterpriſes. For within leſs than the ſpace of
" one hundred years, the great Atlantis was utterly loſt and deſtroyed: not by a
" great earthquake, as your man ſaith, for that whole tract is little ſubject to earth-
" quakes, but by a particular deluge, or inundation: thoſe countries 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 ſame inundation was not deep; not
" paſt forty foot, in moſt places, from the ground. ſo that although it deſtroyed
" man and beaſt generally, yet ſome few wild inhabitants of the wood eſcaped. Birds
" alſo were ſaved by flying to the high trees and woods. For as for men, although
" they had buildings in many places, higher than the depth of the water; yet that
" inundation, though it were ſhallow, had a long continuance; whereby they of the
" vale, that were not drowned, periſhed for want of food, and other things neceſſary.
" So as marvel you not at the thin population of America, nor at the rudeneſs
" and ignorance of the people; for you muſt account your inhabitants of America
" as a young people; younger a thouſand years, at the leaſt, than the reſt of the
" world: for that there was ſo much time between the univerſal flood, and their
" particular inundation. For the poor remnant of human ſeed, which remained
" in their mountains, peopled the country again ſlowly, by little and little; and
" being ſimple and ſavage people, not like Noah and his ſons, which was the
" chief family of the earth, they were not able to leave letters, arts, and civility to
" their poſterity; and having likewiſe in their mountainous habitations been uſed,
" in reſpect of the extreme cold of thoſe regions, to clothe themſelves with the
" ſkins of tygers, bears, 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. Only they take great pride and de-
" light in the feathers of birds; and this alſo they took from thoſe their anceſtors
" of the mountains, who were invited unto it by the infinite flights 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 traffic with the Americans, with whom,
" of all others, in regard they lay neareſt to us, we had moſt commerce. As for
" the other parts of the world, it is moſt manifeſt, that in the ages following,
" whether it were in reſpect of wars, or by a natural revolution of time, naviga-
" tion did every where greatly decay; and eſpecially far voyages, the rather by the
" uſe of galleys, and ſuch veſſels as could hardly brook the ocean, were altogether

" left and omitted. So then, that part of intercourſe which could be from other " nations to ſail to us, you ſee how it hath long ſince ceaſed; except it were by " ſome rare accident, as this of yours. But now of the ceſſation of that other part " of intercourſe, which might be by our ſailing to other nations, I muſt yield you " ſome other cauſe. For I cannot ſay, if I ſhall 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 itſelf; and it will draw nearer to give you ſatisfaction, to your " principal queſtion.

" There reigned in this iſland, about nineteen hundred years ago, a king, whoſe " memory of all others we moſt adore; not ſuperſtitiouſly, but as a divine inſtru- " ment, though a mortal man; his name was Solomona: and we eſteem him as " the lawgiver of our nation. This king had a large heart, inſcrutable for good, " and was wholly bent to make his kingdom and people happy. He therefore tak- " ing into conſideration, how ſufficient and ſubſtantive this land was to maintain it- " ſelf 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 " alſo the ſhipping of this country might be plentifully ſet on work, both by fiſhing " and by tranſportations from port to port, and likewiſe by ſailing unto ſome ſmall " iſlands that are not far from us, and are under the crown and laws of this ſtate; " and recalling into his memory the happy and flouriſhing eſtate wherein this land " then was; ſo as it might be a thouſand ways altered to the worſe, but ſcarce any " one way to the better; thought nothing wanted to his noble and heroical inten- " tions, but only, as far as human foreſight might reach, to give perpetuity to that, " which was in his time ſo happily eſtabliſhed. Therefore amongſt his other funda- " mental laws of this kingdom, he did ordain the interdicts and prohibitions, which " we have touching entrance of ſtrangers; which at that time, though it was after " the calamity of America, was frequent; doubting novelties, and commixture of " manners. It is true, the like law, againſt the admiſſion of ſtrangers without li- " cence, 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 lawgiver made his law of another temper. For firſt, he hath pre- " ſerved all points of humanity, in taking order, and making proviſion for the re- " lief of ſtrangers diſtreſſed, whereof you have taſted." At which ſpeech, as reaſon was, we all roſe up and bowed ourſelves. He went on. " That the king alſo ſtill " deſiring to join humanity and policy together; and thinking it againſt humanity, " to detain ſtrangers here againſt their wills; and againſt policy that they ſhould re- " turn, and diſcover their knowledge of this eſtate, he took this courſe: he did or- " dain, 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 con- " ditions, and means to live from the ſtate. Wherein he ſaw ſo far, that now in " ſo many ages ſince the prohibition, we have memory, not of one ſhip that ever " returned, and but of thirteen perſons only, at ſeveral times, that choſe to return " in our 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 " lawgiver thought fit altogether to reſtrain it. So is it not in China. For the " Chineſes ſail where they will or can; which ſheweth, that their law of keeping

" out

" out ſtrangers, is a law of puſillanimity and fear. But this reſtraint of ours hath " one only exception, which is admirable; preſerving the good which cometh " by communicating with ſtrangers, and avoiding the hurt; and I will now open " it to you. And here I ſhall ſeem a little to digreſs, but you will by and by find " it pertinent. Ye ſhall underſtand, my dear friends, that amongſt the excellent " acts of that king, one above all hath the preeminence. 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 founder's name a little corrupted, as if it ſhould be Solo- " mona's houſe. But the records write it, as it is ſpoken. So as I take it to be " denominate of the king of the Hebrews, which is famous with you, and no ſtranger " to us; for we have ſome parts of his works, which with you are loſt; namely, " that Natural Hiſtory which he wrote of all plants, *from the cedar of Libanus, to* " *the moſs that groweth 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, ho- " noured him with the title of this foundation. And I am the rather induced to be " of this opinion, for that I find in ancient records this order or ſociety is ſome- " times called Solomon's houſe, and ſometimes the college of the ſix days works; " whereby I am ſatisfied, that our excellent king had learned from the Hebrews, " that God had created the world, and all that therein is, within ſix days; and " therefore he inſtituting that houſe 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 the uſe of them, did give it alſo that ſecond name. " But now to come to our preſent purpoſe. When the king had forbidden to all " his people navigation into any part, that was not under his crown, he made never- " theleſs this ordinance; that every twelve years there ſhould be ſet forth, out of " this kingdom, two ſhips appointed to ſeveral voyages; that in either of theſe " ſhips there ſhould be a miſſion of three of the fellows or brethren of Solomon's " houſe; whoſe errand was only to give us knowledge of the affairs and ſtate of " thoſe countries to which they were deſigned; and eſpecially of the ſciences, arts, " manufactures, and inventions of all the world; and withal to bring unto us books, " inſtruments, and patterns, in every kind: that the ſhips, after they had landed " the brethren, ſhould return; and that the brethren ſhould ſtay abroad till the " new miſſion. Theſe ſhips are not otherwiſe fraught, than with ſtore of victuals, " and good quantity of treaſure to remain with the brethren, for the buying of " ſuch things, and rewarding of ſuch perſons, as they ſhould think fit. Now for " me to tell you how the vulgar ſort of mariners are contained from being diſcover- " ed at land; and how they that muſt be put on ſhore for any time, colour them- " ſelves under the names of other nations; and to what places theſe voyages have " been deſigned; and what places of rendezvous are appointed for the new miſſions; " and the like circumſtances of the practique; I may not do it: neither is it much to " your deſire. But thus you ſee we maintain a trade, not for gold, ſilver, or jewels, " nor for ſilks; nor for ſpices; nor any other commodity of matter; but only for " 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 ſo were we all. For indeed we were all aſtoniſhed to hear ſo ſtrange things ſo probably told.

And

And he perceiving that we were willing to ſay ſomewhat, but had it not ready, in great courteſy took us off, and deſcended to aſk us queſtions of our voyage and fortunes, and in the end concluded, that we might do well to think with ourſelves, what time of ſtay we would demand of the ſtate; and bad us not to ſcant ourſelves; for he would procure ſuch time as we deſired. Whereupon we all roſe up, and preſented ourſelves to kiſs the ſkirt of his tippet, but he would not ſuffer us; and ſo took his leave. But when it came once amongſt our people, that the ſtate uſed to offer conditions to ſtrangers that would ſtay, we had work enough to get any of our men to look to our ſhip; and to keep them from going preſently to the governor to crave conditions. But with much ado we refrained them, till we might agree what courſe to take.

We took ourſelves now for free men, ſeeing there was no danger of our utter perdition; and lived moſt joyfully, going abroad and ſeeing what was to be ſeen in the city and places adjacent within our tedder; and obtaining acquaintance with many of the city, not of the meaneſt quality; at whoſe hands we found ſuch humanity, and ſuch a 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 countries: 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 mens eyes, it is that country. One day there were two of our company bidden to a feaſt of the family, as they call it. A moſt natural, pious, and reverend cuſtom it is, ſhewing that nation to be compounded of all goodneſs. This is the manner of it. It is granted to any man, that ſhall live to ſee thirty perſons deſcended of his body alive together, and all above three years old, to make this feaſt, which is done at the coſt of the ſtate. The father of the family, whom they call the Tirſan, two days before the feaſt, taketh to him three of ſuch friends as he liketh to chooſe; and is aſſiſted 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 Tirſan ſitteth in conſultation concerning the good eſtate 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 diſtreſſed or decayed, order is taken for their relief, and competent means to live. There, if any be ſubject to vice, or take ill courſes, they are reproved and cenſured. So likewiſe direction is given touching marriages, and the courſes of life which any of them ſhould take, with divers other the like orders and advices. The governor aſſiſteth, to the end to put in execution, by his public authority, the decrees and orders of the Tirſan, if they ſhould be diſobeyed; though that ſeldom needeth; ſuch reverence and obedience they give to the order of nature. The Tirſan doth alſo then ever chooſe one man from amongſt his ſons, to live in the houſe with him: who is called ever after, the Son of the vine. The reaſon will hereafter appear. On the feaſt-day, the father, or Tirſan, cometh forth after divine ſervice into a large room where the feaſt is celebrated; which room hath an half pace at the upper end. Againſt the wall, in the middle of the half pace, is a chair placed for him, with a table and carpet before it. Over the chair is a ſtate made round or oval, and it is of ivy; an ivy ſomewhat whiter than ours, like the leaf of a ſilver aſp, but more ſhining; for it is green all winter. And the ſtate is curiouſly wrought with ſilver and ſilk of divers colours, broiding or binding in the ivy; and is ever of the work of ſome of the daughters of the family; and veiled over at the top with a fine net of ſilk and ſilver. But the ſubſtance

ſtance 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 Tirſan 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 blue; where ſhe ſitteth, but is not ſeen. When the Tirſan 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 ſhining 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 herald's mantle is ſtreamed with gold, and hath a train. Then the herald with three curteſies, or rather inclinations, cometh up as far as the half pace; and there firſt taketh into his hand the ſcroll. This ſcroll is the king's charter, containing gift of revenue, and many privileges, exemptions, and points of honour, granted to the father of the family; and is ever ſtiled and directed, "To ſuch an one, our well-"beloved friend and creditor:" 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 king's charter, is the king's image, imboſſed or mouſded 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 Tirſan ſtandeth up, ſupported by two of his ſons, ſuch as he chooſeth. Then the herald mounteth the half pace, and delivereth the charter into his hand: and with that there is an acclamation by all that are preſent in their language, which is thus much; "Happy "are the people of Benſalem." Then the herald taketh into his hand from the other child the 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 deſcendents of the family. This golden cluſter the herald delivereth alſo to the Tirſan; who preſently delivereth it over to that ſon, that he had formerly choſen to be in the houſe with him: who beareth it before his father as an enſign of honour, when he goeth in public ever after; and is thereupon called the Son of the vine. After this ceremony ended, the father or Tirſan retireth; and after ſome time cometh forth again to dinner, where he ſitteth alone under the ſtate as before; and none of his deſcendents ſit with him, of what degree or dignity ſoever, except he hap to be of Solomon's houſe. He is ſerved only by his own children, ſuch as are male; who perform unto him all ſervice of the table upon the knee; and the women only ſtand about him, leaning againſt the wall. The room below the half pace, hath tables on the ſides for the gueſts that are bidden; who are ſerved with great and comely order; and towards 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 compoſeth it, for they have excellent poeſy, but the ſubject of it is, always,

always, the praiſes of Adam, and Noah, and Abraham; whereof the former two peopled 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 Tirſan retireth again; and having withdrawn himſelf alone into a place, where he maketh ſome private prayers, he cometh forth the third time to give the bleſſing; with all his deſcendents, who ſtand about him as at the firſt. Then he calleth them forth by one and by one, by name, as he pleaſeth, though ſeldom the order of age be inverted. The perſon that is called, the table being before removed, kneeleth down before the chair, and the father layeth his hand upon his head, or her head, and giveth the bleſſing in theſe words: "Son of Benſalem, or daughter of Benſalem, thy father ſaith it; the man by whom "thou haſt breath and life ſpeaketh the word; The bleſſing of the everlaſting "Father, the Prince of peace, and the Holy Dove be upon thee, and make the "days of thy pilgrimage good and many." This he ſaith to every of them; and that done, if there be any of his ſons of eminent merit and virtue, ſo they be not above two, he calleth for them again; and ſaith, laying his arm over their ſhoulders, they ſtanding; "Sons, it is well ye are born, give God the praiſe, and perſevere to "the end." And withal he 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 muſic 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 ſtrait acquaintance with a merchant of that city, whoſe name was Joabin. He was a Jew, and circumciſed: for they have ſome few ſtirps of Jews yet remaining among them, whom they leave to their own religion: which they may the better do, becauſe they are of a far differing diſpoſition from the Jews in other parts. For whereas they hate the name of Chriſt, and have a ſecret inbred rancour againſt the people amongſt whom they live; theſe, contrariwiſe, give unto our Saviour many high attributes, and love the nation of Benſalem extremely. Surely this man of whom I ſpeak, would ever acknowledge that Chriſt was born of a virgin; and that he was more than a man; and he would tell how God made him ruler of the ſeraphims which guard his throne; and they call him alſo the milken way, and the Eliah of the Meſſias; and many other high names; which though they be inferior to his divine Majeſty, yet they are far from the language of other Jews. And for the country of Benſalem, this man would make no end of commending it: being deſirous by tradition among the Jews there, to have it believed, that the people thereof were of the generations of Abraham, by another ſon, whom they call Nachoran; and that Moſes, by a ſecret cabala, ordained the laws of Benſalem which they now uſe; and that when the Meſſias ſhould come, and ſit in his throne at Hieruſalem, the king of Benſalem ſhould ſit at his feet, whereas other kings ſhould keep a great diſtance. But yet ſetting aſide theſe Jewiſh dreams, the man was a wiſe man, and learned, and of great policy, and excellently ſeen in the laws and cuſtoms of that nation. Amongſt other diſcourſes, one day I told him I was much affected with the relation I had from ſome of the company, of their cuſtom in holding the feaſt of the family; for that, methought, 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

For that where population is ſo much affected, and ſuch as with them it ſeemed to be, there is commonly permiſſion of plurality of wives. To this he ſaid, " You have " reaſon for to commend that excellent inſtitution of the feaſt of the family; and " indeed we have experience, that thoſe families that are partakers of the bleſſing " of that feaſt, do flouriſh and proſper ever after in an extraordinary manner. But " hear me now, and I will tell you what I know. You ſhall underſtand, that there " is not under the heavens ſo chaſte a nation as this of Benſalem; nor ſo free from " all pollution or foulneſs. It is the virgin of the world. I remember I have read " in one of your European books, of an holy hermit among you, that deſired to ſee " the ſpirit of fornication; and there appeared to him a little foul ugly Æthiop; " but if he had deſired to ſee the ſpirit of chaſtity of Benſalem, it would have appear- " ed 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 courte- " ſans, nor any thing of that kind. Nay, they wonder, with deteſtation, at you in " Europe, which permit ſuch things. They ſay, ye have put marriage out of office: " for marriage is ordained a remedy for unlawful concupiſcence; and natural con- " cupiſcence ſeemeth as a ſpur to marriage. But when men have at hand a remedy " more agreeable to their corrupt will, marriage is almoſt expulſed. And therefore " there are with you ſeen infinite men that marry not, but chooſe rather a libertine " and impure ſingle life, than to be yoked in marriage; and many that do marry, " marry late, when the prime and ſtrength of their years is paſt. And when they do " marry, what is marriage to them but a very bargain; wherein is ſought alliance, " or portion, or reputation, with ſome deſire, almoſt indifferent, of iſſue; and not the " faithful nuptial union of man and wife, that was firſt inſtituted. Neither is it poſ- " ſible, that thoſe who have caſt away ſo baſely ſo much of their ſtrength ſhould great- " ly eſteem children, being of the ſame matter, as chaſte men do. So likewiſe " during marriage, Is the caſe much amended, as it ought to be if thoſe things were " tolerated only for neceſſity? No, for they remain ſtill as a very affront to marriage. " The haunting of thoſe diſſolute places, or reſort to courteſans, are no more puniſhed " in married men than in bachelors. And the depraved cuſtom of change, and the " delight in meretricious embracements, where ſin is turned into art, maketh mar- " riage a dull thing, and a kind of impoſition or tax. They hear you defend theſe " things, as done to avoid greater evils; as advoutries, deflouring of virgins, unna- " tural luſt, and the like. But they ſay, this is a prepoſterous wiſdom; and they call " it Lot's offer, who to ſave his gueſts from abuſing, offered his daughters: nay, they " ſay farther, 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 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 in- " violate friendſhips in the world again as are there; and to ſpeak generally, as I " ſaid before, I have not read of any ſuch chaſtity in any people as theirs. And their " uſual ſaying is, That whoſoever is unchaſte cannot reverence himſelf: and they " ſay, That the reverence of a man's ſelf is, next religion, the chiefeſt bridle of all " vices." And when he had ſaid this, the good Jew pauſed a little; whereupon I, far more willing to hear him ſpeak on than to ſpeak 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 Benſalem was " greater than the righteouſneſs of Europe." At which ſpeech he bowed his head, and went on in this manner: " They have alſo many wiſe and excellent laws touch- " ing marriage. They allow no polygamy; they have ordained that none do inter- " marry, or contract, until a month be paſt from their firſt interview. Marriage " without conſent of parents they do not make void, but they mulct it in the inhe- " ritors: 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 con- " tract, to ſee one another naked. This they diſlike; for they think it a ſcorn " to give a refuſal after ſo familiar knowledge: but becauſe of many hidden defects " in men and womens bodies, they have a more civil way: for they have near every " town a couple of pools, which they call Adam and Eve's pools, where it is per- " mitted 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 out one that ſeemed to be a meſſenger, in a rich huke, that ſpake with the Jew: whereupon he turned to me, and ſaid; " You will pardon me, for I am commanded away in haſte." The next morning he came to me again joyful, as it ſeemed, and ſaid, " There is word come to the " governor of the city, that one of the fathers of Solomon's houſe will be here this " day ſeven-night: we have ſeen none of them this dozen years. His coming is in " ſtate; but the cauſe of his coming is ſecret. I will provide you and your fellows " of a good ſtanding to ſee his entry." I thanked him and told him, I was moſt glad of the news. The day being come, he made his entry. He was a man of middle ſtature and age, comely of perſon, and had an aſpect as if he pitied men. He was clothed in a robe of fine black cloth, with wide ſleeves and a cape. His under garment was of excellent white linen down to the foot, girt with a girdle of the ſame; and a ſindon or tippet of the ſame about his neck. He had gloves that were curious, and ſet with ſtone; and ſhoes of peach coloured velvet. His neck was bare to the ſhoulders. His hat was like a helmet, or Spaniſh Montera; and his locks curled below it decently: they were of colour brown. His beard was cut round, and of the ſame colour with his hair, ſomewhat lighter. He was carried in a rich chariot without wheels, litter-wiſe, with two horſes at either end, richly trapped in blue 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 ſapphires, ſet in borders of gold, and the hinder end the like of emeralds of the Peru colour. There was alſo a ſun of gold, radiant upon the top, in the midſt; and on the top before a ſmall cherub of gold, with wings diſplayed. The chariot was covered with cloth of gold tiſſued upon blue. He had before him fifty attendants, young men all, in white ſattin looſe coats to the mid-leg, and ſtockings of white ſilk; and ſhoes of blue velvet; and hats of blue velvet; with fine plumes of divers colours, ſet round like hat-bands. Next before the chariot went two men bare-headed, in linen garments down to the foot, girt, and ſhoes of blue velvet, who carried the one a croſier, the other a paſtoral ſtaff, like a ſheep-hook; neither of them of metal, but the croſier of balm wood, the paſtoral ſtaff of cedar. Horſemen he had none, neither before nor behind his chariot: as it ſeemeth, to avoid all tumult and trouble. Behind his chariot went all the officers and principals of the companies of the city. He ſat alone, upon cuſhions of a kind of excellent pluſh, blue; and under his foot curi-

ous

ous carpets of ſilk of divers colours, like the Perſian, but far finer. He held up his bare hand as he went, as bleſſing the people, but in ſilence. The ſtreet was wonderfully well kept; ſo that there was never any army had their men ſtand in better battle array, than the people ſtood. The windows likewiſe were not crouded, but every one ſtood in them as if they had been placed. When the ſhew was paſt, the Jew ſaid to me; "I ſhall not be able to attend you as I would, in regard of ſome "charge the city hath laid upon me, for the entertaining of this great perſon." Three 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 com- "manded 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 chooſe: and for this hath ap- "pointed the next day after to-morrow. And becauſe he meaneth to give you his "bleſſing, he hath appointed it in the forenoon." We came at our day and hour, and I was choſen by my fellows for the private acceſs. We found him in a fair chamber, richly hanged, and carpeted under foot, without any degrees to the ſtate; he was ſet upon a low throne richly adorned, and a rich cloth of ſtate over his head, of blue ſattin embroidered. He was alone, ſave that he had two pages of honour, on either hand one, finely attired in white. His under garments were like what we ſaw him wear in the chariot; but inſtead of his gown, he had on him a mantle with a cap, of the ſame fine black, faſtened about him. When we came in, as we were taught, we bowed low at our firſt entrance; and when we were come near his chair, he ſtood up, holding forth his hand ungloved, and in poſture of bleſſing; and we every one of us ſtooped down, and kiſſed the hem of his tippet. That done, the reſt departed, and I remained. Then he warned the pages forth of the room, and cauſed me to ſit down beſide him, and ſpake to me thus in the Spaniſh tongue.

"GOD bleſs thee, my ſon; I will give thee the greateſt jewel that 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 whereto our fellows are aſſigned. And, fourth- "ly, the ordinances and rites which we obſerve.

"THE end of our foundation is the knowledge of cauſes, and ſecret motions of "things; and the enlarging of the bounds of human 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 conſervations of "bodies. We uſe them likewiſe for the imitation of natural mines: and the produc- "ing alſo of new artificial metals, by compoſitions and materials which we uſe and

" lay there for many years. We uſe them alſo ſometimes, which may ſeem ſtrange,
" for curing of ſome diſeaſes, and for prolongation of life, in ſome hermits that chooſe
" to live there, well accommodated of all things neceſſary, and indeed live very long;
" by whom alſo we learn many things.

" We have burials in ſeveral earths, where we put divers cements, as the Chineſes
" do their porcellane. But we have them in greater variety, and ſome of them more
" fine. We have alſo great variety of compoſts, and ſoils, for the making of the
" earth fruitful.

" We have high towers; the higheſt about half a mile in height; and ſome of
" them likewiſe ſet upon high mountains; ſo that the vantage of the hill with the
" tower, is in the higheſt of them three miles at leaſt. And theſe places we call the
" upper region: accounting the air between the high places and the low, as a middle
" region. We uſe theſe towers, according to their ſeveral heights and ſituations,
" for inſolation, refrigeration, conſervation, and for the view of divers meteors; as
" winds, rain, ſnow, hail, and ſome of the fiery meteors alſo. And upon them, in
" ſome places, are dwellings of hermits, whom we viſit ſometimes, and inſtruct
" what to obſerve.

" We have great lakes both ſalt and freſh, whereof we have uſe for the fiſh and
" fowl. We uſe them alſo for burials of ſome natural bodies: for we find a differ-
" ence in things buried in earth, or in air below the earth; and things buried in
" water. We have alſo pools, of which ſome do ſtrain freſh water out of ſalt; and
" others by art do turn freſh water into ſalt. We have alſo ſome rocks in the midſt
" of the ſea: and ſome 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 engines for multiplying and enforcing of
" winds, to ſet alſo on going divers motions.

" We have alſo a number of artificial wells and fountains, made in imitation of
" the natural ſources and baths; as tinctured on vitriol, ſulphur, ſteel, braſs,
" lead, nitre, and other minerals. And again, we have little wells for infuſions
" of many things, where the waters take the virtue quicker and better, than in veſſels
" or baſons. And amongſt them we have a water, which we call water of para-
" diſe, being, by that we do to it, made very ſovereign for health and prolonga-
" tion of life.

" We have alſo great and ſpacious houſes, where we imitate and demonſtrate
" meteors; as ſnow, hail, rain, ſome artificial rains of bodies, and not of water,
" thunders, lightenings; alſo generations of bodies in air; as frogs, flies, and di-
" vers 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 arefaction: and others, 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 practiſe likewiſe all

" concluſions

" concluſions of grafting and inoculating, as well of wild trees as of fruit trees, " which produceth many effects. And we make, by art, in the ſame orchards and " gardens, trees and flowers to come earlier or later than their ſeaſons; and to come " up and bear more ſpeedily than by their natural courſe they do. We make them " alſo by art greater much than their nature; and their fruit greater, and ſweeter, " and of differing taſte, ſmell, colour, and figure, from their nature. And many " of them we ſo order, as 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 incloſures of all ſorts of beaſts and birds, which we " uſe not only for view or rareneſs, but likewiſe for diſſections and trials; that " thereby we may take light, what may be wrought upon the body of man. Where- " in we find many ſtrange effects; as continuing life in them, though divers parts, " which you account vital, be periſhed and taken forth; reſuſcitating of ſome that " ſeem dead in appearance; and the like. We try alſo all poiſons and other medicines " upon them, as well of chirurgery as phyſic. 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 than their kind is; and contra- " riwiſe 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 opinion is. We make a number of kinds of ſerpents, worms, flies, fiſhes, " of putrefaction; whereof ſome are advanced in effect to be perfect creatures, like " beaſts, or birds; and have ſexes, and do propagate. Neither do we this by " chance, but we know beforehand, of what matter and commixture, what kind of " thoſe creatures will ariſe.

" We have alſo particular pools, where we make trials upon fiſhes, as we have " ſaid before of beaſts and birds.

" We have alſo places for breed and generation of thoſe kinds of worms, and " flies, which are of ſpecial uſe; ſuch as are with you your ſilk-worms and bees.

" I will not hold you long with 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 laſt of forty " years. We have drinks alſo brewed with ſeveral herbs, and roots, and ſpices; " yea, with ſeveral fleſhes, and white-meats; whereof ſome of the drinks are ſuch " as they are in effect meat and drink both: ſo that divers, eſpecially in age, do " deſire to live with them, with little or no meat, or bread. And above all, we " ſtrive to have drinks of extreme thin parts, to inſinuate into the body, and yet " without all biting, ſharpneſs, or fretting; inſomuch as ſome of them put upon " the back of your hand, will, with a little ſtay, paſs through to the palm, and " yet taſte mild to the mouth. We have alſo waters which we ripen in that faſhion " as they become nouriſhing; ſo that they are indeed excellent drink; and many " will uſe no other. Breads we have of ſeveral grains, roots, and kernels: yea, " and ſome of fleſh, and fiſh, dried; with divers kinds of leavenings and ſeaſonings;

" ſo

" ſo that ſome do extremely move appetites; ſome do nouriſh ſo, as divers do live " on them, without any other meat; who live very long. So for meats, we have " ſome of them ſo beaten, and made tender, and mortified, yet without all cor- " rupting, as a weak heat of the ſtomach will turn them into good chylus, 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 than 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 like- " wiſe of divers ages, and long fermentations. And for their preparations, we have " not only all manner of exquiſite diſtillations and ſeparations, and eſpecially by " gentle heats and percolations through divers ſtrainers, yea, and ſubſtances; but " alſo exact forms of compoſition, whereby they incorporate almoſt as they were " natural ſimples.

" We have alſo divers mechanical arts, which you have not; and ſtuffs made by " them; as papers, linen, ſilks, tiſſues; dainty works of feathers of wonderful " luſtre; excellent dyes, 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 of them 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.

" 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 imitation of the ſun's and heavenly " bodies heats, that paſs divers inequalities, and, as it were, orbs, progreſſes, and " returns, whereby we produce admirable effects. Beſides, we have heats of dungs, " and of bellies and maws of living creatures, and of their blood and bodies; and " of hays and herbs laid up moiſt; of lime unquenched; and ſuch like. Inſtruments " alſo which generate heat only by motion. And farther, places for ſtrong inſola- " tions: 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 demonſtrations 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 rain-bows, 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 colorations of light: all deluſions and deceits of the " ſight, in figures, magnitudes, motions, colours: all demonſtrations of ſhadows. " We find 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 hea- " ven, and remote places; and repreſent things near as far off; and things afar off " as near; making feigned diſtances. We have alſo helps for the ſight, far above " ſpectacles and glaſſes in uſe. We have alſo glaſſes and means, to ſee ſmall and " minute bodies perfectly and diſtinctly; as the ſhapes and colours of ſmall flies and " worms, grains, and flaws in gems, which cannot otherwiſe be ſeen; obſervations

" in

" in urine and blood, not otherwiſe to be ſeen. We make artificial rain-bows, " halos, and circles about light. We repreſent alſo all manner of reflexions, re- " fractions, and multiplications of viſual beams of objects.

" We have alſo precious ſtones of all kinds, many of them of great beauty, and " to you unknown; cryſtals likewiſe; and glaſſes of divers kinds; and amongſt " them ſome of metals vitrificated, and other materials, beſides thoſe of which you " make glaſs. Alſo a number of foſſils, and imperfect minerals, which you have " not. Likewiſe loadſtones of prodigious virtue; and other rare ſtones, both na- " tural and artificial.

" We have alſo ſound-houſes, where we practiſe and demonſtrate all ſounds, and " their generation. We have harmonies which you have not, of quarter-ſounds, " and leſſer ſlides of ſounds. Divers inſtruments of muſic likewiſe to you unknown, " ſome ſweeter than any you have; together with bells and rings that are dainty and " ſweet. We repreſent ſmall ſounds as great and deep; likewiſe great ſounds ex- " tenuate 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 arti- " ficial echoes, reflecting the voice many times, and as it were toſſing it: and ſome " that give back the voice louder than it came; ſome ſhriller, and ſome deeper; " yea, ſome rendering the voice differing in the letters or articulate ſound from that " they receive. We have alſo means to convey ſounds in trunks and pipes, in " ſtraight lines and diſtances.

" We have alſo perfume-houſes; wherewith we join alſo practices of taſte. We " multiply ſmells, which may ſeem ſtrange. We imitate ſmells, making all ſmells " to breathe out of other mixtures than thoſe that give them. We make divers " imitations of taſte likewiſe, ſo that they will deceive any man's taſte. And in this " houſe we contain alſo a confiture-houſe; where we make all ſweet-meats, dry and " moiſt; and divers pleaſant wines, milks, broths, and ſalads, in far greater variety " than you have.

" We have alſo engine houſes, where are prepared engines and inſtruments for " all ſorts of motions. There we imitate and practiſe to make ſwifter motions than " any you have, either out of your muſkets, or any engine that you have; and " to make them, and multiply them more eaſily, and with ſmall force, by wheels " and other means: and to make them ſtronger, and more violent than yours are; " exceeding your greateſt cannons and baſiliſks. We repreſent alſo ordnance and " inſtruments of war, and engines of all kinds: and likewiſe new mixtures and " compoſitions of gun-powder, wild-fires burning in water, and unquenchable. " Alſo fire-works of all variety both for pleaſure and uſe. We imitate alſo flights " of birds; we have ſome degrees of flying in the air; we have ſhips and boats " for going under water, and brooking of ſeas; alſo ſwimming-girdles and ſup- " porters. We have divers curious clocks, and other like motions of return, and " ſome perpetual motions. We imitate alſo motions of living creatures, by images " of men, beaſts, birds, fiſhes, and ſerpents; we have alſo a great number of other " various motions, ſtrange for equality, fineneſs, and ſubtilty.

" We have alſo a mathematical houſe, where are repreſented all inſtruments, as " well of geometry, as aſtronomy, exquiſitely made.

" We

" We have alſo houſes of deceits of the ſenſes; where we repreſent all manner " of feats of jugling, falſe apparitions, impoſtures, and illuſions; and their fallacies. " And ſurely you will eaſily believe, that we that have ſo many things truly natural, " which induce admiration, could in a world of particulars deceive the ſenſes, if " we would diſguiſe thoſe things, and labour to make them ſeem more miraculous. " But we do hate all impoſtures and lies: inſomuch as we have ſeverely forbidden " it to all our fellows, under pain of ignominy and fines, that they do not ſhew " any natural work or thing, adorned or ſwelling; but only pure as it is, and " without all affectation of ſtrangeneſs.

" Theſe are, my ſon, the riches of Solomon's houſe.

" For the ſeveral employments and offices of our fellows; we have twelve that " ſail into foreign countries, under the names of other nations, for our own we con- " ceal, who bring us the books, and abſtracts, and patterns of experiments of all " other parts. Theſe we call merchants of light.

" We have three that collect the experiments which are in all books. Theſe we " call depredators.

" We have three that collect the experiments of all mechanical arts; and alſo " of liberal ſciences; and alſo of practices which are not brought into arts. Theſe " we call myſtery-men.

" We have three that try new experiments, ſuch as themſelves think good. Theſe " we call pioneers or miners.

" We have three that draw the experiments of the former four into titles, and " tables, to give the better light for the drawing of obſervations and axioms out of " them. Theſe we call compilers.

" We have three that bend themſelves, looking into the experiments of their fel- " lows, and caſt about how to draw out of them things of uſe and practice for man's " life and knowledge, as well for works, as for plain demonſtration of cauſes, means " of natural divinations, and the eaſy and clear diſcovery of the virtues and parts of " bodies. Theſe we call dowry-men or benefactors.

" Then after divers meetings and conſults of our whole number, to conſider of " the former labours and collections, we have three that take care, out of them, to " direct new experiments, of a higher light, more penetrating into nature than " the former. Theſe we call lamps.

" We have three others that do execute the experiments ſo directed, and report " them. Theſe we call inoculators.

" Laſtly, we have three that raiſe the former diſcoveries by experiments into " greater obſervations, axioms, and aphoriſms. Theſe we call interpreters of " nature.

" We have alſo, as you muſt think, novices and apprentices, that the ſucceſſion of " the former employed men do not fail: beſides a great number of ſervants, and at- " tendants, 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 fit to keep ſecret: though ſome of thoſe we do reveal ſometimes to the " ſtate, and ſome not.

" For

" For our ordinances and rites: we have two very long and fair galleries: in one " of theſe we place patterns and ſamples of all manner of the more rare and excel- " lent inventions: in the other we place the ſtatues of all principal inventors. There " we have the ſtatue of your Columbus, that diſcovered the Weſt Indies: alſo the " inventor of ſhips: your monk that was the inventor of ordnance, and of gun- " powder: the inventor of muſic: the inventor of letters: the inventor of printing: " the inventor of obſervations of aſtronomy: the inventor of works in metal: the " inventor of glaſs: the inventor of ſilk of the worm: the inventor of wine: the " inventor of corn and bread: the inventor of ſugars: and all theſe by more certain " tradition than you have. Then have we divers inventors of our own of excellent " works; which ſince you have not ſeen, it were too long to make deſcriptions of " them; and beſides, in the right underſtanding of thoſe deſcriptions, you might " eaſily err. For upon every invention of value we erect a ſtatue to the inventor, " and give him a liberal and honourable 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 laud and thanks " to God for his marvellous works: and forms of prayers, imploring his aid and " bleſſing for the illumination of our labours; and the turning of them into good " and holy uſes.

" Laſtly, we have circuits or viſits of divers principal cities of the kingdom; " where, as it cometh to paſs, we do publiſh ſuch new profitable inventions as we " think good. And we do alſo declare natural divinations of diſeaſes, plagues, " ſwarms of hurtful creatures, ſcarcity, tempeſts, earthquakes, great inun- " dations, comets, temperature of the year, and divers other things; and we " give counſel thereupon what the people ſhall do for the prevention and remedy of " them."

And when he had ſaid this, he ſtood up; and I, as I had been taught, kneeled down; and he laid his right hand upon my head, and ſaid; " God 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.

Mr. BACON

In praiſe of KNOWLEDGE.

SILENCE were the beſt celebration of that, which I mean to commend; for who would not uſe ſilence, where ſilence is not made? and what crier can make ſilence in ſuch a noiſe and tumult of vain and popular opinions? My praiſe ſhall be dedicated to the mind itſelf. The mind is the man, and the knowledge of the mind. A man is but what he knoweth. The mind itſelf is but an accident to knowledge; for knowledge is a double of that which is. The truth of being, and the truth of knowing, is all one. And the pleaſures of the affections greater than the pleaſures of the ſenſes. And are not the pleaſures of the intellect greater than the pleaſures of the affections? Is it not a true and only natural pleaſure, whereof there is no ſatiety? Is it not knowledge that doth alone clear the mind of all perturbations? How many things are there which we imagine not? How many things do we eſteem and value otherwiſe than they are? This ill proportioned eſtimation, theſe vain imaginations, theſe be the clouds of error that turn into the ſtorms of perturbation. Is there any ſuch happineſs as for a man's mind to be raiſed above the confuſion of things; where he may have the proſpect of the order of nature, and the error of men? Is this but a vein only of delight, and not of diſcovery? of contentment, and not of benefit? Shall we not as well diſcern the riches of nature's warehouſe, as the benefit of her ſhop? Is truth ever barren? Shall he not be able thereby to produce worthy effects, and to endow the life of man with infinite commodities? But ſhall I make this garland to be put upon a wrong head? Would any body believe me, if I ſhould verify this, upon the knowledge that is now in uſe? Are we the richer by one poor invention, by reaſon of all the learning that hath been theſe many hundred years? The induſtry of artificers maketh ſome ſmall improvement of things invented; and chance ſometimes in experimenting, maketh us to ſtumble upon ſomewhat which is new: but all the diſputation of the learned never brought to light one effect of nature before unknown. When things are known and found out, then they can deſcant upon them, they can knit them into certain cauſes, they can reduce them to their principles. If any inſtance of experience ſtand againſt them, they can range it in order by ſome diſtinctions. But all this is but a web of the wit, it can work nothing. I do not doubt but that common notions which we call reaſon, and the knitting of them together, which we call logic, are the art of reaſon and ſtudies. But they rather caſt obſcurity, than gain light to the contemplation of nature. All the philoſophy of nature which is now received, is either the philoſophy of the Grecians, or that o h r of the alchemiſts. That of the Grecians hath the foundations in words, in oſtentation, in confutation, in ſects, in ſchools, in diſputations. The Grecians were, as one of themſelves ſayeth, *you Grecians, ever children.* They knew little antiquity; they knew,

knew, except fables, not much above five hundred years before themſelves. They knew but a ſmall portion of the world. That of the alchemiſts hath the foundation in impoſture, in auricular traditions and obſcurity. It was catching hold of religion, but the principle of it is, *Populus vult decipi*. So that I know no great difference between theſe great philoſophers, but that the one is a loud crying folly, and the other is a whiſpering folly. The one is gathered out of a few vulgar obſervations, and the other out of a few experiments of a furnace. The one never faileth to multiply words, and the other ever faileth to multiply gold. Who would not ſmile at Ariſtotle, when he admireth the eternity and invariableneſs of the heavens, as there were not the like in the bowels of the earth? Thoſe be the confines and borders of theſe two kingdoms, where the continual alteration and incurſion are. The ſuperficies and upper parts of the earth are full of varieties. The ſuperficies and lower parts of the heavens, which we call the middle region of the air, is full of variety. There is much ſpirit in the one part, that cannot be brought into maſs. There is much maſſy body in the other place, that cannot be refined to ſpirit. The common air is as the waſte ground between the borders. Who would not ſmile at the aſtronomers, I mean not theſe few carmen which drive the earth about, but the ancient aſtronomers, which feign the moon to be the ſwifteſt of the planets in motion, and the reſt in order, the higher the ſlower; and ſo are compelled to imagine a double motion: whereas how evident is it, that that which they call a contrary motion, is but an abatement of motion? The fixed ſtars overgo Saturn, and ſo in them and the reſt, all is but one motion, and the nearer the earth the ſlower. A motion alſo whereof air and water do participate, though much interrupted. But why do I in a conference of pleaſure enter into theſe great matters, in ſort that pretending to know much, I ſhould forget what is ſeaſonable? Pardon me, it was becauſe all things may be endowed and adorned with ſpeeches, but knowledge itſelf is more beautiful than any apparel of words that can be put upon it. And let not me ſeem arrogant without reſpect to theſe great reputed authors. Let me ſo give every man his due, as I give Time his due, which is to diſcover truth. Many of theſe men had greater wits, far above mine own, and ſo are many in the univerſities of Europe at this day. But alas, they learn nothing there but to believe: firſt to believe that others know that which they know not; and after themſelves know that which they know not. But indeed facility to believe, impatience to doubt, temerity to anſwer, glory to know, doubt to contradict, end to gain, ſloth to ſearch, ſeeking things in words, reſting in part of nature; theſe, and the like, have been the things which have forbidden the happy match between the mind of man, and the nature of things; and in place thereof have married it to vain notions and blind experiments: and what the poſterity and iſſue of ſo honourable a match may be, it is not hard to conſider. Printing, a groſs invention; artillery, a thing that lay not far out of the way; the needle, a thing partly known before: what a change have theſe three made in the world in theſe times; the one in the ſtate of learning, the other in the ſtate of war, the third in the ſtate of treaſure, commodities, and navigation? And thoſe, I ſay, were but ſtumbled upon and lighted upon by chance. Therefore, no doubt the ſovereignty of man lieth hid in knowledge; wherein many things are reſerved, which kings with their treaſure cannot buy, nor with their force command; their ſpials and intelligencers can give no news of them, their ſeamen and diſcoverers cannot ſail where they grow: now we govern nature in opinions, but we are thrall unto her in neceſſity; but if we would be led by her in invention, we ſhould command her in action.

VALERIUS TERMINUS

OF THE

INTERPRETATION of NATURE:

WITH THE

ANNOTATIONS of HERMES STELLA.

A few fragments of the first book.

[*None of the Annotations of Stella are set down in these fragments.*]

CHAP. I. *Of the limits and end of knowledge.*

IN the divine nature, both religion and philosophy have acknowledged goodness in perfection, science or providence comprehending all things, and absolute sovereignty or kingdom. In aspiring to the throne of power, the angels transgressed and fell; in presuming to come within the oracle of knowledge, man transgressed and fell; but in pursuit towards the similitude of God's goodness or love, which is one thing, for love is nothing else but goodness put in motion or applied, neither man or spirit ever have transgressed, or shall transgress.

The angel of light that was, when he presumed before his fall, said within himself, *I will ascend and be like unto the Highest*; not God, but the Highest. To be like to God in goodness, was no part of his emulation: knowledge, being in creation an angel of light, was not the want which did most solicit him; only because he was a minister he aimed at a supremacy; therefore his climbing or ascension was turned into a throwing down or precipitation.

Man on the other side, when he was tempted before he fell, had offered unto him this suggestion, *that he should be like unto God.* But how? not simply, but in this part, *knowing good and evil.* For being in his creation invested with sovereignty of all inferior creatures, he was not needy of power or dominion. But again, being a spirit newly inclosed in a body of earth, he was fittest to be allured with appetite of light and liberty of knowledge. Therefore this approaching and intruding into God's secrets and mysteries, was rewarded with a further removing and estranging from God's presence. But as to the goodness of God, there is no danger in contending or advancing towards a similitude thereof; as that which is open and propounded to our imitation. For that voice, whereof the heathen and all other errors of religion have ever confessed that it sounds not like man, *Love your enemies; be you like unto your heavenly Father, that suffereth his rain to fall both upon*

upon the juſt and the unjuſt, doth well declare, that we can in that point commit no exceſs. So again we find it often repeated in the old law, *Be you holy as I am holy*; and what is holineſs elſe but goodneſs, as we conſider it ſeparate, and guarded from all mixture, and all acceſs of evil?

Wherefore ſeeing that knowledge is of the number of thoſe things which are to be accepted of with caution and diſtinction; being now to open a fountain, ſuch as it is not eaſy to diſcern where the iſſues and ſtreams thereof will take and fall; I thought it good and neceſſary in the firſt place, to make a ſtrong and ſound head or bank to rule and guide the courſe of the waters; by ſetting down this poſition or firmament, namely, *That all knowledge is to be limited by religion, and to be referred to uſe and action.*

For if any man ſhall think, by view and enquiry into theſe ſenſible and material things, to attain to any light for the revealing of the nature or will of God; he ſhall dangerouſly abuſe himſelf. It is true, that the contemplation of the creatures of God hath for end, as to the natures of the creatures themſelves, knowledge; but as to the nature of God, no knowledge, but wonder: which is nothing elſe but contemplation broken off, or loſing itſelf. Nay further, as it was aptly ſaid by one of Plato's ſchool, *the ſenſe of man reſembles the ſun, which openeth and revealeth the terreſtrial globe, but obſcureth and concealeth the celeſtial*; ſo doth the ſenſe diſcover natural things, but darken and ſhut up divine. And this appeareth ſufficiently in that there is no proceeding in invention of knowledge, but by ſimilitude; and God is only ſelf-like, having nothing in common with any creature, otherwiſe than as in ſhadow and trope. Therefore attend his will as himſelf openeth it, and give unto faith that which unto faith belongeth; for more worthy it is to believe, than to think or know, conſidering that in knowledge, as we now are capable of it, the mind ſuffereth from inferior natures; but in all belief it ſuffereth from a ſpirit, which it holdeth ſuperior, and more authorized than itſelf.

To conclude; the prejudice hath been infinite, that both divine and human knowledge hath received by the intermingling and tempering of the one with the other; as that which hath filled the one full of hereſies, and the other full of ſpeculative fictions and vanities.

But now there are again, which, in a contrary extremity to thoſe which give to contemplation an over-large ſcope, do offer too great a reſtraint to natural and lawful knowledge; being unjuſtly jealous that every reach and depth of knowledge wherewith their conceits have not been acquainted, ſhould be too high an elevation of man's wit, and a ſearching and ravelling too far into God's ſecrets; an opinion that ariſeth either of envy, which is proud weakneſs, and to be cenſured and not confuted, or elſe of a deceitful ſimplicity. For if they mean that the ignorance of a ſecond cauſe doth make men more devoutly to depend upon the providence of God, as ſuppoſing the effects to come immediately from his hand; I demand of them, as Job demanded of his friends, *Will you lye for God, as man will for man to gratify him?* But if any man, without any ſiniſter humour, doth indeed make doubt that this digging further and further into the mine of natural knowledge, is a thing without example, and uncommended in the Scriptures, or fruitleſs; let him remember and be inſtructed: for behold it was not that pure light of natural knowledge, whereby man in paradiſe was able to give unto every living creature a name according to his propriety, which gave occaſion to the fall; but it was an aſpiring deſire to attain to that part of moral knowledge, which

which defineth of good and evil, whereby to diſpute God's commandments, and not to depend upon the revelation of his will, which was the original temptation. And the firſt holy records, which within thoſe brief memorials of things which paſſed before the flood, entered few things as worthy to be regiſtred, but only linages and propagations, yet nevertheleſs honour the remembrance of the inventor both of muſic and works in metal. Moſes again, who was the reporter, is ſaid to have been ſeen in all the Egyptian learning, which nation was early and leading in matter of knowledge. And Solomon the king, as out of a branch of his wiſdom extraordinarily petitioned and granted from God, is ſaid to have written a natural hiſtory of all that is green, from the cedar to the moſs, which is but a rudiment between putrefaction and an herb, and alſo of all that liveth and moveth. And if the book of Job be turned over, it will be found to have much aſperſion of natural philoſophy. Nay, the ſame Solomon the king affirmeth directly, that the glory of God *is to conceal a thing, but the glory of the king is to find it out*, as if, according to the innocent play of children, the divine Majeſty took delight to hide his works, to the end to have them found out; for in naming the king he intendeth man, taking ſuch a condition of man as hath moſt excellency and greateſt commandment of wits and means, alluding alſo to his own perſon, being truly one of thoſe cleareſt burning lamps, whereof himſelf ſpeaketh in another place, when he ſaith, *The ſpirit of man is as the lamp of God, wherewith he ſearcheth all inwardneſs*; which nature of the ſoul the ſame Solomon holding precious and ineſtimable, and therein conſpiring with the affection of Socrates, who ſcorned the pretended learned men of his time for raiſing great benefit of their learning, whereas Anaxagoras contrariwiſe, and divers others, being born to ample patrimonies, decayed them in contemplation, delivereth it in precept yet remaining, *Buy the truth, and ſell it not; and ſo of wiſdom and knowledge.*

And leſt any man ſhould retain a ſcruple, as if this thirſt of knowledge were rather an humour of the mind, than an emptineſs or want in nature, and an inſtinct from God; the ſame author defineth of it fully, ſaying, *God hath made every thing in beauty according to ſeaſon; alſo he hath ſet the world in man's heart, yet can he not find out the work which God worketh from the beginning to the end:* declaring not obſcurely that God hath framed the mind of man as a glaſs, capable of the image of the univerſal world, joying to receive the ſignature thereof, as the eye is of light; yea, not only ſatisfied in beholding the variety of things, and viciſſitude of times, but raiſed alſo to find out and diſcern thoſe ordinances and decrees, which throughout all theſe changes are infallibly obſerved. And although the higheſt generality of motion, or ſummary law of nature, God ſhould ſtill reſerve within his own curtain; yet many and noble are the inferior and ſecondary operations which are within man's ſounding. This is a thing which I cannot tell whether I may ſo plainly ſpeak as truly conceive, that as all knowledge appeareth to be a plant of God's own planting, ſo it may ſeem the ſpreading and flouriſhing, or at leaſt the bearing and fructifying of this plant, by a providence of God, nay, not only by a general providence, but by a ſpecial proph cy, was appointed to this autumn of the world: for to my underſtanding, it is not violent to the letter, and ſafe now after the event, ſo to interpret that place in the prophecy of Daniel, where, ſpeaking of the latter times, it is ſaid, *Many ſhall paſs to and fro, and ſcience ſhall be increaſed*; as if the opening of the world by navigation and commerce, and the further diſcovery of knowledge, ſhould meet in one time or age.

But

But howſoever that be, there are beſides the authorities of Scriptures before recited, two reaſons of exceeding great weight and force, why religion ſhould dearly protect all increaſe of natural knowledge the one, becauſe it leadeth to the greater exaltation of the glory of God; for as the Pſalms and other Scriptures do often invite us to conſider, and to magnify the great and wonderful works of God; ſo if we ſhould reſt only in the contemplation of thoſe ſhews which firſt offer themſelves to our ſenſes, we ſhould do a like injury to the majeſty of God, as if we ſhould judge of the ſtore of ſome excellent jeweller, by that only which is ſet out to the ſtreet in his ſhop. The other reaſon is, becauſe it is a ſingular help and a preſervative againſt unbelief and error: for ſaith our Saviour, *You err, not knowing the Scriptures, nor the power of God*; laying before us two books or volumes to ſtudy, if we will be ſecured from error; firſt, the Scriptures revealing the will of God, and then the creatures expreſſing his power; for that latter book will certify us, that nothing which the firſt teacheth ſhall be thought impoſſible. And moſt ſure it is, and a true concluſion of experience, that a little natural philoſophy inclineth the mind to atheiſm, but a further proceeding bringeth the mind back to religion.

To conclude then: Let no man preſume to check the liberality of God's gifts, who, as was ſaid, *hath ſet the world in man's heart*. So as whatſoever is not God, but parcel of the world, he hath fitted it to the comprehenſion of man's mind, if man will open and dilate the powers of his underſtanding as he may.

But yet evermore it muſt be remembred, that the leaſt part of knowledge paſſed to man by this ſo large a charter from God, muſt be ſubject to that uſe for which God hath granted it, which is the benefit and relief of the ſtate and ſociety of man; for otherwiſe all manner of knowledge becometh malign and ſerpentine, and therefore, as carrying the quality of the ſerpent's ſting and malice, it maketh the mind of man to ſwell; as the Scripture ſaith excellently, *Knowledge bloweth up, but charity buildeth up*. And again, the ſame author doth notably diſavow both power and knowledge, ſuch as is not dedicated to goodneſs or love; for ſaith he, *If I have all faith, ſo as I could remove mountains*, there is power active, *if I render my body to the fire*, there is power paſſive, *if I ſpeak with the tongues of men and angels*, there is knowledge, for language is but the conveyance of knowledge, *all were nothing*.

And therefore it is not the pleaſure of curioſity, nor the quiet of reſolution, nor the raiſing of the ſpirit, nor victory of wit, nor faculty of ſpeech, nor lucre of profeſſion, nor ambition of honour or fame, or inablement for buſineſs, that are the true ends of knowledge; ſome of theſe being more worthy than other, though all inferior and degenerate: but it is a reſtitution and reinveſting, in great part, of man to the ſovereighty and power, for whenſoever he ſhall be able to call the creatures by their true names, he ſhall again command them, which he had in his firſt ſtate of creation. And to ſpeak plainly and clearly, it is a diſcovery of all operations and poſſibilities of operations from immortality, if it were poſſible, to the meaneſt mechanical practice. And therefore knowledge, that tendeth but to ſatisfaction, is but as a courteſan, which is for pleaſure, and not for fruit or generation. And knowledge that tendeth to profit or profeſſion, or glory, is but as the golden ball thrown before Atalanta; which while ſhe goeth aſide, and ſtoopeth to take up, ſhe hindreth the race. And knowledge referred to ſome particular point of uſe, is but as Harmodius, which putteth down one tyrant: and not like Hercules, who did perambulate the world to ſuppreſs tyrants and giants and monſters in every part.

It

It is true, that in two points the curſe is peremptory, and not to be removed: the one, that vanity muſt be the end in all human effects; eternity being reſumed, though the revolutions and periods may be delayed. The other, that the conſent of the creature being now turned into reluctation, this power cannot otherwiſe be exerciſed and adminiſtred but with labour, as well in inventing as in executing; yet nevertheleſs chiefly that labour and travel which is deſcribed by the ſweat of the brows, more than of the body; that is, ſuch travel as is joined with the working and diſcurſion of the ſpirits in the brain: for as Solomon ſaith excellently, *The fool putteth to more ſtrength, but the wiſe man conſidereth which way*; ſignifying the election of the mean to be more material than the multiplication of endeavour. It is true alſo, that there is a limitation rather potential than actual, which is when the effect is poſſible, but the time or place yieldeth not the matter or baſis whereupon man ſhould work. But notwithſtanding theſe precincts and bounds, let it be believed, and appeal thereof made to time, with renunciation nevertheleſs to all the vain and abuſing promiſes of alchemiſts and magicians, and ſuch like light, idle, ignorant, credulous, and fantaſtical wits and ſects, that the new-found world of land was not greater addition to the ancient continent, than there remaineth at this day a world of inventions and ſciences unknown, having reſpect to thoſe that are known, with this difference, that the ancient regions of knowledge will ſeem as barbarous, compared with the new; as the new regions of people ſeem barbarous, compared to many of the old.

The dignity of this end, of endowment of man's life with new commodities, appeareth by the eſtimation that antiquity made of ſuch as guided thereunto; for whereas founders of ſtates, lawgivers, extirpers of tyrants, fathers of the people, were honoured but with the titles of worthies or demi-gods, inventors were ever conſecrated amongſt the gods themſelves. And if the ordinary ambitions of men lead them to ſeek the amplification of their own power in their countries, and a better ambition than that hath moved men to ſeek the amplification of the power of their own countries amongſt other nations; better again and more worthy muſt that aſpiring be, which ſeeketh the amplification of the power and kingdom of mankind over the world: the rather, becauſe the other two proſecutions are ever culpable of much perturbation and injuſtice; but this is a work truly divine, which cometh *in aura leni*, without noiſe or obſervation.

The acceſs alſo to this work hath been by that port or paſſage, which the divine Majeſty, who is unchangeable in his ways, doth infallibly continue and obſerve; that is, the felicity wherewith he hath bleſſed an humility of mind, ſuch as rather laboureth to ſpell, and ſo by degrees to read in the volumes of his creatures, than to ſolicit and urge, and as it were to invocate a man's own ſpirit to divine, and give oracles unto him. For as in the inquiry of divine truth, the pride of man hath ever inclined to leave the oracles of God's word, and to vaniſh in the mixture of their own inventions; ſo in the ſelf-ſame manner, in inquiſition of nature, they have ever left the oracles of God's works, and adored the deceiving and deformed imagery, which the unequal mirrours of their own minds have repreſented unto them. Nay, it is a point fit and neceſſary in the front, and beginning of this work, without heſitation or reſervation to be profeſſed, that it is no leſs true in this human kingdom of knowledge, than in God's kingdom of heaven, that no man ſhall enter into it, *except he become firſt as a little child.*

Of

Of the impediments of knowledge.

Being the IVth chapter, the preface only of it.

IN ſome things it is more hard to attempt than to atchieve; which falleth out, when the difficulty is not ſo much in the matter or ſubject, as it is in the croſſineſs and indiſpoſition of the mind of man to think of any ſuch thing, to will or to reſolve it; and therefore Titus Livius in his declamatory digreſſion, wherein he doth depreſs and extenuate the honour of Alexander's conqueſts, ſaith, *Nihil aliud quam bene auſus vana contemnere:* in which ſort of things it is the manner of men firſt to wonder that any ſuch thing ſhould be poſſible, and after it is found out, to wonder again how the world ſhould miſs it ſo long. Of this nature, I take to be the invention and diſcovery of knowledge, *etc.*

The impediments which have been in the times, and in diverſion of wits.

Being the Vth chapter, a ſmall fragment in the beginning of that chapter.

THE incounters of the times have been nothing favourable and proſperous for the invention of knowledge, ſo as it is not only the daintineſs of the ſeed to take, and the ill mixture and unliking of the ground to nouriſh or raiſe this plant, but the ill ſeaſon alſo of the weather, by which it hath been checked and blaſted. Eſpecially in that the ſeaſons have been proper to bring up and ſet forward other more haſty and indifferent plants, whereby this of knowledge hath been ſtarved and overgrown; for in the deſcent of times always there hath been ſomewhat elſe in reign and reputation, which hath generally alienated and diverted wits and labours from that employment.

For as for the uttermoſt antiquity, which is like fame that muffles her head, and tells tales, I cannot preſume much of it; for I would not willingly imitate the manner of thoſe that deſcribe maps, which when they come to ſome far countries, whereof they have no knowledge, ſet down how there be great waſtes and deſerts there: ſo I am not apt to affirm that they knew little, becauſe what they knew is little known to us. But if you will judge of them by the laſt traces that remain to us, you will conclude, though not ſo ſcornfully as Ariſtotle doth, that ſaith our anceſtors were extreme groſs, as thoſe that came newly from being moulded out of the clay, or ſome earthly ſubſtance; yet reaſonably and probably thus, that it was with them in matter of knowledge, but as the dawning or break of day. For at that time the world was altogether home-bred, every nation looked little beyond their own confines or territories, and the world had no thorough lights then, as it hath had ſince by commerce and navigation, whereby there would neither be that contribution of wits one to help another, nor that variety of particulars for the correcting the cuſtomary conceits.

And as there could be no great collection of wits of ſeveral parts or nations, ſo neither could there be any ſucceſſion of wits of ſeveral times, whereby one might refine the other, in regard they had not hiſtory to any purpoſe. And the manner of their traditions was utterly unfit and unproper for amplification of knowledge. And again, the ſtudies of thoſe times, you ſhall find, beſides wars, incurſions, and rapines,

which were then almoſt every where betwixt ſtates adjoining, the uſe of leagues and confederacies being not then known, were to populate by multitude of wives and generation, a thing at this day in the waſter part of the Weſt-Indies principally affected; and to build, ſometimes for habitation, towns and cities; ſometimes, for fame and memory, monuments, pyramids, coloſſes, and the like. And if there happened to riſe up any more civil wits; then would he found and erect ſome new laws, cuſtoms and uſages, ſuch as now of late years, when the world was revolute almoſt to the like rudeneſs and obſcurity, we ſee both in our own nation and abroad many examples of, as well in a number of tenures reſerved upon mens lands, as in divers cuſtoms of towns and manors, being the deviſes that ſuch wits wrought upon in ſuch times of deep ignorance, *etc.*

The impediments of knowledge for want of a true ſucceſſion of wits, and that hitherto the length of one man's life hath been the greateſt meaſure of knowledge.

Being the VIth chapter, the whole chapter.

IN arts mechanical the firſt deviſe cometh ſhorteſt, and time addeth and perfecteth. But in ſciences of conceit, the firſt author goeth furtheſt, and time leeſeth and corrupteth. Painting, artillery, ſailing, and the like groſsly managed at firſt, by time accommodate and refined. The philoſophies and ſciences of Ariſtotle, Plato, Democritus, Hippocrates, of moſt vigour at firſt, by time degenerated and imbaſed. In the former many wits and induſtries contributed in one. In the latter many mens wits ſpent to deprave the wit of one.

The error is both in the deliverer and in the receiver. He that delivereth knowledge, deſireth to deliver it in ſuch form as may be ſooneſt believed, and not as may eaſilieſt be examined. He that receiveth knowledge, deſireth rather preſent ſatisfaction than expectant ſearch, and ſo rather not to doubt than not to err. Glory maketh the author not to lay open his weakneſs: and ſloth maketh the diſciple not to know his ſtrength.

Then begin men to aſpire to the ſecond prizes, to be a profound interpreter and commenter, to be a ſharp champion and defender, to be a methodical compounder and abridger. And this is the unfortunate ſucceſſion of wits which the world hath yet had, whereby the patrimony of all knowledge goeth not on huſbanded or improved, but waſted and decayed. For knowledge is like a water, that will never ariſe again higher than the level from which it fell. And therefore to go beyond Ariſtotle by the light of Ariſtotle, is to think that a borrowed light can increaſe the original light from whom it is taken. So then, no true ſucceſſion of wits having been in the world; either we muſt conclude, that knowledge is but a taſk for one man's life, and then vain was the complaint, that *life is ſhort, and art is long:* or elſe, that the knowledge that now is, is but a ſhrub; and not that tree which is never dangerous, but where it is to the purpoſe of knowing good and evil; which deſire ever riſeth upon an appetite to elect, and not to obey, and ſo containeth in it a manifeſt defection.

That the pretended ſucceſſion of wits hath been evil placed, for as much as after variety of ſects and opinions, the moſt popular and not the trueſt prevaileth and weareth out the reſt.

Being the VIIth chapter, a fragment.

IT is ſenſible to think, that when men enter firſt into ſearch and inquiry, according to the ſeveral frames and compoſitions of their underſtanding, they light upon differing conceits, and ſo all opinions and doubts are beaten over; and then men having made a taſte of all, wax weary of variety, and ſo reject the worſt, and hold themſelves to the beſt, either ſome one, if it be eminent; or ſome two or three, if they be in ſome equality; which afterwards are received and carried on, and the reſt extinct.

But truth is contrary; and that time is like a river, which carrieth down things which are light and blown up, and ſinketh and drowneth that which is ſad and weighty. For howſoever governments have ſeveral forms, ſometimes one governing, ſometimes few, ſometimes the multitude; yet the ſtate of knowledge is ever a democrity, and that prevaileth which is moſt agreeable to the ſenſes and conceits of people. As for example, there is no great doubt, but he that did put the beginnings of things to be ſolid, void, and motion to the center, was in better earneſt than he that put matter, form, and ſhift; or he that put the mind, motion, and matter. For no man ſhall enter into inquiſition of nature, but ſhall paſs by that opinion of Democritus; whereas he ſhall never come near the other two opinions, but leave them aloof, for the ſchools and table-talk. Yet thoſe of Ariſtotle and Plato, becauſe they be both agreeable to popular ſenſe, and the one was uttered with ſubtilty and the ſpirit of contradiction, and the other with a ſtile of ornament and majeſty, did hold out, and the other gave place, *etc.*

Of the impediments of knowledge, in handling it by parts, and in ſlipping off particular ſciences from the root and ſtock of univerſal knowledge.

Being the VIIIth chapter, the whole chapter.

CICERO the orator, willing to magnify his own profeſſion, and thereupon ſpending many words to maintain that eloquence was not a ſhop of good words and elegancies, but a treaſury and receipt of all knowledges, ſo far forth as may appertain to the handling and moving of the minds and affections of men by ſpeech; maketh great complaint of the ſchool of Socrates; that whereas before his time the ſame profeſſors of wiſdom in Greece did pretend to teach an univerſal ſapience and knowledge both of matter and words, Socrates divorced them, and withdrew philoſophy, and left rhetoric to itſelf, which by that deſtitution became but a barren and unnoble ſcience. And in particular ſciences we ſee, that if men fall to ſubdivide their labours, as to be an oculiſt in phyſic, or to be perfect in ſome one title of the law or the like, they may prove ready and ſubtile, but not deep or ſufficient, no not in that ſubject which they do particularly attend, becauſe of that conſent which it hath with the reſt. And it is a matter of common diſcourſe, of the chain of ſciences, how they are linked together, inſomuch as the Grecians, who had terms at will, have fitted it of a name of Circle-Learning. Nevertheleſs I that hold it for a great impediment towards the advance-

ment and further invention of knowledge, that particular arts and ſciences have been diſincorporated from general knowledge, do not underſtand one and the ſame thing, which Cicero's diſcourſe and the note and conceit of the Grecians in their word Circle-Learning do intend. For I mean not that uſe which one ſcience hath of another for ornament or help in practice, as the orator hath of knowledge of affections for moving, or as military ſcience may have uſe of geometry for fortifications; but I mean it directly of that uſe by way of ſupply of light and information, which the particulars and inſtances of one ſcience do yield and preſent for the framing or correcting of the axioms of another ſcience in their very truth and notion. And therefore that example of oculiſts and title lawyers doth come nearer my conceit than the other two; for ſciences diſtinguiſhed have a dependence upon univerſal knowledge to be augmented and rectified by the ſuperior light thereof; as well as the parts and members of a ſcience have upon the maxims of the ſame ſcience, and the mutual light and conſent which one part receiveth of another. And therefore the opinion of Copernicus in aſtronomy, which aſtronomy itſelf cannot correct, becauſe it is not repugnant to any of the appearances; yet natural philoſophy doth correct. On the other ſide, if ſome of the ancient philoſophers had been perfect in the obſervations of aſtronomy, and had called them to counſel when they made their principles and firſt axioms, they would never have divided their philoſophy, as the coſmographers do their deſcriptions by globes, making one philoſophy for heaven, and another for under heaven, as in effect they do.

So if the moral philoſophers, that have ſpent ſuch an infinite quantity of debate touching good and the higheſt good, had caſt their eye abroad upon nature, and beheld the appetite that is in all things to receive and to give; the one motion affecting preſervation, and the other multiplication; which appetites are moſt evidently ſeen in living creatures, in the pleaſure of nouriſhment and generation; and in man do make the apteſt and moſt natural diviſion of all his deſires, being either of ſenſe of pleaſure, or ſenſe of power; and in the univerſal frame of the world are figured, the one in the beams of heaven which iſſue forth, and the other in the lap of the earth which takes in: and again, if they had obſerved the motion of congruity, or ſituation of the parts in reſpect of the whole, evident in ſo many particulars: and laſtly, if they had conſidered the motion, familiar in attraction of things, to approach to that which is higher in the ſame kind: when by theſe obſervations, ſo eaſy and concurring in natural philoſophy, they ſhould have found out this quaternion of good, in enjoying or fruition, effecting or operation, conſenting or proportion, and approach or aſſumption; they would have ſaved and abridged much of their long and wandering diſcourſes of pleaſure, virtue, duty, and religion. So likewiſe in this ſame logic and rhetoric, or acts of argument and grace of ſpeech, if the great maſters of them would but have gone a form lower, and looked but into the obſervations of grammar concerning the kinds of words, their derivations, deflexions and ſyntax, ſpecially inriching the ſame with the helps of ſeveral languages, with their differing proprieties of words, phraſes and tropes; they might have found out more and better footſteps of common reaſon, help of diſputation, and advantages of cavillation, than many of theſe which they have propounded. So again, a man ſhould be thought to dally, if he did note how the figures of rhetoric and muſic are many of them the ſame. The repetitions and traductions in ſpeech, and the reports and hauntings of ſounds in muſic, are the very ſame things. Plutarch hath almoſt made a book of the Lacedemonian kind of jeſting, which joined ever pleaſure with diſtaſte. "Sir," ſaid a man of art to Philip king of Macedon, when he controlled

trolled him in his faculty, "God forbid your fortune ſhould be ſuch as to know theſe "things better than I." In taxing his ignorance in his art, he repreſented to him the perpetual greatneſs of his fortune, leaving him no vacant time for ſo mean a ſkill. Now in muſic it is one of the ordinarieſt flowers to fall from a diſcord, or hard tune, upon a ſweet accord. The figure that Cicero and the reſt commend, as one of the beſt points of elegancy, which is the fine checking of expectation, is no leſs well known to the muſicians, when they have a ſpecial grace in flying the cloſe or cadence. And theſe are no alluſions but direct communities, the ſame delights of the mind being to be found not only in muſic, rhetoric, but in moral philoſophy, policy, and other knowledges, and that obſcure in the one, which is more apparent in the other; yea, and that diſcovered in the one, which is not found at all in the other; and ſo one ſcience greatly aiding to the invention and augmentation of another. And therefore, without this intercourſe, the axioms of ſciences will fall out to be neither full nor true; but will be ſuch opinions, as Ariſtotle in ſome places doth wiſely cenſure, when he ſaith, "Theſe are the opinions of perſons that have reſpect but to a few things." So then we ſee, that this note leadeth us to an adminiſtration of knowledge in ſome ſuch order and policy, as the king of Spain, in regard of his great dominions, uſeth in ſtate: who though he hath particular councils for ſeveral countries and affairs, yet hath one council of ſtate, or laſt reſort, that receiveth the advertiſements and certificates from all the reſt. Hitherto of the diverſion, ſucceſſion, and conference of wits.

That the end and ſcope of knowledge hath been generally miſtaken, and that men were never well adviſed what it was they ſought.

Being the IXth chapter, immediately preceding the Inventory, and inducing the ſame.

IT appeareth then how rarely the wits and labours of men have been converted to the ſevere and original inquiſition of knowledge; and in thoſe who have pretended, what hurt had been done by the affectation of profeſſors, and the diſtraction of ſuch as were no profeſſors; and how there was never in effect any conjunction or combination of wits in the firſt and inducing ſearch, but that every man wrought apart, and would either have his own way, or elſe would go no further than his guide, having in the one caſe the honour of a firſt, and in the other the eaſe of a ſecond; and laſtly, how in the deſcent and continuance of wits and labours, the ſucceſſion hath been in the moſt popular and weak opinions, like unto the weakeſt natures, which many times have moſt children; and in them alſo the condition of ſucceſſion hath been rather to defend and to adorn, than to add; and if to add, yet that addition to be rather a refining of a part, than an increaſe of the whole. But the impediments of time and accidents, though they have wrought a general indiſpoſition, yet are they not ſo peremptory and binding, as the internal impediments and clouds in the mind and ſpirit of man, whereof it now followeth to ſpeak.

The Scripture, ſpeaking of the worſt ſort of error, ſaith, *Errare fecit eos in invio et non in via.* For a man may wander in the way, by rounding up and down; but if men have failed in their very direction and addreſs, that error will never by good fortune correct itſelf. Now it hath fared with men in their contemplations, as Seneca ſaith it fareth with them in their actions, *De partibus vitae quiſque deliberat, de ſumma nemo.*

nemo. A courſe very ordinary with men who receive for the moſt part their final ends from the inclination of their nature, or from common example and opinion, never queſtioning or examining them, nor reducing them to any clear certainty; and uſe only to call themſelves to account and deliberation touching the means and ſecond ends, and thereby ſet themſelves in the right way to the wrong place. So likewiſe upon the natural curioſity and deſire to know, they have put themſelves in way without foreſight or conſideration of their journey's end.

For I find that even thoſe that have ſought knowledge for itſelf, and not for benefit, or oſtentation, or any practical inablement in the courſe of their life, have nevertheleſs propounded to themſelves a wrong mark, namely ſatisfaction, which men call truth, and not operation. For as in the courts and ſervices of princes and ſtates, it is a much eaſier matter to give ſatisfaction than to do the buſineſs; ſo in the enquiring of cauſes and reaſons it is much eaſier to find out ſuch cauſes as will ſatisfy the mind of man and quiet objections, than ſuch cauſes as will direct him and give him light to new experiences and inventions. And this did Celſus note wiſely and truly, how that the cauſes which are in uſe, and whereof the knowledges now received do conſiſt, were in time minors and ſubſequents to the knowledge of the particulars, out of which they were induced and collected; and that it was not the light of thoſe cauſes which diſcovered particulars, but only the particulars being firſt found, men did fall on gloſſing and diſcourſing of the cauſes; which is the reaſon, why the learning that now is hath the curſe of barrenneſs, and is courteſan-like, for pleaſure, and not for fruit. Nay, to compare it rightly, the ſtrange fiction of the poets of the transformation of Scylla, ſeemeth to be a lively emblem of this philoſophy and knowledge: a fair woman upward in the parts of ſhow, but when you come to the parts of uſe and generation, barking monſters; for no better are the endleſs diſtorted queſtions, which ever have been, and of neceſſity muſt be, the end and womb of ſuch knowledge. . . . . .

But yet nevertheleſs, here I may be miſtaken, by reaſon of ſome which have much in their pen the referring ſciences to action and the uſe of man, which mean quite another matter than I do. For they mean a contriving of directions, and precepts for readineſs of practice, which I diſcommend not, ſo it be not occaſion that ſome quantity of the ſcience be loſt; for elſe it will be ſuch a piece of huſbandry, as to put away a manor lying ſomewhat ſcattered, to buy in a cloſe that lieth handſomely about a dwelling. But my intention contrariwiſe is to increaſe and multiply the revenues and poſſeſſions of man, and not to trim up only, or order with conveniency the grounds whereof he is already ſtated. Wherefore the better to make myſelf underſtood, that I mean nothing elſe than words, and directly to demonſtrate the point which we are now upon, that is, what is the true end, ſcope, or office of knowledge, which I have ſet down to conſiſt not in any plauſible, delectable, reverend or admired diſcourſe, or any ſatisfactory arguments, but in effecting and working, and in diſcovery of particulars not revealed before, for the better endowment and help of man's life; I have thought good to make, as it were a kalendar or inventory of the wealth, furniture, or means of man, according to his preſent eſtate, as far as it is known; which I do not to ſhew any univerſality of ſenſe or knowledge, and much leſs to make a ſatire of reprehenſion in reſpect of wants and errors, but partly becauſe cogitations new had need of ſome groſſneſs, and inculcation to make them perceived, and chiefly to the end, that for the time to come, upon the account and ſtate now made and caſt up, it may appear what increaſe this new manner of uſe and adminiſtration of the ſtock, if

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it be once planted, ſhall bring with it hereafter; and for the time preſent, in caſe I ſhould be prevented by death to propound and reveal this new light as I purpoſe, yet I may at the leaſt give ſome awaking note, both of the wants in man's preſent condition, and the nature of the ſupplies to be wiſhed; though for mine own part neither do I much build upon my preſent anticipations, neither do I think ourſelves yet learned or wiſe enough to wiſh reaſonably: for as it aſks ſome knowledge to demand a queſtion not impertinent; ſo it aſketh ſome ſenſe, to make a wiſh not abſurd.

The Inventory, or an enumeration and view of inventions already diſcovered in uſe, together with a note of the wants, and the nature of the ſupplies.

Being the Xth chapter; and this a ſmall fragment thereof, being the preface to the Inventory.

THE plaineſt method, and moſt directly pertinent to this intention, will be to make diſtribution of ſciences, arts, inventions, works, and their portions, according to the uſe and tribute which they yield and render to the conditions of man's life, and under thoſe ſeveral uſes, being as ſeveral offices of proviſions, to charge and tax what may be reaſonably exacted or demanded, not guiding ourſelves neither by the poverty of experience and probations, nor according to the vanity of credulous imaginations; and then upon thoſe charges and taxations to diſtinguiſh and preſent, as it were in ſeveral columns, what is extant and already found, and what is defective and further to be provided. Of which proviſions, becauſe in many of them, after the manner of ſlothful and faulty officers and accomptants, it will be returned, by way of excuſe, that no ſuch are to be had, it will be fit to give ſome light of the nature of the ſupplies, whereby it will evidently appear, that they are to be compaſſed and procured. And yet neverthleſs on the other ſide again, it will be as fit to check and controul the vain and void aſſignations and gifts, whereby certain ignorant, extravagant, and abuſing wits have pretended to indue the ſtate of man with wonders, differing as much from truth in nature, as Cæſar's commentaries differeth from the acts of King Arthur, or Huon of Bourdeaux, in ſtory. For it is true that Cæſar did greater things than thoſe idle wits had the audacity to feign their ſuppoſed worthies to have done; but he did them not in that monſtrous and fabulous manner.

The chapter immediately following the Inventory.

Being the XIth in order, a part thereof.

IT appeareth then what is now in propoſition, not by a general circumlocution, but by particular note, no former philoſophy varied in terms or method; no new placet or ſpeculation upon particulars already known; no referring to action, by any manual of practice; but the revealing and diſcovering of new inventions and operations. This to be done without the errors and conjectures of art, or the length or difficulties of experience; the nature and kinds of which inventions have been deſcribed as they could be diſcovered; for your eye cannot paſs one kenning without further ſailing: only we have ſtood upon the beſt advantages of the notions received, as upon a mount, to ſhew the knowledges adjacent and confining. If therefore the true end of knowledge,

ledge, not propounded, hath bred large error, the beſt and perfecteſt condition of the ſame end, not perceived, will cauſe ſome declination. For when the butt is ſet up, men need not rove, but except the white be placed, men cannot level. This perfection we mean, not in the worth of the effects, but in the nature of the direction, for our purpoſe is not to ſtir up mens hopes, but to guide their travels. The fulneſs of direction to work, and produce any effect, conſiſteth in two conditions, certainty and liberty. Certainty is, when the direction is not only true for the moſt part, but infallible. Liberty is, when the direction is not reſtrained to ſome definite means, but comprehendeth all the means and ways poſſible; for the poet ſaith well, *Sapientibus undique latae ſunt viae*; and where there is the greateſt plurality of change, there is the greateſt ſingularity of choice. Beſides, as a conjectural direction maketh a caſual effect, ſo a particular and reſtrained direction is no leſs caſual than uncertain. For thoſe particular means whereunto it is tied, may be out of your power, or may be accompanied with an overvalue of prejudice; and ſo if for want of certainty in direction, you are fruſtrated in ſucceſs, for want of variety in direction, you are ſtopped in attempt. If therefore your direction be certain, it muſt refer you, and point you to ſomewhat, which if it be preſent, the effect you ſeek will of neceſſity follow, elſe may you perform and not obtain. If it be free then muſt it refer you to ſomewhat, which if it be abſent, the effect you ſeek will of neceſſity withdraw, elſe may you have power and not attempt. This notion Ariſtotle had in light, though not in uſe. For the two commended rules by him ſet down, whereby the axioms of ſciences are precepted to be made convertible, and which the latter men have not without elegancy ſurnamed, the one the rule of truth, becauſe it preventeth deceit; the other the rule of prudence, becauſe it freeth election; are the ſame thing in ſpeculation and affirmation, which we now obſerve. An example will make my meaning attained, and yet percaſe make it thought that they attained it not.

Let the effect to be produced be whiteneſs; let the firſt direction be, that if air and water be intermingled, or broken in ſmall portions together, whiteneſs will enſue; as in ſnow, in the breaking of the ways of the ſea and rivers, and the like. This direction is certain, but very particular; and reſtrained, being tied but to air and water. Let the ſecond direction be, that if air be mingled as before with any tranſparent body, ſuch nevertheleſs as is uncoloured and more groſsly tranſparent than air itſelf, that then, *etc.* as glaſs or cryſtal, being beaten to fine powder, by the interpoſition of the air becometh white; the white of an egg, being clear of itſelf, receiving air by agitation, becometh white, receiving air by concoction becometh white; here you are freed from water, and advanced to a clear body, and ſtill tied to air. Let the third direction exclude or remove the reſtraint of an uncoloured body, as in amber, ſapphires, *etc.* which beaten to fine powder, become white in wine and beer; which brought to froth, become white. Let the fourth direction exclude the reſtraint of a body more groſly tranſparent than air, as in flame, being a body compounded between air and a finer ſubſtance than air; which flame if it were not for the ſmoke, which is the third ſubſtance that incorporateth itſelf and dieth, the flame would be more perfect white. In all theſe four directions air ſtill beareth a part. Let the fifth direction then be, that if any bodies, both tranſparent, but in an unequal degree, be mingled as before, whiteneſs will follow: as oil and water beaten to an ointment, though by ſettling, the air which gathereth in the agitation be evaporated, yet remaineth white; and the powder of glaſs or cryſtal, put into water, whereby the air giveth place, yet remaineth white, though not ſo perfect. Now are you freed from air, but ſtill you

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are tied to transparent bodies. To ascend further by scale I do forbear, partly because it would draw on the example to an over-great length, but chiefly because it would open that which in this work I determine to reserve; for to pass through the whole history and observation of colours and objects visible, were too long a digression; and our purpose is now to give an example of a free direction, thereby to distinguish and describe it; and not to set down a form of interpretation how to recover and attain it. But as we intend not now to reveal, so we are circumspect not to mislead; and therefore, this warning being given, returning to our purpose in hand, we admit the sixth direction to be, that all bodies, or parts of bodies, which are unequal equally, that is, in a simple proportion, do represent whiteness; we will explain this, though we induce it not. It is then to be understood, that absolute equality produceth transparence, inequality in simple order or proportion produceth whiteness, inequality in compound or respective order or proportion produceth other colours, and absolute or orderless inequality produceth blackness; which diversity, if so gross a demonstration be needful, may be signified by four tables; a blank, a chequer, a fret, and a medley; whereof the fret is evident to admit great variety. Out of this assertion are satisfied a multitude of effects and observations, as that whiteness and blackness are most incompatible with transparence; that whiteness keepeth light, and blackness stoppeth light, but neither passeth it; that whiteness or blackness are never produced in rainbows, diamonds, crystals, and the like; that white giveth no dye, and black hardly taketh dye; that whiteness seemeth to have an affinity with dryness, and blackness with moisture; that adustion causeth blackness, and calcination whiteness; that flowers are generally of fresh colours, and rarely black, *etc.* all which I do now mention confusedly by way of derivation, and not by way of induction. This sixth direction which I have thus explained, is of good and competent liberty, for whiteness fixed and inherent; but not for whiteness fantastical, or appearing, as shall be afterwards touched. But first do you need a reduction back to certainty or verity; for it is not all position or contexture of unequal bodies that will produce colours; for *aqua fortis*, oil of vitriol, *etc.* more manifestly, and many other substances more obscurely, do consist of very unequal parts, which yet are transparent and clear. Therefore the reduction must be, that the bodies or parts of bodies so intermingled as before, be of a certain grossness or magnitude; for the unequalities which move the sight must have a further dimension and quantity, than those which operate many other effects. Some few grains of saffron will give a tincture to a tun of water, but so many grains of civet will give a perfume to a whole chamber of air. And therefore when Democritus, from whom Epicurus did borrow it, held that the position of the solid portions was the cause of colours; yet in the very truth of this assertion he should have added, that the portions are required to be of some magnitude. And this is one cause why colours have little inwardness, and necessitude with the nature and proprieties of things, those things resembling in colour, which otherwise differ most, as salt and sugar; and contrariwise differing in colour, which otherwise resemble most, as the white and blue violets, and the several veins of one agate or marble. by reason that other virtues consist in more subtile proportions than colours do; and yet are there virtues and natures, which require a grosser magnitude than colours, as well as scents and divers other require a more subtile; for as the portion of a body will give forth scent, which is too small to be seen, so the portion of a body will shew colours, which is too small to be endued with weight: and therefore one of the prophets with great elegancy describing how all creatures carry no proportion towards God the creator, saith, *that all the*

nations in reſpect of him are like the duſt upon the balance; which is a thing appeareth, but weigheth not. But to return, there reſteth a further freeing of this ſixth direction; for the clearneſs of a river or ſtream ſheweth white at a diſtance, and cryſtalline glaſſes deliver the face or any other object falſified in whiteneſs, and long beholding the ſnow, to a weak eye, giveth an impreſſion of azure, rather than of whiteneſs. So as for whiteneſs in apparition only, and repreſentation, by the qualifying of the light, altering the *intermedium*, or affecting the eye itſelf, it reacheth not. But you muſt free your direction to the producing of ſuch an incidence, impreſſion, or operation, as may cauſe a preciſe and determinate paſſion of the eye, a matter which is much more eaſy to induce than that which we have paſt through; but yet becauſe it hath a full coherence both with that act of radiation, which hath hitherto been conceived and termed ſo unproperly and untruly, by ſome, an effluxion of ſpiritual ſpecies, and by others, an inveſting of the *intermedium*, with a motion which ſucceſſively is conveyed to the eye, and with the act of ſenſe, wherein I ſhould likewiſe open that which I think good to withdraw, I will omit.

Neither do I contend, but that this notion, which I call the freeing of a direction in the received philoſophies, as far as a ſwimming anticipation could take hold, might be perceived and diſcerned; being not much other matter than that which they did not only aim at the two rules of axioms before remembered, but more nearly alſo than that which they term the form or formal cauſe, or that which they call the true difference; both which nevertheleſs, it ſeemeth, they propound rather as impoſſibilities and wiſhes, than as things within the compaſs of human comprehenſion: for Plato caſteth his burden, and ſaith, *that he will revere him as a God, that can truly divide and define*; which cannot be but by true forms and differences, wherein I join hands with him, confeſſing as much, as yet aſſuming to myſelf little; for if any man can, by the ſtrength of his anticipations, find out forms, I will magnify him with the foremoſt. But as any of them would ſay, that if divers things, which many men know by inſtruction and obſervation, another knew by revelation, and without thoſe means, they would take him for ſomewhat ſupernatural and divine; ſo I do acknowledge, that if any man can by anticipations reach to that which a weak and inferior wit may attain to by interpretation, he cannot receive too high a title. Nay, I for my part do indeed admire to ſee how far ſome of them have proceeded by their anticipations; but how? it is as I wonder at ſome blind men to ſee what ſhift they make without their eyeſight; thinking with myſelf that if I were blind, I could hardly do it. Again, Ariſtotle's ſchool confeſſeth, that there is no true knowledge but by cauſes, no true cauſe but the form, no true form known except one, which they are pleaſed to allow; and therefore thus far their evidence ſtandeth with us, that both hitherto there hath been nothing but a ſhadow of knowledge, and that we propound now that which is agreed to be worthieſt to be ſought, and hardeſt to be found. There wanteth now a part very neceſſary, not by way of ſupply, but by way of caution: for as it is ſeen for the moſt part, that the outward tokens and badge of excellency and perfection are more incident to things merely counterfeit, than to that which is true, but for a meaner and baſer ſort; as a dubline is more like a perfect ruby than a ſpinel, and a counterfeit angel is made more like a true angel, than if it were an angel coined of China gold; in like manner, the direction carrieth a reſemblance of a true direction in verity and liberty, which indeed is no direction at all. For though your direction ſeem to be certain and free, by pointing you to nature that is unſeparable from the nature you inquire upon; yet if it do not carry you on a degree or remove nearer

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to action, operation or light, to make or produce, it is but superficial and counterfeit. Wherefore to secure and warrant what is a true direction, though that general note I have given be perspicuous in itself, for a man shall soon cast with himself whether he be ever the near to effect and operate or no, or whether he have won but an abstract or varied notion, yet for better instruction I will deliver three particular notes of caution. The first is, that the nature discovered be more original than the nature supposed, and not more secondary, or of the like degree; as to make a stone bright, or to make it smooth, it is a good direction to say, make it even; but to make a stone even, it is no good direction to say, make it bright, or make it smooth: for the rule is, that the disposition of any thing referring to the state of it in itself, or the parts, is more original than that which is relative or transitive towards another thing. So evenness is the disposition of the stone in itself, but smooth is to the hand, and bright to the eye, and yet nevertheless they all cluster and concur; and yet the direction is more unperfect, if it do appoint you to such a relative, as is in the same kind, and not in a diverse. For in the direction, to produce brightness by smoothness, although properly it win no degree, and will never teach you any new particulars before unknown, yet by way of suggestion, or bringing to mind, it may draw your consideration to some particulars known but not remembered; as you shall sooner remember some practical means of making smoothness, than if you had fixed your consideration only upon brightness; but if the direction had been to make brightness, by making reflexion, as thus, make it such as you may see your face in it; this is merely secondary, and helpeth neither by way of informing, nor by way of suggesting. So if in the inquiry of whiteness you were directed to make such a colour as should be seen furthest in a dark light; here you are advanced nothing at all. For these kinds of natures are but proprieties, effects, circumstances, concurrences, or what else you shall like to call them, and not radical and formative natures towards the nature supposed. The second caution is, that the nature inquired be collected by division before composition, or to speak more properly, by composition subaltern, before you ascend to composition absolute, *etc.*

Of the internal and profound errors and superstitions in the nature of the mind, and of the four sorts of idols or fictions which offer themselves to the understanding in the inquisition of knowledge.

Being the XVIth chapter, and this a small fragment thereof, being a preface to the inward elenches of the mind.

THE opinion of Epicurus, that the gods were of human shape, was rather justly derided, than seriously confuted by the other sects, demanding whether every kind of sensible creatures did not think their own figure fairest, as the horse, the bull, and the like, which found no beauty but in their own forms, as in appetite of lust appeared. And the heresy of the Anthropomorphites was ever censured for a gross conceit, bred in the obscure cells of solitary monks that never looked abroad. Again, the fable so well known of *Quis pinxit leonem*, doth set forth well, that there is an error of pride and partiality, as well as of custom and familiarity. The reflexion also from glasses so usually resembled to the imagery of the mind, every man knoweth to receive error and variety both in colour, magnitude, and shape, according to the quality of the glass.

But yet no uſe hath been made of theſe and many the like obſervations to move men to ſearch out, and upon ſearch to give true cautions of the native and inherent errors in the mind of man, which have coloured and corrupted all his notions and impreſſions.

I do find therefore in this inchanted glaſs four idols, or falſe appearances of ſeveral and diſtinct ſorts, every ſort comprehending many ſubdiviſions: the firſt ſort, I call idols of the nation or tribe; the ſecond, idols of the palace; the third, idols of the cave; and the fourth, idols of the theatre, *etc.*

Here followeth an abridgment of divers chapters of the firſt book of the INTERPRETATION OF NATURE.

CHAP. XII.

THAT in deciding and determining of the truth of knowledge, men have put themſelves upon trials not competent. That antiquity and authority, common and confeſſed notions, the natural and yielding conſent of the mind, the harmony and coherence of a knowledge in itſelf, the eſtabliſhing of principles with the touch and reduction of other propoſitions unto them, inductions without inſtances contradictory, and the report of the ſenſes, are none of them abſolute and infallible evidences of truth; and bring no ſecurity ſufficient for effects and operations. That the diſcovery of new works or active directions not known before, is the only trial to be accepted of; and yet not that neither, in caſe where one particular giveth light to another; but where particulars induce an axiom or obſervation, which axiom found out, diſcovereth and deſigneth new particulars. That the nature of this trial is not only upon the point, whether the knowledge be profitable or no, but even upon the point, whether the knowledge be true or no. Not becauſe you may always conclude, that the axiom which diſcovereth new inſtances is true; but contrariwiſe you may ſafely conclude, that if it diſcover not any new inſtance, it is vain and untrue. That by new inſtances are not always to be underſtood new recipes, but new aſſignations; and of the diverſity between theſe two. That the ſubtilty of words, arguments, notions, yea of the ſenſes themſelves, is but rude and groſs in compariſon of the ſubtilty of things. And of the ſlothful and flattering opinions of thoſe which pretended to honour the mind of man in withdrawing and abſtracting it from particulars; and of the inducements and motives whereupon ſuch opinions have been conceived and received.

CHAP. XIII.

OF the error in propounding chiefly the ſearch of cauſes and productions of things concrete, which are infinite and tranſitory; and not of abſtract natures, which are few and permanent. That theſe natures are as the alphabet or ſimple letters, whereof the variety of things conſiſteth; or as the colours mingled in the painter's ſhell, wherewith he is able to make infinite variety of faces or ſhapes. An enumeration of them according to popular note. That at the firſt one would conceive that in the ſchools by natural philoſophy were meant the knowledge of the efficients of things concrete; and by metaphyſic the knowledge of the forms of natures ſimple; which is a good and fit diviſion of knowledge: but upon examination there is no ſuch matter by them intended. That the little enquiry into the production

production of ſimple natures, ſheweth well that works were not ſought; becauſe by the former knowledge ſome ſmall and ſuperficial deflexions from the ordinary generations and productions may be found out, but the diſcovery of all profound and radical alteration muſt ariſe out of the latter knowledge.

CHAP. XIV.

OF the error in propounding the ſearch of the materials, or dead beginnings or principles of things, and not the nature of motions, inclinations, and applications. That the whole ſcope of the former ſearch is impertinent and vain; both becauſe there are no ſuch beginnings, and if there were they could not be known. That the latter manner of ſearch, which is all, they paſs over compendiouſly and ſlightly as a bye matter. That the ſeveral conceits in that kind; as that the lively and moving beginnings of things ſhould be ſhift or appetite of matter to privation; the ſpirit of the world, working in matter according to platform; the proceeding or fructifying of diſtinct kinds according to their proprieties; the intercourſe of the elements by mediation of their common qualities; the appetite of like portions to unite themſelves; amity and diſcord, or ſympathy and antipathy; motion to the centre, with motion of ſtripe or preſs; the caſual agitation, aggregation, and eſſays of the ſolid portions in the void ſpace; motion of ſhuttings and openings; are all mere nugations. And that the calculating and ordination of the true degrees, moments, limits and laws of motions and alterations, by means whereof all works and effects are produced, is a matter of a far other nature, than to conſiſt in ſuch eaſy and wild generalities.

CHAP. XV.

OF the great error of inquiring knowledge in anticipations. That I call anticipations, the voluntary collections that the mind maketh of knowledge, which is every man's reaſon. That though this be a ſolemn thing, and ſerves the turn to negotiate between man and man, becauſe of the conformity and participation of mens minds in the like errors, yet towards enquiry of the truth of things and works, it is of no value. That civil reſpects are a lett that this pretended reaſon ſhould not be ſo contemptibly ſpoken of, as were fit and medicinable, in regard that hath been too much exalted and glorified, to the infinite detriment of man's eſtate. Of the nature of words, and their facility and aptneſs to cover and grace the defects of anticipations. That it is no marvel if theſe anticipations have brought forth ſuch diverſity and repugnance in opinions, theories or philoſophies, as ſo many fable, of ſeveral arguments. That had not the nature of civil cuſtoms and government been in moſt times ſomewhat adverſe to ſuch innovations, though contemplative, there might have been, and would have been many more. That the ſecond ſchool of the Academics and the ſect of Pyrrho, or the conſiderers, that denied comprehenſion as to the diſabling of man's knowledge, entertained in anticipations, is well to be allowed: but that they ought, when they had overthrown and purged the floor of the ruins, to have ſought to build better in place. And more eſpecially that they did unjuſtly and prejudicially, to charge the deceit upon the report of the ſenſes, which admitteth very ſparing remedy; being indeed to have been charged upon the anticipations of the mind, which admitteth a perfect remedy. That the information of the ſenſes

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is ſufficient, not becauſe they err not, but becauſe the uſe of the ſenſe in diſcovering of knowledge is for the moſt part not immediate. So that it is the work, effect, or inſtance, that trieth the axiom, and the ſenſe doth but try the work done or not done, being or not being. That the mind of man in collecting knowledge needeth great variety of helps, as well as the hand of man in manual and mechanical practices needeth great variety of inſtruments. And that it were a poor work, that if inſtruments were removed, men would overcome with their naked hands. And of the diſtinct points of want and inſufficiency in the mind of man.

CHAP. XVI.

THAT the mind of a man, as it is not a veſſel of that content or receipt to comprehend knowledge without helps and ſupplies; ſo again it is not ſincere, but of an ill and corrupt tincture. Of the inherent and profound errors and ſuperſtitions in the nature of the mind, and of the four ſorts of idols or falſe appearances that offer themſelves to the underſtanding in the inquiſition of knowledge; that is to ſay, the idols of the tribe, the idols of the palace, the idols of the cave, and the idols of the theatre: That theſe four, added to the incapacity of the mind, and the vanity and malignity of the affections, leave nothing but impotency and confuſion. A recital of the particular kinds of theſe four idols, with ſome choſen examples of the opinions they have begot, ſuch of them as have ſupplanted the ſtate of knowledge moſt.

CHAP. XVII.

OF the errors of ſuch as have deſcended and applied themſelves to experience, and attempted to induce knowledge upon particulars. That they have not had the reſolution and ſtrength of mind to free themſelves wholly from anticipations, but have made a confuſion and intermixture of anticipations and obſervations, and ſo vaniſhed. That if any have had the ſtrength of mind generally to purge away and diſcharge all anticipations; they have not had that greater and double ſtrength and patience of mind, as well to repel new anticipations after the view and ſearch of particulars, as to reject old which were in their mind before; but have from particulars and hiſtory flown up to principles without the mean degrees, and ſo framed all the middle generalities or axioms, not by way of ſcale or aſcenſion from particulars, but by way of derivation from principles, whence hath iſſued the infinite chaos of ſhadows and moths, wherewith both books and minds have been hitherto, and may be yet hereafter much more peſtered. That in the courſe of thoſe derivations to make them yet the more unprofitable, they have uſed, when any light of new inſtance oppoſite to any aſſertion appeared, rather to reconcile the inſtance, than to amend the rule. That if any have had, or ſhall have the power and reſolution to fortify and incloſe his mind againſt all anticipations, yet if he have not been or ſhall not be cautioned by the full underſtanding of the nature of the mind and ſpirit of man, and therein of the ſtates, pores and paſſages both of knowledge and error, he hath not been nor ſhall not be poſſibly able to guide or keep on his courſe aright. That thoſe that have been converſant in experience and obſervation, have uſed, when they have intended to diſcover the cauſe of any effect, to fix their conſideration narrowly and exactly upon that effect itſelf, with all the circumſtances thereof,

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and to vary the trial thereof as many ways as can be deviſed; which courſe amounteth but to a tedious curioſity, and ever breaketh off in wondring, and not in knowing. And that they have not uſed to enlarge their obſervation to match and ſort that effect with inſtances of a diverſe ſubject, which muſt of neceſſity be before any cauſe be found out. That they have paſſed over the obſervation of inſtances vulgar and ignoble, and ſtayed their attention chiefly upon inſtances of mark; whereas the other ſort are for the moſt part more ſignificant, and of better light and information. That every particular that worketh any effect, is a thing compounded, more or leſs, of diverſe ſingle natures, more manifeſt and more obſcure, and that it appeareth not to whether of the natures the effect is to be aſcribed; and yet notwithſtanding they have taken a courſe without breaking particulars, and reducing them by excluſions and incluſions to a definite point, to conclude upon inductions in groſs; which empirical courſe is no leſs vain than the ſcholaſtical. That all ſuch as have ſought action and work out of their enquiry, have been haſty and preſſing to diſcover ſome practices for preſent uſe, and not to diſcover axioms, joining with them the new aſſignations as their ſureties. That the forerunning of the mind to frame recipes upon axioms at the entrance, is like Atalanta's golden ball that hindereth and interrupteth the courſe; and is to be inhibited till you have aſcended to a certain ſtage and degree of generalities; which forbearance will be liberally recompenſed in the end: and that chance diſcovereth new inventions by one and one, but ſcience by knots and cluſters. That they have not collected ſufficient quantity of particulars, nor them in ſufficient certainty and ſubtilty, nor of all ſeveral kinds, nor with thoſe advantages and diſcretions in the entry and ſorting which are requiſite; and of the weak manner of collecting natural hiſtory, which hath been uſed. Laſtly, that they had no knowledge of the formulary of interpretation, the work whereof is to abridge experience, and to make things as certainly found out by axiom in ſhort time, as by infinite experiences in ages.

CHAP. XVIII.

THAT the cautels and devices put in practice in the delivery of knowledge for the covering and palliating of ignorance, and the gracing and over-valuing of that they utter, are without number; but none more bold and more hurtful than two: the one, that men have uſed of a few obſervations upon any ſubject to make a ſolemn and formal art; by filling it up with diſcourſe, accommodating it with ſome circumſtances and directions to practice, and digeſting it into method, whereby men grow ſatisfied and ſecure, as if no more enquiry were to be made of that matter; the other, that men have uſed to diſcharge ignorance with credit, in defining all thoſe effects which they cannot attain unto, to be out of the compaſs of art and human endeavour. That the very ſtyles and forms of utterance are ſo many characters of impoſture, ſome chooſing a ſtyle of pugnacity and contention, ſome of ſatire and reprehenſion, ſome of plauſible and tempting ſimilitudes and examples, ſome of great words and high diſcourſe, ſome of ſhort and dark ſentences, ſome of exactneſs of method, all of poſitive affirmation; without diſcloſing the true motives and proofs of their opinions, or free confeſſing their ignorance or doubts, except it be now and then for a grace, and in cunning to win the more credit in the reſt, and not in good faith. That although men be free from theſe errors and incumbrances in the will and affection, yet it is not a thing ſo eaſy as is conceived, to convey the

the conceit of one man's mind into the mind of another, without loſs or miſtaking, eſpecially in notions new and differing from thoſe that are received. That never any knowledge was delivered in the ſame order it was invented, no not in the mathematics, though it ſhould ſeem otherwiſe, in regard that the propoſitions placed laſt do uſe the propoſitions or grants placed firſt for their proof and demonſtration. That there are forms and methods of tradition wholly diſtinct and differing, according to their ends whereto they are directed. That there are two ends of tradition of knowledge, the one to teach and inſtruct for uſe and practice, the other to impart or intimate for re-examination and progreſſion. That the former of theſe ends requireth a method not the ſame, whereby it was invented and induced, but ſuch as is moſt compendious and ready, whereby it may be uſed and applied. That the latter of the ends, which is where a knowledge is delivered to be continued and ſpun on by a ſucceſſion of labours, requireth a method whereby it may be tranſpoſed to another in the ſame manner as it was collected, to the end it may be diſcerned both where the work is weak, and where it breaketh off. That this latter method is not only unfit for the former end, but alſo impoſſible for all knowledge gathered and inſinuated by anticipations, becauſe the mind working inwardly of itſelf, no man can give a juſt account how he came to that knowledge which he hath received, and that therefore this method is peculiar for knowledge gathered by interpretation. That the diſcretion anciently obſerved, though by the precedent of many vain perſons and deceivers diſgraced, of publiſhing part and reſerving part to a private ſucceſſion, and of publiſhing in a manner whereby it ſhall not be to the capacity nor taſte of all, but ſhall as it were ſingle and adopt his reader, is not to be laid aſide, both for the avoiding of abuſe in the excluded, and the ſtrengthening of affection in the admitted. That there are other virtues of tradition, as that there be no occaſion given to error, and that it carry a vigour to root and ſpread againſt the vanity of wits and injuries of time; all which, if they were ever due to any knowledge delivered, or if they were never due to any human knowledge heretofore delivered, yet are now due to the knowledge propounded.

CHAP. XIX.

OF the impediments which have been in the affections, the principal whereof hath been deſpair or diffidence, and the ſtrong apprehenſion of the difficulty, obſcurity, and infiniteneſs which belongeth to the invention of knowledge, and that men have not known their own ſtrength; and that the ſuppoſed difficulties and vaſtneſs of the work are rather in ſhew and muſter, than in ſtate or ſubſtance, where the true way is taken. That this diffidence hath moved and cauſed ſome never to enter into ſearch, and others, when they have been entred, either to give over, or to ſeek a more compendious courſe than can ſtand with the nature of true ſearch. That of thoſe that have refuſed and prejudged enquiry, the more ſober and grave ſort of wits have depended upon authors and traditions, and the more vain and credulous reſorted to revelation and intelligence with ſpirits and higher natures. That of thoſe that have entred into ſearch, ſome having fallen upon ſome conceits, which they after conſider to be the ſame which they have found in former authors, have ſuddenly taken a perſuaſion that a man ſhall but, with much labour, incur and light upon the ſame inventions which he might with eaſe receive from others, and that it is but a vanity and ſelf-pleaſing of the wit to go about again, as one that would rather have

have a flower of his own gathering, than much better gathered to his hand. That the ſame humour of ſloth and diffidence ſuggeſteth, that a man ſhall but revive ſome ancient opinion which was long ago propounded, examined and rejected. And that it is eaſy to err in conceit, that a man's obſervation or notion is the ſame with a former opinion, both becauſe new conceits muſt of neceſſity be uttered in old words, and becauſe upon true and erroneous grounds men may meet in conſequence or concluſion, as ſeveral lines or circles that cut in ſome one point. That the greateſt part of thoſe that have deſcended into ſearch have choſen for the moſt artificial and compendious courſe, to induce principles out of particulars, and to reduce all other propoſitions to principles; and ſo inſtead of the neareſt way have been led to no way, or a mere labyrinth. That the two contemplative ways have ſome reſemblance with the old parable of the two moral ways, the one beginning with uncertainty and difficulty, and ending in plainneſs and certainty; and the other beginning with ſhew of plainneſs and certainty, and ending in difficulty and uncertainty. Of the great and manifeſt error and untrue conceit or eſtimation of the infiniteneſs of particulars, whereas indeed all prolixity is in diſcourſe and derivations; and of the infinite and moſt laborious expence of wit that hath been employed upon toys and matters of no fruit or value. That although the period of one age cannot advance men to the furtheſt point of interpretation of nature, except the work ſhould be undertaken with greater helps than can be expected, yet it cannot fail in much leſs ſpace of time to make return of many ſingular commodities towards the ſtate and occaſions of man's life. That there is leſs reaſon of diſtruſt in the courſe of interpretation now propounded, than in any knowledge formerly delivered, becauſe this courſe doth in ſort equal mens wits, and leaveth no great advantage or preeminence to the perfect and excellent motions of the ſpirit. That to draw a ſtraight line, or to make a circle perfect round by aim of hand only, there muſt be a great difference between an unſteady and unpractiſed hand and a ſteady and practiſed; but to do it by rule or compaſs, it is much alike.

CHAP. XXI.

OF the impediments which have been in the two extreme humours of admiration of antiquity and love of novelty; and again, of over-ſervile reverence, or over-light ſcorn of the opinions of others.

CHAP. XXII.

OF the impediments which have been in the affection of pride, ſpecially of one kind, which is the diſdain of dwelling and being converſant much in experiences and particulars, eſpecially ſuch as are vulgar in occurrency, and baſe and ignoble in uſe. That beſides certain higher myſteries of pride, generalities ſeem to have a dignity and ſolemnity, in that they do not put men in mind of their familiar actions, in that they have leſs affinity with arts mechanical and illiberal, in that they are not ſo ſubject to be controled by perſons of mean obſervation, in that they ſeem to teach men what they know not, and not to refer them to what they know. All which conditions directly feeding the humour of pride, particulars do want. That the majeſty of generalities, and the divine nature of the mind in taking them, if they be truly collected, and be indeed the direct reflexions of things, cannot be too much

magnified. And that it is true, that interpretation is the very natural and direct intention, action, and progreſſion of the underſtanding, delivered from impediments. And that all anticipation is but a deflexion or declination by accident.

CHAP. XXV.

OF the impediments which have been in the ſtate of heathen religion, and other ſuperſtitions and errors of religion. And that in the true religion there hath not, nor is any impediment, except it be by accident or intermixture of humour. That a religion which conſiſteth in rites and forms of adoration, and not in confeſſions and beliefs, is adverſe to knowledge; becauſe men having liberty to inquire and diſcourſe of theology at pleaſure, it cometh to paſs that all inquiſition of nature endeth and limiteth itſelf in ſuch metaphyſical or theological diſcourſe; whereas if mens wits be ſhut out of that port, it turneth them again to diſcover, and ſo to ſeek reaſon of reaſon more deeply. And that ſuch was the religion of the Heathen. That a religion that is jealous of the variety of learning, diſcourſe, opinions, and ſects, as miſdoubting it may ſhake the foundations, or that cheriſheth devotion upon ſimplicity and ignorance, as aſcribing ordinary effects to the immediate working of God, is adverſe to knowledge. That ſuch is the religion of the Turk, and ſuch hath been the abuſe of Chriſtian religion at ſome ſeveral times, and in ſome ſeveral factions. And of the ſingular advantage which the Chriſtian religion hath towards the furtherance of true knowledge, in that it excludeth and interdicteth human reaſon, whether by interpretation or anticipation, from examining or diſcuſſing of the myſteries and principles of faith.

CHAP. XXVI.

OF the impediments which have been in the nature of ſociety, and the policies of ſtate. That there is no compoſition of eſtate or ſociety, nor order or quality of perſons, which have not ſome point of contrariety towards true knowledge. That monarchies incline wits to profit and pleaſure, and commonwealths to glory and vanity. That univerſities incline wits to ſophiſtry and affectation; cloiſters to fables and unprofitable ſubtilty; ſtudy at large to variety; and that it is hard to ſay, whether mixture of contemplations with an active life, or retiring wholly to contemplations, do diſable and hinder the mind more.

FILUM LABYRINTHI,

SIVE

FORMULA INQUISITIONIS.

AD FILIOS.

PARS PRIMA.

1. FRANCIS BACON thought in this manner. The knowledge whereof the world is now poſſeſſed, eſpecially that of nature, extendeth not to magnitude and certainty of works. The phyſician pronounceth many diſeaſes incurable, and faileth oft in the reſt. The alchemiſts wax old and die in hopes. The magicians perform nothing that is permanent and profitable. The mechanics take ſmall light from natural philoſophy, and do but ſpin on their own little threads. Chance ſometimes diſcovereth inventions; but that worketh not in years, but ages. So he ſaw well, that the inventions known are very imperfect, and that new are not like to be brought to light but in great length of time; and that thoſe which are, came not to light by philoſophy.

2. He thought alſo this ſtate of knowledge was the worſe, becauſe men ſtrive againſt themſelves to ſave the credit of ignorance, and to ſatisfy themſelves in this poverty. For the phyſician, beſides the cauteles of practice, hath this general cautele of art, that he diſchargeth the weakneſs of his art upon ſuppoſed impoſſibilities; neither can his art be condemned when itſelf judgeth. That philoſophy alſo, out of which the knowledge of phyſic which now is in uſe is hewed, receiveth certain poſitions and opinions, which, if they be well weighed, induce this perſuaſion, that no great works are to be expected from art, and the hand of man; as, in particular, that opinion, that *the heat of the ſun and fire differ in kind*; and that other, *that compoſition is the work of man, and mixture is the work of nature*, and the like; all tending to the circumſcription of man's power, and to artificial deſpair; killing in men not only the comfort of imagination, but the induſtry of trial: only upon vainglory, to have their art thought perfect, and that all is impoſſible that is not already found. The alchemiſt diſchargeth his art upon his own errors, either ſuppoſing a miſunderſtanding of the words of his authors, which maketh him liſten after auricular traditions; or elſe a failing in the true proportions and ſcruples of practice, which maketh him renew infinitely his trials; and finding alſo that he lighteth upon ſome mean experiments and concluſions by the way, feedeth upon them, and magnifieth them to the moſt, and ſupplieth the reſt in hopes. The magician, when he findeth ſomething, as he conceiveth, above nature, effected, thinketh, when a breach is

once made in nature, that it is all one to perform great things and ſmall; not ſeeing, that they are but ſubjects of a certain kind, wherein magic and ſuperſtition hath played in all times. The mechanical perſon, if he can refine an invention, or put two or three obſerv ations or practices together in one, or couple things better with their uſe, or make the work in leſs or greater volume, taketh himſelf for an inventor. So he ſaw well, that men either perſuade themſelves of new inventions as of impoſſibilities; or elſe think they are already extant, but in ſecret and in few hands; or that they account of thoſe little induſtries and additions, as of inventions: all which turneth to the averting of their minds from any juſt and conſtant labour, to invent further in any quantity.

3. He thought alſo, when men did ſet before themſelves the variety and perfection of works produced by mechanical arts, they are apt rather to admire the proviſions of man, than to apprehend his wants; not conſidering, that the original inventions and concluſions of nature, which are the life of all that variety, are not many, nor deeply fetched; and that the reſt is but the ſubtile and ruled motion of the inſtrument and hand; and that the ſhop therein is not unlike the library, which in ſuch number of books containeth, for the far greater part, nothing but iterations, varied ſometimes in form but not new in ſubſtance. So he ſaw plainly, that opinion of ſtore was a cauſe of want; and that both works and doctrines appear many, and are few.

4. He thought alſo, that knowledge is uttered to men in a form, as if every thing were finiſhed; for it is reduced into arts and methods; which in their diviſions do ſeem to include all that may be. And how weakly ſoever the parts are filled, yet they carry the ſhew and reaſon of a total; and thereby the writings of ſome received authors go for the very art: whereas antiquity uſed to deliver the knowledge which the mind of man had gathered, in obſervations, aphoriſms, or ſhort and diſperſed ſentences, or ſmall tractates of ſome parts that they had diligently meditated and laboured; which did invite men, both to ponder that which was invented, and to add and ſupply further. But now ſciences are delivered to be believed and accepted, and not to be examined and further diſcovered; and the ſucceſſion is between maſter and diſciple, and not between inventor and continuer or advancer; and therefore ſciences ſtand at a ſtay, and have done for many ages, and that which is poſitive is fixed, and that which is queſtion is kept queſtion, ſo as the columns of no further proceeding are pitched. And therefore he ſaw plainly men had cut themſelves off from further invention; and that it is no marvel, that that is not obtained which hath not been attempted, but rather ſhut out and debarred.

5. He thought alſo, that knowledge is almoſt generally ſought either for delight and ſatisfaction, or for gain or profeſſion, or for credit and ornament, and that every of theſe are as Atalanta's balls, which hinder the race of invention. For men are ſo far in theſe courſes from ſeeking to increaſe the maſs of knowledge, as of that maſs which is they will take no more than will ſerve their turn: and if any one amongſt ſo many ſeeketh knowledge for itſelf, yet he rather ſeeketh to know the variety of things, than to diſcern of the truth and cauſes of them; and if his inquiſition be yet more ſevere, yet it tendeth rather to judgment than to invention; and rather to diſcover truth in controverſy, than new matter; and if his heart be ſo large as he propoundeth to himſelf further diſcovery or invention, yet it is rather of new diſcourſe and ſpeculation of cauſes, than of effects and operations. And as for thoſe that have ſo much in their mouths, action and uſe and practice, and the referring of ſciences thereunto;

thereunto; they mean it of application of that which is known, and not of a diſcovery of that which is unknown. So he ſaw plainly, that this mark, namely, invention of further means to endow the condition and life of man with new powers or works, was almoſt never yet ſet up and reſolved in man's intention and inquiry.

6. He thought alſo that, amongſt other knowledges, natural philoſophy hath been the leaſt followed and laboured. For ſince the chriſtian faith, the greateſt number of wits have been employed, and the greateſt helps and rewards have been converted upon divinity. And before-time likewiſe, the greateſt part of the ſtudies of philoſophers was conſumed in moral philoſophy, which was as the heathen divinity. And in both times a great part of the beſt wits betook themſelves to law, pleadings, and cauſes of eſtate; ſpecially in the time of the greatneſs of the Romans, who by reaſon of their large empire needed the ſervice of all their able men for civil buſineſs. And the time amongſt the Grecians, in which natural philoſophy ſeemed moſt to flouriſh, was but a ſhort ſpace; and that alſo rather abuſed in differing ſects and conflicts of opinions than profitably ſpent. Since which time, natural philoſophy was never any profeſſion, nor never poſſeſſed any whole man, except perchance ſome monk in a cloiſter, or ſome gentleman in the country, and that very rarely; but became a ſcience of paſſage, to ſeaſon a little young and unripe wits, and to ſerve for an introduction to other arts, eſpecially phyſic and the practical mathematics. So as he ſaw plainly, that natural philoſophy hath been intended by few perſons, and in them hath occupied the leaſt part of their time; and that in the weakeſt of their age and judgment.

7. He thought alſo, how great oppoſition and prejudice natural philoſophy had received by ſuperſtition, and the immoderate and blind zeal of religion; for he found that ſome of the Grecians, which firſt gave the reaſon of thunder, had been condemned of impiety; and that the coſmographers, which firſt diſcovered and deſcribed the roundneſs of the earth, and the conſequence thereof touching the Antipodes, were not much otherwiſe cenſured by the ancient fathers of the Chriſtian church; and that the caſe is now much worſe, in regard of the boldneſs of the ſchoolmen and their dependences in the monaſteries, who having made divinity into an art, have almoſt incorporated the contentious philoſophy of Ariſtotle into the body of Chriſtian religion; and generally he perceived in men of devout ſimplicity this opinion, that the ſecrets of nature were the ſecrets of God; and part of that glory whereinto the mind of man, if it ſeek to preſs, ſhall be oppreſſed; and that the deſire in men to attain to ſo great and hidden knowledge, hath a reſemblance with that temptation which cauſed the original fall; and on the other ſide, in men of a devout policy, he noted an inclination to have the people depend upon God the more, when they are leſs acquainted with ſecond cauſes; and to have no ſtirring in philoſophy, leſt it may lead to an innovation in divinity, or elſe ſhould diſcover matter of further contradiction to divinity. But in this part, reſorting to the authority of the Scriptures, and holy examples, and to reaſon, he reſted not ſatisfied alone, but much confirmed. For firſt, he conſidered that the knowledge of nature, by the light whereof man diſcerned of every living creature, and impoſed names according to their propriety, was not the occaſion of the fall; but the moral knowledge of good and evil, affected to the end to depend no more upon God's commandments, but for man to direct himſelf. Neither could he find in any Scripture, that the inquiry and ſcience of man in any thing, under the myſteries of the Deity, is determined and reſtrained, but contrariwiſe:

wiſe allowed and provoked. For concerning all other knowledge the Scripture pronounceth, *That it is the glory of God to conceal, but it is the glory of man,* (or of the king, for the king is but the excellency of man) *to invent*; and again, *The ſpirit of man is as the lamp of God, wherewith he ſearcheth every ſecret*; and again moſt effectually, *That God hath made all things beautiful and decent, according to the return of their ſeaſons; alſo that he hath ſet the world in man's heart, and yet man cannot find out the work which God worketh from the beginning to the end:* ſhewing that the heart of man is a continent of that concave or capacity, wherein the content of the world, that is, all forms of the creatures, and whatſoever is not God, may be placed, or received; and complaining, that through the variety of things, and viciſſitudes of times, which are but impediments and not impuiſſances, man cannot accompliſh his invention. In precedent alſo he ſet before his eyes, that in thoſe few memorials before the flood, the Scripture honoureth the name of the inventors of muſic and works in metal; that Moſes had this addition of praiſe, that he was ſeen in all the learning of the Egyptians; that Solomon, in his grant of wiſdom from God, had contained, as a branch thereof, that knowledge whereby he wrote a natural hiſtory of all verdure, from the cedar to the moſs, and of all that breatheth; that the book of Job, and many places of the prophets, have great aſperſion of natural philoſophy; that the church in the boſom and lap thereof, in the greateſt injuries of times, ever preſerved, as holy relicks, the books of philoſophy and all heathen learning; and that when Gregory the biſhop of Rome became adverſe and unjuſt to the memory of heathen antiquity, it was cenſured for puſillanimity in him, and the honour thereof ſoon after reſtored, and his own memory almoſt perſecuted by his ſucceſſor Sabinian; and laſtly, in our times, and the ages of our fathers, when Luther and the divines of the Proteſtant church on the one ſide, and the Jeſuits on the other, have enterpriſed to reform, the one the doctrine, the other the diſcipline and manners of the church of Rome, he ſaw well how both of them have awaked to their great honour and ſuccour all human learning. And for reaſon, there cannot be a greater and more evident than this, that all knowledge, and ſpecially that of natural philoſophy, tendeth highly to the magnifying of the glory of God in his power, providence and benefits, appearing and engraven in his works, which without this knowledge are beheld but as through a veil: for if the heavens in the body of them do declare the glory of God to the eye, much more do they in the rule and decrees of them declare it to the underſtanding. And another reaſon, not inferior to this, is, that the ſame natural philoſophy principally amongſt all other human knowledge, doth give an excellent defence againſt both extremes of religion, ſuperſtition and infidelity; for both it freeth the mind from a number of weak fancies and imaginations, and it raiſeth the mind to acknowledge that to God all things are poſſible: for to that purpoſe ſpeaketh our Saviour in that firſt canon againſt hereſies, delivered upon the caſe of the reſurrection, *You err, not knowing the Scriptures, nor the power of God*; teaching, that there are but two fountains of hereſy, not knowing the will of God revealed in the Scriptures, and not knowing the power of God revealed or at leaſt made moſt ſenſible in his creatures. So as he ſaw well, that natural philoſophy was of excellent uſe to the exaltation of the Divine Majeſty; and, that which is admirable, that being a remedy of ſuperſtition, it is nevertheleſs an help to faith. He ſaw likewiſe, that the former opinions to the prejudice hereof had no true ground; but muſt ſpring either out of mere ignorance, or out of an exceſs of devotion, to have divinity all in all, whereas it ſhould be only above all; both which ſtates of mind may be beſt pardoned; or elſe

out

out of worſe cauſes, namely out of envy, which is proud weakneſs, and deſerveth to be deſpiſed; or out of ſome mixture of impoſture, to tell a lie for God's cauſe; or out of an impious diffidence, as if men ſhould fear to diſcover ſome things in nature which might ſubvert faith. But ſtill he ſaw well, howſoever theſe opinions are in right reaſon reproved, yet they leave not to be moſt effectual hinderances to natural philoſophy and invention.

8. He thought alſo, that there wanted not great contrariety to the further diſcovery of ſciences in regard of the orders and cuſtoms of univerſities, and alſo in regard of common opinion. For in univerſities and colleges mens ſtudies are almoſt confined to certain authors, from which if any diſſenteth or propoundeth matter of redargution, it is enough to make him thought a perſon turbulent; whereas if it be well adviſed, there is a great difference to be made between matters contemplative and active. For in government change is ſuſpected, though to the better; but it is natural to arts to be in perpetual agitation and growth. Neither is the danger alike of new light, and of new motion or remove; and for vulgar and received opinions, nothing is more uſual, or more uſually complained of, than that it is impoſed for arrogancy and preſumption, for men to authoriſe themſelves againſt antiquity and authors, towards whom envy is ceaſed, and reverence by time amortiſed; it not being conſidered what Ariſtotle himſelf did, upon whom the philoſophy that now is chiefly dependeth, who came with a profeſſed contradiction to all the world, and did put all his opinions upon his own authority and argument, and never ſo much as nameth an author, but to confute and reprove him; and yet his ſucceſs well fulfilled the obſervation of him that ſaid, *If a man come in his own name, him will you receive.* Men think likewiſe, that if they ſhould give themſelves to the liberty of invention and travail of inquiry, that they ſhall light again upon ſome conceits and contemplations which have been formerly offered to the world, and have been put down by better, which have prevailed and brought them to oblivion; not ſeeing, that howſoever the property and breeding of knowledges is in great and excellent wits, yet the eſtimation and price of them is in the multitude, or in the inclinations of princes and great perſons meanly learned. So as thoſe knowledges are like to be received and honoured, which have their foundation in the ſubtility or fineſt trial of common ſenſe, or ſuch as fill the imagination, and not ſuch knowledge as is digged out of the hard mine of hiſtory and experience, and falleth out to be in ſome points as adverſe to common ſenſe, or popular reaſon, as religion, or more. Which kind of knowledge, except it be delivered with ſtrange advantages of eloquence and power, may be likely to appear and diſcloſe a little to the world, and ſtraight to vaniſh and ſhut again. So that time ſeemeth to be of the nature of a river or flood, that bringeth down to us that which is light and blown up, and ſinketh and drowneth that which is ſolid and grave. So he ſaw well, that in the ſtate of religion, and in the adminiſtration of learning, and in common opinion, there were many and continual ſtops and traverſes to the courſe of invention.

9. He thought alſo, that the invention of works and further poſſibility was prejudiced in a more ſpecial manner than that of ſpeculative truth; for beſides the impediments common to both, it hath by itſelf been notably hurt and diſcredited by the vain promiſes and pretences of alchemy, magic, aſtrology, and ſuch other arts, which, as they now paſs, hold much more of imagination and belief, than of ſenſe and demonſtration. But to uſe the poet's language, men ought to have remembered, that although Ixion of a cloud in the likeneſs of Juno begat Centaurs and Chimæras,

yet

yet Jupiter alſo of the true Juno begat Vulcan and Hebe. Neither is it juſt to deny credit to the greatneſs of the acts of Alexander, becauſe the like or more ſtrange have been feigned of an Amadis or an Arthur, or other fabulous worthies. But though this in true reaſon ſhould be, and that men ought not to make a confuſion of unbelief; yet he ſaw well, it could not otherwiſe be in event, but that experience of untruth had made acceſs to truth more difficult, and that the ignominy of vanity had abated all greatneſs of mind.

10. He thought alſo, there was found in the mind of man an affection naturally bred and fortified, and furthered by diſcourſe and doctrine, which did pervert the true proceeding towards active and operative knowledge. This was a falſe eſtimation, that it ſhould be as a diminution to the mind of man to be much converſant in experiences and particulars, ſubject to ſenſe and bound in matter, and which are laborious to ſearch, ignoble to meditate, harſh to deliver, illiberal to practiſe, infinite as is ſuppoſed in number, and no ways accommodated to the glory of arts. This opinion or ſtate of mind received much credit and ſtrength by the ſchool of Plato, who thinking that particulars rather revived the notions, or excited the faculties of the mind, than merely informed; and having mingled his philoſophy with ſuperſtition, which never favoureth the ſenſe, extolleth too much the underſtanding of man in the inward light thereof. And again, Ariſtotle's ſchool, which giveth the dew to the ſenſe in aſſertion, denieth it in practice much more than that of Plato. For we ſee the ſchoolmen, Ariſtotle's ſucceſſors, which were utterly ignorant of hiſtory, reſted only upon agitation of wit; whereas Plato giveth good example of inquiry by induction and view of particulars; though in ſuch a wandering manner as is of no force or fruit. So that he ſaw well, that the ſuppoſition of the ſufficiency of man's mind hath loſt the means thereof.

SEQUELA

SEQUELA CHARTARUM;

SIVE

INQUISITIO LEGITIMA

DE

CALORE et FRIGORE.

SECTIO ORDINIS.

Charta ſuggeſtionis, ſive memoria fixa.

THE ſun-beams hot to ſenſe.

The moon-beams not hot, but rather conceived to have a quality of cold, for that the greateſt colds are noted to be about the full, and the greateſt heats about the change. *Query.*

The beams of the ſtars have no ſenſible heat by themſelves; but are conceived to have an augmentative heat of the ſun beams by the inſtance following. The ſame climate arctic and antarctic are obſerved to differ in cold, namely, that the antarctic is the more cold, and it is manifeſt the antarctic hemiſphere is thinner planted with ſtars.

The heats obſerved to be greater in July than in June; at which time the ſun is neareſt the greateſt fixed ſtars, namely, *Cor Leonis*, *Cauda Leonis*, *Spica Virginis*, *Syrius*, *Canicula*.

The conjunction of any two of the three higheſt planets noted to cauſe great heats.

Comets conceived by ſome to be as well cauſes as effects of heat, much more the ſtars.

The ſun-beams have greater heat when they are more perpendicular than when they are more oblique; as appeareth in difference of regions, and the difference of the times of ſummer and winter in the ſame region; and chiefly in the difference of the hours of mid-day, mornings, evenings in the ſame day.

The heats more extreme in July and Auguſt than in May or June, commonly imputed to the ſtay and continuance of heat.

The heats more extreme under the tropics than under the line: commonly imputed to the ſtay and continuance of heat, becauſe the ſun there doth as it were double a cape.

The heats more about three or four of clock than at noon; commonly imputed to the ſtay and continuance of heat.

The ſun noted to be hotter when it ſhineth forth between clouds, than when the ſky is open and ſerene.

The middle region of the air hath manifeſt effects of cold, notwithſtanding locally it be nearer the ſun, commonly imputed to antiperiſtaſis, aſſuming that the beams of the ſun are hot either by approach or by reflexion, and that falleth in the middle term between both; or if, as ſome conceive, it be only by reflexion, then the cold

of that region reſteth chiefly upon diſtance. The inſtances ſhewing the cold of that region, are the ſnows which deſcend, the hails which deſcend, and the ſnows and extreme colds which are upon high mountains.

But *Query*, of ſuch mountains as adjoin to ſandy vales, and not to fruitful vales, which miniſter no vapours; or of mountains above the region of vapours, as is reported of Olympus, where any inſcription upon the aſhes of the altar remained untouched of wind or dew. And note, it is alſo reported, that men carry up ſponges with vinegar to thicken their breath, the air growing too fine for reſpiration, which ſeemeth not to ſtand with coldneſs.

The clouds make a mitigation of the heat of the ſun. So doth the interpoſition of any body, which we term ſhades; but yet the nights in ſummer are many times as hot to the feeling of mens bodies as the days are within doors, where the beams of the ſun actually beat not.

There is no other nature of heat known from the celeſtial bodies or from the air, but that which cometh by the ſun-beams. For in the countries near the pole, we ſee the extreme colds end in the ſummer months, as in the voyage of Nova Zembla, where they could not diſengage their barks from the ice, no not in July, and met with great mountains of ice, ſome floating, ſome fixed, at that time of the year, being the heart of ſummer.

The caves under the earth noted to be warmer in winter than in ſummer, and ſo the waters that ſpring from within the earth.

Great quantity of ſulphur, and ſometimes naturally burning after the manner of Ætna, in Iceland; the like written of Groenland, and divers other the cold countries †.

The trees in the cold countries are ſuch as are fuller of roſin, pitch, tar, which are matters apt for fire, and the woods themſelves more combuſtible than thoſe in much hotter countries; as for example, fir, pine-apple, juniper: *Query*, whether their trees of the ſame kind that ours are, as oak and aſh, bear not, in the more cold countries a wood more brittle and ready to take fire than the ſame kinds with us?

The ſun-beams heat manifeſtly by reflexion, as in countries pent in with hills, upon walls or buildings, upon pavements, upon gravel more than earth, upon arable more than graſs, upon rivers if they be not very open, *etc.*

The uniting or collection of the ſun-beams multiplieth heat, as in burning-glaſſes, which are made thinner in the middle than on the ſides, as I take it contrary to ſpectacles; and the operation of them is, as I remember, firſt to place them between the ſun and the body to be fired, and then to draw them upward towards the ſun, which it is true maketh the angle of the cone ſharper. But then I take it if the glaſs had been firſt placed at the ſame diſtance, to which it is after drawn, it would not have had that force, and yet that had been all one to the ſharpneſs of the angle. *Query.*

So in that the ſun's beams are hotter perpendicularly than obliquely, it may be imputed to the union of the beams, which in caſe of perpendicularity reflect into the very ſame lines with the direct; and the further from perpendicularity the more obtuſe the angle, and the greater diſtance between the direct beam and the reflected beam.

† No doubt the heat of the ſun hath great power in cold countries, though it be not to the analogy of men, and fruits, *etc.*

The

The ſun-beams raiſe vapours out of the earth, and when they withdraw they fall back in dews.

The ſun-beams do many times ſcatter the miſts which are in the mornings.

The ſun-beams cauſe the divers returns of the herbs, plants, and fruits of the earth; for we ſee in lemon-trees and the like, that there is coming on at once fruit ripe, fruit unripe, and bloſſoms; which may ſhew that the plant worketh to put forth continually, were it not for the variations of the acceſſes and receſſes of the ſun, which call forth, and put back.

The exceſſive heat of the ſun doth wither and deſtroy vegetables, as well as the cold doth nip and blaſt them.

The heat or beams of the ſun doth take away the ſmell of flowers, ſpecially ſuch as are of a milder odour.

The beams of the ſun do diſcloſe ſummer flowers, as the pimpernel, marigold, and almoſt all flowers elſe, for they cloſe commonly morning and evening, or in over-caſt weather, and open in the brightneſs of the ſun; which is but imputed to dryneſs and moiſture, which doth make the beams heavy or erect; and not to any other propriety in the ſun-beams: ſo they report not only a cloſing, but a bending or inclining in the *heliotropium* and *calendula*. *Query*.

The ſun-beams do ripen all fruits, and addeth to them a ſweetneſs or fatneſs; and yet ſome ſultry hot days overcaſt, are noted to ripen more than bright days.

The ſun-beams are thought to mend diſtilled waters, the glaſſes being well ſtopped, and to make them more virtuous and fragrant.

The ſun-beams do turn wine into vinegar; but *Query*, whether they would not ſweeten verjuice?

The ſun-beams do pall any wine or beer that is ſet in them.

The ſun-beams do take away the luſtre of any ſilks or arras.

There is almoſt no mine but lieth ſome depth in the earth; gold is conceived to lie higheſt and in the hotteſt countries; yet Thracia and Hungary are cold, and the hills of Scotland have yielded gold, but in ſmall grains or quantity.

If you ſet a root of a tree too deep in the ground, that root will periſh, and the ſtock will put forth a new root nearer the ſuperficies of the earth.

Some trees and plants proſper beſt in the ſhade; as the bayes, ſtrawberries, ſome wood-flowers.

Almoſt all flies love the ſun-beams, ſo do ſnakes; toads and worms contrary.

The ſun-beams tanneth the ſkin of man; and in ſome places turneth it to black.

The ſun-beams are hardly endured by many, but cauſe head-ach, faintneſs, and with many they cauſe rheums; yet to aged men they are comfortable.

The ſun cauſes peſtilence, which with us rage about autumn; but it is reported, in Barbary they break up about June, and rage moſt in winter.

The heat of the ſun, and of fire, and living creatures, agree in ſome things which pertain to vivification; as the back of a chimney will ſet forward an apricot-tree as well as the ſun; the fire will raiſe a dead butterfly as well as the ſun; and ſo will the heat of a living creature. The heat of the ſun in ſand will hatch an egg. *Query*.

The heat of the ſun in the hotteſt countries is nothing ſo violent as that of fire, no not ſcarcely ſo hot to the ſenſe as that of a living creature.

The ſun, a fountain of light as well as heat. The other celeſtial bodies manifeſt

in light, and yet *non conſtat* whether all borrowed, as in the moon; but obſcure in heat.

The ſouthern and weſtern wind with us is the warmeſt, whereof the one bloweth from the ſun, the other from the ſea; the northern and eaſtern the more cold. *Query*, whether in the coaſt of Florida, or at Braſil, the eaſt wind be not the warmeſt, and the weſt the coldeſt; and ſo beyond the antarctic tropic, the ſouthern wind the coldeſt.

The air uſeth to be extreme hot before thunders.

The ſea and air ambient, appeareth to be hotter than that at land; for in the northern voyages two or three degrees farther at the open ſea, they find leſs ice than two or three degrees more ſouth near land: but *Query*, for that may be by reaſon of the ſhores and ſhallows.

The ſnows diſſolve faſteſt upon the ſea-coaſts, yet the winds are counted the bittereſt from the ſea, and ſuch as trees will bend from. *Query*,

The ſtreams or clouds of brightneſs which appear in the firmament, being ſuch through which the ſtars may be ſeen, and ſhoot not, but reſt, are ſigns of heat.

The pillars of light which are ſo upright, and do commonly ſhoot and vary, are ſigns of cold; but both theſe are ſigns of drought.

The air when it is moved is to the ſenſe colder; as in winds, fannings, *ventilabra*.

The air in things fibrous, as fleeces, furs, *etc.* warm; and thoſe ſtuffs to the feeling warm.

The water to man's body ſeemeth colder than the air; and ſo in ſummer, in ſwimming it ſeemeth at the firſt going in; and yet after one hath been in a while, at the coming forth again, the air ſeemeth colder than the water.

The ſnow more cold to the ſenſe than water, and the ice than ſnow; and they have in Italy means to keep ſnow and ice for the cooling of their drinks; *Query*, whether it be ſo in froth in reſpect of the liquor.

Baths of hot water feel hotteſt at the firſt going in.

The froſt dew which we ſee in hoar froſt, and in the rymes upon trees or the like, accounted more mortifying cold than ſnow; for ſnow cheriſheth the ground, and any thing ſowed in it; the other biteth and killeth.

Stone and metal exceeding cold to the feeling more than wood: yea more than jet or amber, or horn, which are no leſs ſmooth.

The ſnow is ever in the winter ſeaſon, but the hail, which is more of the nature of ice, is ever in the ſummer ſeaſon; whereupon it is conceived, that as the hollows of the earth are warmeſt in the winter, ſo that region of the air is coldeſt in the ſummer; as if they were a fugue of the nature of either from the contrary, and a collecting itſelf to an union, and ſo to a further ſtrength.

So in the ſhades under trees, in the ſummer, which ſtand in an open field, the ſhade noted to be colder than in a wood.

Cold effecteth congelation in liquors, ſo as they do conſiſt and hold together, which before did run.

Cold breaketh glaſſes, if they be cloſe-ſtopped, in froſt, when the liquor freezeth within.

Cold in extreme maketh metals, that are dry and brittle, cleft and crack, *Æraque diſſiliunt*; ſo of pots of earth and glaſs.

Cold maketh bones of living creatures more fragile.

Cold

Cold maketh living creatures to ſwell in the joints, and the blood to clot, and turn more blue.

Bitter froſts do make all drinks to taſte more dead and flat.

Cold maketh the arteries and fleſh more aſper and rough.

Cold cauſes rheums and diſtillations by compreſſing the brain, and laxes by like reaſon.

Cold increaſes appetite in the ſtomach, and willingneſs to ſtir.

Cold maketh the fire to ſcald and ſparkle.

Paracelſus reporteth, that if a glaſs of wine be ſet upon a terras in a bitter froſt, it will leave ſome liquor unfrozen in the center of the glaſs, which excelleth *ſpiritus vini* drawn by fire.

Cold in Muſcovy, and the like countries, cauſes thoſe parts which are voideſt of blood, as the noſe, the ears, the toes, the fingers, to mortify and rot; eſpecially if you come ſuddenly to fire, after you have been in the air abroad, they are ſure to moulder and diſſolve. They uſe for remedy, as is ſaid, waſhing in ſnow water.

If a man come out of a bitter cold ſuddenly to the fire, he is ready to ſwoon or be overcome.

So contrariwiſe at Nova Zembla, when they opened their door at times to go forth, he that opened the door was in danger to be overcome.

The quantity of fiſh in the cold countries, Norway, *etc.* very abundant.

The quantity of fowl and eggs laid in the cliffs in great abundance.

In Nova Zembla they found no beaſt but bears and foxes, whereof the bears gave over to be ſeen about September, and the foxes began.

Meat will keep from putrifying longer in froſty weather, than at other times.

In Iceland they keep fiſh, by expoſing it to the cold, from putrifying without ſalt.

The nature of man endureth the colds in the countries of Scricfinnia, Biarmia, Lappia, Iceland, Groenland; and that not by perpetual keeping in in ſtoves in the winter time, as they do in Ruſſia; but contrariwiſe, their chief fairs and intercourſe is written to be in the winter, becauſe the ice evens and levelleth the paſſages of waters, plaſhes, *etc.*

A thaw after a froſt doth greatly rot and mellow the ground.

Extreme cold hurteth the eyes, and cauſeth blindneſs in many beaſts, as is reported.

The cold maketh any ſolid ſubſtance, as wood, ſtone, metal, put to the fleſh, to cleave to it, and to pull the fleſh after it, and ſo put to any cloth that is moiſt.

Cold maketh the pilage of beaſts more thick and long, as foxes of Muſcovy, ſables, *etc.*

Cold maketh the pilage of moſt beaſts incline to grayneſs or whiteneſs, as foxes, bears, and ſo the plumage of fowls; and maketh alſo the creſts of cocks and their feet white, as is reported.

Extreme cold will make nails leap out of the walls, and out of locks, and the like.

Extreme cold maketh leather to be ſtiff like horn.

In froſty weather the ſtars appear cleareſt and moſt ſparkling.

In the change from froſt to open weather, or from open weather to froſts, commonly great miſts.

In

In extreme colds any thing never ſo little which arreſteth the air maketh it to congeal; as we ſee in cobwebs in windows, which is one of the leaſt and weakeſt threads that is, and yet drops gather about it like chains of pearl.

So in froſts, the inſide of glaſs windows gathereth a dew; *Query*, if not more without.

Query, Whether the ſweating of marble and ſtones be in froſt, or towards rain.

Oil in time of froſt gathereth to a ſubſtance, as of tallow: and it is ſaid to ſparkle ſome time, ſo as it giveth a light in the dark.

The countries which lie covered with ſnow, have a haſtier maturation of all grain than in other countries, all being within three months, or thereabouts.

Query, It is ſaid, that compoſitions of honey, as mead, do ripen, and are moſt pleaſant in the great colds.

The froſts with us are caſual, and not tied to any months, ſo as they are not merely cauſed by the receſs of the ſun, but mixed with ſome inferior cauſes. In the inland of the northern countries, as in Ruſſia, the weather for the three or four months of November, December, January, February, is conſtant, namely, clear and perpetual froſt, without ſnows or rains.

There is nothing in our region, which, by approach of a matter hot, will not take heat by tranſition or excitation.

There is nothing hot here with us but is in a kind of conſumption, if it carry heat in itſelf; for all fired things are ready to conſume; chafed things are ready to fire; and the heat of mens bodies needeth aliment to reſtore.

The tranſition of heat is without any imparting of ſubſtance, and yet remaineth after the body heated is withdrawn; for it is not like ſmells, for they leave ſome airs or parts; not like light, for that abideth not when the firſt body is removed; not unlike to the motion of the loadſtone, which is lent without adheſion of ſubſtance, for if the iron be filed where it was rubbed, yet it will draw or turn.

PHYSIOLOGICAL REMAINS.

Inquiſitions touching the compounding of metals.

TO make proof of the incorporation of iron with flint, or other ſtone. For if it can be incorporated without over-great charge, or other incommodity, the cheapneſs of the flint or ſtone doth make the compound ſtuff profitable for divers uſes. The doubts may be three in number.

Firſt, Whether they will incorporate at all, otherwiſe than to a body that will not hold well together, but become brittle and uneven?

Secondly, Although it ſhould incorporate well, yet whether the ſtuff will not be ſo ſtubborn as it will not work well with a hammer, whereby the charge in working will overthrow the cheapneſs of the material?

Thirdly, Whether they will incorporate, except the iron and ſtone be firſt calcined into powder? And if not, whether the charge of the calcination will not eat out the cheapneſs of the material?

The uſes are moſt probable to be; firſt for the implements of the kitchen; as ſpits, ranges, cobirons, pots, *etc.* then for the wars, as ordnance, portculliſes, grates, chains, *etc.*

Note; the finer works of iron are not ſo probable to be ſerved with ſuch a ſtuff; as locks, clocks, ſmall chains, *etc.* becauſe the ſtuff is not like to be tough enough.

For the better uſe, in compariſon of iron, it is like the ſtuff will be far lighter: for the weight of iron to flint is double and a third part; and, ſecondly, it is like to ruſt not ſo eaſily, but to be more clean.

The ways of trial are two: firſt, by the iron and ſtone of themſelves, wherein it muſt be inquired, what are the ſtones that do eaſilieſt melt. Secondly, with an additament, wherein brimſtone is approved to help to the melting of iron or ſteel. But then it muſt be conſidered, whether the charge of the additament will not deſtroy the profit.

It muſt be known alſo, what proportion of the ſtone the iron will receive to incorporate well with it, and that with once melting; for if either the proportion be too ſmall, or that it cannot be received but piece-meal by ſeveral meltings, the work cannot be of value.

To make proof of the incorporating of iron and braſs. For the cheapneſs of the iron in compariſon of the braſs, if the uſes may be ſerved, doth promiſe profit. The doubt will be touching their incorporating; for that it is approved, that iron will not incorporate, neither with braſs nor other metals, of itſelf, by ſimple fire: ſo as the inquiry muſt be upon the calcination, and the additament, and the charge of them.

The uſes will be for ſuch things as are now made of braſs, and might be as well ſerved by the compound ſtuff; wherein the doubts will be chiefly of the toughneſs, and of the beauty.

Firſt,

First, therefore, if braſs ordnance could be made of the compound ſtuff, in reſpect of the cheapneſs of the iron, it would be of great uſe.

The advantage which braſs ordnance hath over iron, is chiefly, as I ſuppoſe, becauſe it will hold the blow, though it be driven far thinner than the iron can be; whereby it ſaveth both in the quantity of the material, and in the charge and commodity of mounting and carriage, in regard, by reaſon of the thinneſs, it beareth much leſs weight: there may be alſo ſomewhat in being not ſo eaſily over-heated.

Secondly, for the beauty. Thoſe things wherein the beauty or luſtre are eſteemed, are andirons, and all manner of images, and ſtatues, and columns, and tombs, and the like. So as the doubt will be double for the beauty; the one, whether the colour will pleaſe ſo well, becauſe it will not be ſo like gold as braſs? The other, whether it will poliſh ſo well? Wherein for the latter it is probable it will; for ſteel gloſſes are more reſplendent than the like plates of braſs would be; and ſo is the glittering of a blade. And beſides, I take it, andiron braſs, which they call white braſs, hath ſome mixture of tin to help the luſtre. And for the golden colour, it may be by ſome ſmall mixture of orpiment, ſuch as they uſe to braſs in the yellow alchemy; it will eaſily recover that which the iron loſeth. Of this the eye muſt be the judge upon proof made.

But now for pans, pots, curfews, counters, and the like, the beauty will not be ſo much reſpected, ſo as the compound ſtuff is like to paſs.

For the better uſe of the compound ſtuff, it will be ſweeter and cleaner than braſs alone, which yieldeth a ſmell or ſoilineſs; and therefore may be better for the veſſels of the kitchen and brewing. It will alſo be harder than braſs, where hardneſs may be required.

For the trial the doubts will be two: firſt, the over-weight of braſs towards iron, which will make iron float on the top in the melting. This perhaps will be holpen with the calaminar ſtone, which conſenteth ſo well with braſs, and as I take it, is lighter than iron. The other doubt will be, the ſtiffneſs and drineſs of iron to melt; which muſt be holpen either by moiſtening the iron, or opening it. For the firſt, perhaps ſome mixture of lead will help. Which is as much more liquid than braſs, as iron is leſs liquid. The opening may be holpen by ſome mixture of ſulphur: ſo as the trials would be with braſs, iron, calamin ſtone and ſulphur; and then again with the ſame compoſition, and an addition of ſome lead; and in all this the charge muſt be conſidered, whether it eat not out the profit of the cheapneſs of iron?

There be two proofs to be made of incorporation of metals, for magnificence and delicacy. The one for the eye, and the other for the ear. Statue-metal, and bell-metal, and trumpet-metal, and ſtring-metal; in all theſe, though the mixture of braſs or copper ſhould be dearer than the braſs itſelf, yet the pleaſure will advance the price to profit.

Firſt therefore for ſtatue-metal, ſee Pliny's mixtures, which are almoſt forgotten, and conſider the charge.

Try likewiſe the mixture of tin in larger portion with copper, and obſerve the colour and beauty, it being poliſhed. But chiefly let proof be made of the incorporating of copper or braſs with glaſs-metal, for that is cheap, and is like to add a great glory and ſhining.

For bell-metal. Firſt, it is to be known what is the compoſition which is now in uſe. Secondly, it is probable that it is the drineſs of the metal that doth help the clearneſs

clearneſs of the ſound, and the moiſtneſs that dulleth it: and therefore the mixtures that are probable, are ſteel, tin, glaſs-metal.

For ſtring-metal, or trumpet-metal, it is the ſame reaſon; ſave that glaſs-metal may not be uſed, becauſe it will make it too brittle; and trial may be made with mixture of ſilver, it being but a delicacy, with iron or braſs.

To make proof of the incorporation of ſilver and tin in equal quantity, or with two parts ſilver, and one part tin, and to obſerve whether it be of equal beauty and luſtre with pure ſilver; and alſo whether it yield no ſoilineſs more than ſilver? And again, whether it will endure the ordinary fire which belongeth to chafing-diſhes, poſnets, and ſuch other ſilver veſſels? And if it do not endure the fire, yet whether by ſome mixture of iron it may not be made more fixt? For if it be in beauty and all the uſes aforeſaid equal to ſilver, it were a thing of ſingular profit to the ſtate, and to all particular perſons, to change ſilver plate or veſſels into the compound ſtuff, being a kind of ſilver electrum, and to turn the reſt into coin. It may be alſo queſtioned, whether the compound ſtuff will receive gilding as well as ſilver, and with equal luſtre? It is to be noted, that the common allay of ſilver coin is braſs, which doth diſcolour more, and is not ſo neat as tin.

The drownings of metals within other metals, in ſuch ſort as they can never riſe again, is a thing of great profit. For if a quantity of ſilver can be ſo buried in gold, as it will never be reduced again, neither by fire, nor parting waters, nor otherwiſe: and alſo that it ſerve all uſes as well as pure gold, it is in effect all one as if ſo much ſilver were turned into gold; only the weight will diſcover it; yet that taketh off but half of the profit; for gold is not fully double weight to ſilver, but gold is twelve times price to ſilver.

The burial muſt be by one of theſe two ways, either by the ſmallneſs of the proportion, as perhaps fifty to one, which will be but ſix-pence gains in fifty ſhillings; or it muſt be holpen by ſomewhat which may fix the ſilver, never to be reſtored or vapoured away, when it is incorporated into ſuch a maſs of gold; for the leſs quantity is ever the harder to ſever: and for this purpoſe iron is the likeſt, or coppel ſtuff, upon which the fire hath no power of conſumption.

The making of gold ſeemeth a thing ſcarcely poſſible; becauſe gold is the heavieſt of metals, and to add matter is impoſſible: and again, to drive metals into a narrower room than their natural extent beareth, is a condenſation hardly to be expected. But to make ſilver ſeemeth more eaſy, becauſe both quickſilver and lead are weightier than ſilver; ſo as there needeth only fixing, and not condenſing. The degree unto this that is already known, is infuſing of quick-ſilver in a parchment, or otherwiſe, in the midſt of molten lead when it cooleth; for this ſtupifieth the quick-ſilver that it runneth no more. This trial is to be advanced three ways. Firſt, by iterating the melting of the lead, to ſee whether it will not make the quick-ſilver harder and harder. Secondly, to put realgar hot into the midſt of the quick-ſilver, whereby it may be condenſed, as well from within as without. Thirdly, to try it in the midſt of molten iron, or molten ſteel, which is a body more likely to fix the quick-ſilver than lead. It may be alſo tried, by incorporating powder of ſteel, or coppel duſt, by pouncing, into the quick-ſilver, and ſo to proceed to the ſtupifying.

Upon glaſs four things ſhould be put in proof. The firſt, means to make the glaſs more cryſtalline. The ſecond, to make it more ſtrong for falls, and for fire, though it come not to the degree to be malleable. The third, to make it coloured

by tinctures, comparable to or exceeding precious ſtones. The fourth, to make a compound body of glaſs and galletyle; that is, to have the colour milky like a chalcedon, being a ſtuff between a porcelane and a glaſs.

For the firſt, it is good firſt to know exactly the ſeveral materials whereof the glaſs in uſe is made; window-glaſs, Normandy and Burgundy, ale-houſe glaſs, Engliſh drinking-glaſs: and then thereupon to conſider what the reaſon is of the coarſeneſs or clearneſs; and from thence to riſe to a conſideration how to make ſome additaments to the coarſer materials, to raiſe them to the whiteneſs and cryſtalline ſplendor of the fineſt.

For the ſecond; we ſee pebbles, and ſome other ſtones, will cut as fine as cryſtal, which if they will melt, may be a mixture for glaſs, and may make it more tough and more cryſtalline. Beſides we ſee metals will vitrify; and perhaps ſome portion of the glaſs of metal vitrified, mixed in the pot of ordinary glaſs-metal, will make the whole maſs more tough.

For the third; it were good to have of coloured window-glaſs, ſuch as is coloured in the pot, and not by colours--------

It is to be known of what ſtuff galletyle is made, and how the colours in it are varied; and thereupon to conſider how to make the mixture of glaſs-metal and them, whereof I have ſeen the example.

Inquire what be the ſtones that do eaſilieſt melt. Of them take half a pound, and of iron a pound and a half, and an ounce of brimſtone, and ſee whether they will incorporate, being whole, with a ſtrong fire. If not, try the ſame quantities calcined: and if they will incorporate make a plate of them, and burniſh it as they do iron.

Take a pound and a half of braſs, and half a pound of iron; two ounces of the calaminar ſtone, an ounce and a half of brimſtone, an ounce of lead; calcine them and ſee what body they make; and if they incorporate, make a plate of it burniſhed.

Take of copper an ounce and a half, of tin an ounce, and melt them together, and make a plate of them burniſhed.

Take of copper an ounce and a half, of tin an ounce, of glaſs-metal half an ounce; ſtir them well in the boiling, and if they incorporate, make a plate of them burniſhed.

Take of copper a pound and a half, tin four ounces, braſs two ounces; make a plate of them burniſhed.

Take of ſilver two ounces, tin half an ounce; make a little ſay-cup of it, and burniſh it.

To inquire of the materials of every of the kind of glaſſes, coarſer and finer, and of the proportions.

Take an equal quantity of glaſs-metal, of ſtone calcined, and bring a pattern.

Take an ounce of vitrified metal, and a pound of ordinary glaſs-metal, and ſee whether they will incorporate, and bring a pattern.

Bring examples of all coloured glaſſes, and learn the ingredients whereby they are coloured.

Inquire of the ſubſtance of galletyle.

ARTICLES OF QUESTIONS touching MINERALS.

The Lord BACON's queſtions, with Dr. MEVEREL's ſolutions.

Concerning the compounding, incorporating, or union of metals or minerals.

Which ſubject is the firſt letter of his Lordſhip's Alphabet.

WITH what metals gold will incorporate by ſimple colliquefaction, 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 braſs: gold with iron: gold with tin.

So likewiſe of ſilver: ſilver with quick-ſilver: ſilver with lead: ſilver with copper: ſilver with braſs: ſilver with iron: *Plinius ſecund. lib.* xxxiii. 9. *Miſcuit denario triumvir Antonius ferrum*, ſilver with tin.

So likewiſe of quick-ſilver: quick-ſilver with lead: quick-ſilver with copper: quick-ſilver with braſs: quick-ſilver with iron: quick-ſilver with tin.

So of lead: lead with copper: lead with braſs: lead with iron: lead with tin. *Plin.* xxxiv. 9.

So of copper: copper with braſs: copper with iron: copper with tin.

So of braſs: braſs with iron: braſs with tin.

So of iron: iron with tin.

What be the compound metals that are common and known? And what are the proportions of their mixtures? As,

Latten of braſs, and the calaminar ſtone.

Pewter of tin and lead.

Bell-metal of *etc.* and the counterfeit plate, which they call alchemy.

The decompoſites of three metals or more, are too long to inquire of, 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 foſſils; as latten is made with braſs and the calaminar ſtone; as all the metals incorporate with vitriol; all with iron powdered; all with flint, *etc.*

Some few of theſe ſhould be inquired of, to diſcloſe the nature of the reſt.

Whether metals or other foſſils will incorporate with molten glaſs, and what body it makes?

The quantity in the mixture ſhould be well conſidered; for ſome ſmall quantity perhaps will incorporate, as in the allays of gold and ſilver coin.

Upon the compound body, three things are chiefly to be obſerved: the colour; the fragility or pliantneſs; the volatility or fixation, compared with the ſimple bodies.

For preſent uſe or profit, this is the rule: conſider the price of the two ſimple bodies; conſider again the dignity of the one above the other in uſe; then ſee if you can make a compound, that will ſave more in price, than it will loſe in dignity of the uſe.

As for example; conſider the price of braſs ordnance; conſider again the price of iron ordnance, and then conſider wherein the braſs ordnance doth excel the iron ordnance in uſe: then if you can make a compound of braſs and iron that will be near as good in uſe, and much cheaper in price, then there is profit both to the private and 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 eyes, as in cloth of ſilver, ſilvered rapiers, *etc.* 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 ſully and canker more than gilding; which if it might be corrected with a little mixture of gold, there is profit: and I do ſomewhat marvel, that the latter ages have loſt the ancient *electrum*, which was a mixture of ſilver with gold: whereof 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 villany. But it ſhould ſeem there is a middle way, and that is by new compounds, if the ways of incorporating were well known.

What incorporation or imbibition metals will receive from vegetables, without being diſſolved in their ſubſtance: as when the armourers make their ſteel more tough and pliant, by aſperſion of water or juice of herbs; when gold being grown ſomewhat churliſh by recovering, is made more pliant by throwing in ſhreds of tanned leather, or by leather oiled.

Note; that in theſe and the like ſhews of imbibition, it were good to try by the weights, 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 that other body doth diſpoſe and invite the metal to another poſture of parts, than of itſelf it would have taken.

After the incorporation of metals by ſimple colliquefaction, for the better diſcovery of the nature and conſents and diſſents of metals, it ſhould be likewiſe tried by incorporating of their diſſolutions. What metals being diſſolved in ſtrong waters will incorporate well together, and what not? Which is to be inquired particularly, as it was in colliquefactions.

There is to be obſerved in thoſe diſſolutions which will not eaſily incorporate, what the effects are: as the bullition; the precipitation to the bottom; the ejaculation towards the top; the ſuſpenſion in the midſt; and the like.

Note; that the diſſents of the menſtrual or ſtrong waters may hinder the incorporation, as well as the diſſents of the metals themſelves; therefore where the *menſtrua* are the ſame, and yet the incorporation followeth not, you may conclude the diſſent is in the metals; but where the *menſtrua* are ſeveral, not ſo certain.

Dr.

Dr. Meverell's anſwers to the foregoing queſtions, concerning the compounding, incorporating, or union of metals and minerals.

GOLD will incorporate with ſilver in any proportion. *Plin. lib.* xxxiii. *cap.* 4. *Omni auro ineſt argentum vario pondere; alibi dena, alibi nona, alibi octava parte -----Ubicunque quinta argenti portio invenitur, electrum vocatur.* The body remains fixt, ſolid, and coloured, according to the proportion of the two metals.

Gold with quick-ſilver eaſily mixeth, but the product is imperfectly fixed; and ſo are all other metals incorporate with mercury.

Gold incorporates with lead in any proportion.

Gold incorporates with copper in any proportion, the common allay.

Gold incorporates with braſs in any proportion. And what is ſaid of copper is true of braſs, in the union of other metals.

Gold will not incorporate with iron.

Gold incorporates with tin, the ancient allay, Iſa. i. 25.

What was ſaid of gold and quick-ſilver, may be ſaid of quick-ſilver and the reſt of metals.

Silver with lead in any proportion.

Silver incorporates with copper. Pliny mentions ſuch a mixture for *triumphales ſtatuae, lib.* xxxiii. 9. *Miſcentur argento, tertia pars aeris Cyprii tenuiſſimi, quod coronarium vocant, et ſulphuris vivi quantum argenti.* The ſame is true of braſs.

Silver incorporates not with iron. Wherefore I wonder at that which Pliny hath, *lib.* xxxiii. 9. *Miſcuit denario triumvir Antonius ferrum.* And what is ſaid of this is true in the reſt; for iron incorporateth with none of them.

Silver mixes with tin.

Lead incorporates with copper. Such a mixture was the pot-metal whereof Pliny ſpeaks, *lib.* xxxiv. 9. *Ternis aut quaternis libris plumbi argentarii in centenas aeris additis.*

Lead incorporates with tin. The mixture of theſe two in equal proportions, is that which was anciently called *plumbum argentarium*, Plin. *lib.* xxxiv. 17.

Copper incorporates with tin. Of ſuch a mixture were the mirrors of the Romans. Plin. *Atque ut omnia de ſpeculis peragantur hoc loco, optima apud majores erant Brunduſina, ſtanno et aere miſtis. Lib.* xxxiii. 9.

Compound metals now in uſe.

1. Fine tin. The mixture is thus: pure tin a thouſand pound, temper fifty pounds, glaſs of tin three pounds.

2. Coarſe pewter is made of fine tin and lead. Temper is thus made: the droſs of pure tin, four pound and a half; copper, half a pound.

3. Braſs is made of copper and *calaminaris.*

4. Bell-metal. Copper, a thouſand pound; tin, from three hundred to two hundred pound; braſs, a hundred and fifty pound.

5. Pot-metal, copper and lead.

6. White alchemy is made of pan-braſs one pound, and *arſenicum* three ounces.

7. Red alchemy is made of copper and auripigment.

There be divers imperfect minerals, which will incorporate with the metals: being indeed metals inwardly, but clothed with earths and ſtones: as *pyritis, calaminaris, miſy, chalcitis, ſory, vitriolum.*

Metals

Metals incorporate not with glaſs, except they be brought into the form of glaſs.

Metals diſſolved. The diſſolution of gold and ſilver diſagree, ſo that in their mixture there is great ebullition, darkneſs, and in the end a precipitation of a black powder.

The mixture of gold and mercury agree.

Gold agrees with iron. In a word, the diſſolution of mercury and iron agree with all the reſt.

Silver and copper diſagree, and ſo do ſilver and lead. Silver and tin agree.

The ſecond letter of the croſs-row, touching the ſeparation of metals and minerals.

SEPARATION is of three ſorts; the firſt, is the ſeparating of the pure metal from the ore or droſs, which we call refining. The ſecond, is the drawing one metal or mineral out of another, which we call extracting. The third, is the ſeparating of any metal into its original or *materia prima*, or element, or call them what you will; which work we will call principiation.

1. For refining, we are to inquire of it according to the ſeveral metals; as gold, ſilver, *etc.* Incidently we are to inquire of the firſt ſtone, or ore, or ſpar, or marcaſite of metals ſeverally, and what kind of bodies they are, and of the degrees of richneſs. Alſo we are to inquire 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 ſo ſave the charge in the fining.

The means of this 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 reflexion; 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 nature of the metals. Note again, that if you think that multiplying of the additaments in the ſame proportion that you multiply the ore, the work will follow, you may be deceived: for quantity in the paſſive will add more reſiſtance, than the ſame quantity in the active will add force.

2. For extracting, you are to inquire what metals contain others, and likewiſe what not; as lead, ſilver; copper, ſilver, *etc.*

Note, although the charge of extraction ſhould exceed the worth, yet that is not the matter: for at leaſt it will diſcover nature and poſſibility, the other may be thought on afterwards.

We are likewiſe to inquire 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 ore in themſelves. As the lead that contains moſt ſilver is accounted to be more brittle, and yet otherwiſe poorer in itſelf.

3. For principiation, I cannot affirm whether there be any ſuch thing or not; and I think the chemiſts make too much ado about it: but howſoever it be, be it ſolution or extraction, or a kind of converſion by the fire; it is diligently to be inquired what ſalts, ſulphur, vitriol, mercury, or the like ſimple bodies are to be found in the ſeveral metals, and in what quantity.

Dr.

Dr. Meverel's anſwers to the foregoing queſtions, touching the ſeparations of metals and minerals.

1. FOR the means of ſeparating. After that the ore is waſhed, or cleanſed from the earth, there is nothing ſimply neceſſary, ſave only a wind-furnace well framed, narrow above and at the hearth, in ſhape oval, ſufficiently fed with charcoal and ore, in convenient proportions.

For additions in this firſt ſeparation, I have obſerved none; the droſs the mineral brings being ſufficient. The refiners of iron obſerve, that that iron-ſtone is hardeſt to melt which is fulleſt of metal, and that eaſieſt which hath moſt droſs. But in lead and tin the contrary is noted. Yet in melting of metals, when they have been calcined formerly by fire, or ſtrong-waters, there is good uſe of additaments, as of borax, tartar, armoniac, and ſalt-petre.

2. In extracting of metals. Note, that lead and tin contain ſilver. Lead and ſilver contain gold. Iron contains braſs. Silver is beſt ſeparated from lead by the teſt. So gold from ſilver. Yet the beſt way for that is *aqua regia*.

3. For principiation. I can truly and boldly affirm, that there are no ſuch principles as ſal, ſulphur, and mercury, which can be ſeparated from any perfect metals. For every part ſo ſeparated, may eaſily be reduced into perfect metal without ſubſtitution of that, or thoſe principles which chemiſts imagine to be wanting. As ſuppoſe you take the ſalt of lead; this ſalt, or as ſome name it, ſulphur, may be turned into perfect lead, by melting it with the like quantity of lead which contains principles only for itſelf.

I acknowledge that there is quick-ſilver and brimſtone found in the imperfect minerals: but thoſe are nature's remote materials, and not the chemiſt's principles. As if you diſſolve antimony by *aqua regia*, there will be real brimſtone ſwimming upon the water: as appears by the colour of the fire when it is burnt, and by the ſmell.

The third letter of the croſs-row, touching the variation of metals into ſeveral ſhapes, bodies, or natures, the particulars whereof follow:

TINCTURE: turning to ruſt: calcination: ſublimation: precipitation: amalgamatizing, or turning into a ſoft body: vitrification: opening or diſſolving into liquor: ſproutings, or branchings, or arboreſcents: induration and mollification: making tough or brittle: volatility and fixation: tranſmutation or verſion.

For tincture; it is to be inquired how metal may be tinged through and through, and with what, and into what colours; as tinging ſilver yellow, tinging copper white, and tinging red, green, blue; eſpecially with keeping the luſtre.

Item, tincture of glaſſes.

Item, tincture of marble, flint, or other ſtone.

For turning into ruſt, two things are chiefly to be inquired; by what corroſives it is done, and into what colours it turns; as lead into white, which they call *ceruſs*; iron into yellow, which they call *crocus martis*; quick-ſilver into vermilion; braſs into green, which they call verdegriſe.

For

For calcination; how every metal is calcined, and into what kind of body, and what is the exquiſiteſt way of calcination.

For ſublimation; to inquire the manner of ſubliming, and what metals endure ſubliming, and what body the ſublimate makes.

For precipitation likewiſe; by what ſtrong water every metal will precipitate, and 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 farther, where the whole metal is turned into glaſs, and where the metal doth but hang in the glaſſy parts; alſo what weight the vitrified body bears, compared with the crude body; alſo becauſe vitrification 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 inquire 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, vapouring more violent, or more gentle, cauſing much heat or leſs. *Item*, the quantity or charge that the ſtrong water will bear, and then give over. *Item*, the colour into which the liquor will turn. Above all it is to be inquired, whether there be any *menſtruum* to diſſolve any metal that is not fretting, or corroding; and 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 diſcovereth 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 inquired what will make metals harder and harder, and what will make them ſofter and ſofter. And this inquiry tendeth to two ends: firſt, for uſe; as to make iron ſoft by the fire makes it malleable. Secondly, becauſe induration is a degree towards fixation, and mollification towards volatility; and therefore the inquiry of them will give light towards the other.

For tough and brittle, they are much of the ſame kind, but yet worthy of an inquiry apart, eſpecially to join hardneſs with toughneſs, as making glaſs malleable, *etc.* 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 inquired: the utmoſt degree of fixation is that whereon no fire will work, nor ſtrong water joined with fire, if there be any ſuch fixation poſſible. The next is, when fire ſimply will not work without ſtrong waters. The next is by the teſt. The next is when it will endure fire not blown, or ſuch a ſtrength of fire. The next is when it will not endure, but yet is malleable. The next is when it is not malleable, but yet is not fluent, but ſtupified. So of volatility, the utmoſt degree is when it will fly away without returning. The next is when it will fly up, but with eaſe return. The next is when it will fly upwards over the helm by a kind of exſufflation

tion without vapouring. The next is when it will melt though not riſe. The next is when it will ſoften though not melt. Of all theſe diligent inquiry is to be made in ſeveral metals, eſpecially of the more extreme degrees.

For tranſmutation or verſion. If it be real and true, it is the fartheſt part of art, and ſhould be well diſtinguiſhed from extraction, from reſtitution, and from adulteration. I hear much of turning iron into copper; I hear alſo of the growth of lead in weight, which cannot be without a converſion of ſome body into lead: but whatſoever is of this kind, and well expreſſed, is diligently to be inquired and ſet down.

Dr. Meverel's anſwers to the foregoing queſtions, concerning the variation of metals and minerals.

1. FOR tinctures, there are none that I know, but that rich variety which ſprings from mixture of metals with metals, or imperfect minerals.

2. The imperfect metals are ſubject to ruſt, all of them except mercury, which is made into vermilion by ſolution or calcination. The reſt are ruſted by any ſalt, ſour, or acid water. Lead into a white body called *ceruſſa*. Iron into a pale red called *ferrugo*. Copper is turned into green, named *aerugo*, *aes viride*. Tin into white: but this is not in uſe, neither hath it obtained a name.

The Scriptures mention the ruſt of gold, but that is in regard of the allay.

3. Calcination. All metals may be calcined by ſtrong waters, or by admixtion of ſalt, ſulphur, and mercury. The imperfect metals may be calcined by continuance of ſimple fire; iron thus calcined is called *crocus martis*.

And this is their beſt way. Gold and ſilver are beſt calcined by mercury. Their colour is gray. Lead calcined is very red. Copper duſky red.

4. Metals are ſublimed by joining them with mercury or ſalts. As ſilver with mercury, gold with ſal armoniac, mercury with vitriol.

5. Precipitation is, when any metal being diſſolved into a ſtrong water, is beaten down into a powder by ſalt water. The chiefeſt in this kind is oil of tartar.

6. Amalgamation is the joining or mixing of mercury with any other of the metals. The manner is this in gold, the reſt are anſwerable: take ſix parts of mercury, make them hot in a crucible, and pour them to one part of gold made red hot in another crucible, ſtir theſe well together that they may incorporate; which done, caſt the maſs into cold water and waſh it. This is called the amalgama of gold.

7. For vitrification. All the imperfect metals may be turned by ſtrong fire into glaſs, except mercury; iron into green; lead into yellow; braſs into blue; tin into pale yellow. For gold and ſilver I have not known them vitrified, except joined with antimony. Theſe glaſſy bodies may be reduced into the form of mineral bodies.

8. Diſſolution. All metals without exception may be diſſolved.

(1.) Iron may be diſſolved by any tart, ſalt, or vitriolated water; yea by common water, if it be firſt calcined with ſulphur. It diſſolves in *aqua fortis*, with great ebullition and heat, into a red liquor ſo red as blood.

(2.) Lead is fitteſt diſſolved in vinegar, into a pale yellow, making the vinegar very ſweet.

(3.) Tin is beſt diſſolved with diſtilled ſalt-water. It retains the colour of the *menſtruum*.

(4.) Copper diſſolves as iron doth, in the ſame liquor, into a blue.

(5.) Silver hath its proper *menſtruum*, which is *aqua fortis*. The colour is green, with great heat and ebullition.

(6.) Gold is diſſolved with *aqua regia*, into a yellow liquor, with little heat or ebullition.

(7.) Mercury is diſſolved with much heat and boiling, into the ſame liquors which gold and ſilver are. It alters not the colour of the *menſtruum*.

Note. Strong waters may be charged with half their weight of fixed metals, and equal of mercury; if the workman be ſkilful.

(9.) Sprouting. This is an accident of diſſolution. For if the *menſtruum* be overcharged, then within ſhort time the metals will ſhoot into certain cryſtals.

(10.) For induration or mollification, they depend upon the quantity of fixed mercury and ſulphur. I have obſerved little of them, neither of toughneſs nor brittleneſs.

(11.) The degrees of fixation and volatility I acknowledge, except the two utmoſt, which never were obſerved.

(12.) The queſtion of tranſmutation is very doubtful. Wherefore I refer your honour to the fourth tome of *Theatrum chymicum*: and there, to that tract which is intitled *Diſquiſitio Heliana*; where you ſhall find full ſatisfaction.

The fourth letter of the croſsrow, touching reſtitution.

FIRST, therefore, it is to be inquired in the negative, what bodies will never return, either by their extreme fixings, as in ſome vitrifications, or by extreme volatility.

It is alſo to be inquired of the two means of reduction; and firſt by the fire, which is but by congregation of homogeneal parts.

The ſecond is, by drawing them down by ſome body that hath conſent with them. As iron draweth down copper in water; gold draweth quick-ſilver in vapour; whatſoever is of this kind, is very diligently to be inquired.

Alſo it is to be inquired what time, or age, will reduce without help of fire or body.

Alſo it is to be inquired what gives impediment to union or reſtitution, which is ſometimes called mortification; as when quick-ſilver is mortified with turpentine, ſpittle, or butter.

Laſtly, it is to be inquired, how the metal reſtored, differeth in any thing from the metal rare: as whether it become not more churliſh, altered in colour, or the like.

Dr. Meverel's anſwers touching the reſtitutions of metals and minerals.

REDUCTION is chiefly effected by fire, wherein if they ſtand and nele, the imperfect metals vapour away, and ſo do all manner of ſalts which ſeparated them *in minimas partes* before.

Reduction

Reduction is ſingularly holpen, by joining ſtore of metal of the ſame nature with it in the melting.

Metals reduced are ſomewhat churliſh, but not altered in colour.

The Lord VERULAM's INQUISITION

CONCERNING THE

Verſions, tranſmutations, multiplications, and effections of bodies.

EARTH by fire is turned into brick, which is of the nature of a ſtone, and ſerveth for building, as ſtone doth: and the like of tile. *Query*, the manner.

Naphtha, which was the bituminous mortar uſed in the walls of Babylon, grows to an intire and very hard matter like a ſtone.

In clay countries, where there is pebble and gravel, you ſhall find great ſtones, where you may ſee the pebbles or gravel, and between them a ſubſtance of ſtone as hard or harder than the pebble itſelf.

There are ſome ſprings of water, wherein if you put wood, it will turn into the nature of ſtone: ſo as that within the water ſhall be ſtone, and that above the water continue wood.

The ſlime about the reins and bladder in a man's body, turns into ſtone: and ſtone is likewiſe found often in the gall; and ſometimes, though rarely, *in vena porta.*

Query, what time the ſubſtance of earth in quarries aſketh to be turned into ſtone?

Water, as it ſeems, turneth into cryſtal, as is ſeen in divers caves, where the cryſtal hangs *in ſtillicidiis.*

Try wood, or the ſtalk of herbs, buried in quick-ſilver, whether it will not grow hard and ſtony.

They ſpeak of a ſtone ingendred in a toad's head.

There was a gentleman, digging in his moat, found an egg turned into ſtone, the white and the yolk keeping their colour, and the ſhell gliſtering like a ſtone cut with corners.

Try ſome things put into the bottom of a well; as wood, or ſome ſoft ſubſtance: but let it not touch the water, becauſe it may not putrify.

They ſpeak, that the white of an egg, with lying long in the ſun, will turn ſtone.

Mud in water turns into ſhells of fiſhes, as in horſe-muſſels, in freſh ponds, old and overgrown. And the ſubſtance is a wondrous fine ſubſtance, light and ſhining.

A SPEECH touching the recovering of drowned mineral works.

Prepared for the parliament (as Mr. Buſhel affirmed) by the Viſcount of St. Albans, then lord high chancellor of England.*

My lords and gentlemen,

THE king, my royal maſter, was lately graciouſly pleaſed to move ſome diſcourſe to me concerning Mr. Sutton's hoſpital, and ſuch like worthy foundations of memorable piety: which humbly ſeconded by myſelf, drew his

* See Mr. Bee's extract, p. 18, 19.

majeſty into a ſerious conſideration of the mineral treaſures of his own territories, and the practical diſcoveries of them by way of my philoſophical theory: which he then ſo well reſented, that afterwards, upon a mature digeſtion of my whole deſign, he commanded me to let your lordſhips underſtand, how great an inclination he hath to further ſo hopeful a work, for the honour of his dominions, as the moſt probable means to relieve all the poor thereof, without any other ſtock or benevolence, than that which divine bounty ſhould confer on their own induſtries and honeſt labours, in recovering all ſuch drowned mineral works, as have been, or ſhall be therefore deſerted.

And, my lords, all that is now deſired of his majeſty and your lordſhips, is no more than a gracious act of this preſent parliament to authorize them herein, adding a mercy to a munificence, which is, the perſons of ſuch ſtrong and able petty-felons, who, in true penitence for their crimes, ſhall implore his majeſty's mercy and permiſſion to expiate their offences by their aſſiduous labours in ſo innocent and hopeful a work.

For by this unchangeable way, my lords, have I propoſed to erect the academical fabric of this iſland's Solomon's houſe, modelled in my New Atlantis. And I can hope, my lords, that my midnight ſtudies, to make our countries flouriſh and outvy European neighbours in myſterious and beneficent arts, have not ſo ungratefully affected your noble intellects, that you will delay or reſiſt his majeſty's deſires, and my humble petition in this benevolent, yea, magnificent affair; ſince your honourable poſterities may be enriched thereby, and my ends are only to make the world my heir, and the learned fathers of my Solomon's houſe, the ſucceſſive and ſworn truſtees in the diſpenſation of this great ſervice, for God's glory, my prince's magnificence, this parliament's honour, our country's general good, and the propagation of my own memory.

And I may aſſure your lordſhips, that all my propoſals in order to this great architype, ſeemed ſo rational and feaſible to my royal ſovereign our chriſtian Solomon, that I thereby prevailed with his majeſty to call this honourable parliament, to confirm and impower me in my own way of mining, by an act of the ſame, after his majeſty's more weighty affairs were conſidered in your wiſdoms; both which he deſires your lordſhips, and you gentlemen that are choſen as the patriots of your reſpective countries, to take ſpeedy care of: which done, I ſhall not then doubt the happy iſſue of my undertakings in this deſign, whereby concealed treaſures, which now ſeem utterly loſt to mankind, ſhall be confined to ſo univerſal a piety, and brought into uſe by the induſtry of converted penitents, whoſe wretched carcaſes the impartial laws have, or ſhall dedicate, as untimely feaſts, to the worms of the earth, in whoſe womb thoſe deſerted mineral riches muſt ever lie buried as loſt abortments, unleſs thoſe be made the active midwives to deliver them. For, my lords, I humbly conceive them to be the fitteſt of all men to effect this great work, for the ends and cauſes which I have before expreſſed.

All which, my lords, I humbly refer to your grave and ſolid judgments to conclude of, together with ſuch other aſſiſtances to this frame, as your own oraculous wiſdom ſhall intimate, for the magnifying our Creator in his inſcrutable providence, and admirable works of nature.

Certain

Certain experiments made by the Lord BACON *about weight in air and water.*

A New ſovereign of equal weight in the air to the piece in braſs, overweigheth in the water nine grains: in three ſovereigns the difference in the water is but twenty-four grains.

The ſame ſovereign overweigheth an equal weight of lead, four grains in the water, in braſs grains for gold: in three ſovereigns about eleven grains.

The ſame ſovereign overweigheth an equal weight of ſtones in the air, at leaſt ſixty-five grains in the water: the grains being for the weight of gold in braſs metal.

A glaſs filled with water weighing, in Troy weights, thirteen ounces and five drams, the glaſs and the water together weigheth ſeverally, namely, the water nine ounces and a half, and the glaſs four ounces and a dram.

A bladder weighing two ounces ſeven drams and a half, a pebble laid upon the top of the bladder makes three ounces ſix drams and a half, the ſtone weigheth ſeven drams.

The bladder as above, blown, and the ſame fallen, weigheth equal.

A ſponge dry weigheth one ounce twenty ſix grains: the ſame ſponge being wet, weigheth fourteen ounces ſix drams and three quarters: the water weigheth in ſeveral eleven ounces one dram and a half, and the ſponge three ounces and a half, and three quarters of a dram. Firſt time.

The ſponge and water together weigh fifteen ounces and ſeven drams: in ſeveral, the water weigheth eleven ounces and ſeven drams, and the ſponge three ounces ſeven drams and a half. Second time.

Three ſovereigns made equal to a weight in ſilver in the air, differ in the water.

For falſe weights, one beam long, the other thick.

The ſtick and thread weigh half a dram, and twenty grains, being laid in the balance.

The ſtick tied to reach within half an inch of the end of the beam, and ſo much from the tongue, weigheth twenty-eight grains; the difference is twenty-two grains.

The ſame ſtick being tied to hang over the end of the beam an inch and a half, weigheth half a dram and twenty-four grains, exceeding the weight of the ſaid ſtick in the balance by four grains.

The ſame ſtick being hanged down beneath the thread, as near the tongue as is poſſible, weigheth only eight grains.

Two weights of gold being made equal in the air, and weighing ſeverally ſeven drams; the one balance being put into the water, and the other hanging in the air, the balance in the water weigheth only five drams and three grains, and abateth of the weight in the air one dram and a half, and twenty-ſeven grains.

The ſame trial being made the ſecond time, and more truly and exactly betwixt gold and gold, weighing ſeverally, as above; and making a juſt and equal weight in the air, the one balance being put into the water the depth of five inches, and the other hanging in the air; the balance in the water weigheth only four drams, and fifty-five grains, and abateth of the weight in the air two drams and five grains.

The trial being made betwixt lead and lead, weighing ſeverally ſeven drams in the air, the balance in the water weigheth only four drams and forty-one grains, and abateth

abateth of the weight in the air two drams and nineteen grains; the balance kept the ſame depth in the water as aboveſaid.

The trial being made betwixt ſilver and ſilver, weighing ſeverally ſeven drams in the air, the balance in the water weigheth only four drams and twenty-five grains. So it abateth two drams and thirty-five grains; the ſame depth in the water obſerved.

In iron and iron, weighing ſeverally each balance in the air ſeven drams, the balance in the water weigheth only four drams and eighteen grains; and abateth of the weight in the air two drams and forty-two grains; the depth obſerve as above.

In ſtone and ſtone, the ſame weight of ſeven drams equally in the air, the balance in the water weigheth only two drams and twenty-two grains; and abateth of the weight in the air four drams and thirty-eight grains; the depth as above.

In braſs and braſs, the ſame weight of ſeven drams in each balance, equal in the air, the balance in the water weigheth only four drams and twenty-two grains; and abateth in the water two drams and thirty-eight grains; the depth obſerved.

The two balances being weighed in air and water, the balance in the air overweigheth the other in the water one dram and twenty-eight grains; the depth in the water as aforeſaid.

It is a profitable experiment which ſheweth the weights of ſeveral bodies in compariſon with water. It is of uſe in lading of ſhips, and other bottoms, and may help to ſhew what burden in the ſeveral kinds they will bear.

Certain ſudden thoughts of the Lord Bacon's, *Set down by him under the title of* Experiments for Profit.

MUCK of leaves: muck of river, earth, and chalk: muck of earth cloſed, both for ſalt-petre and muck: ſetting of wheat and peas: mending of crops by ſteeping of ſeeds: making peas, cherries, and ſtrawberries come early: ſtrengthening of earth for often returns of radiſhes, parſnips, turnips, *etc.* making great roots of onions, radiſhes, and other eſculent roots: ſowing of ſeeds of trefoil: ſeting of woad: ſeting of tobacco, and taking away the rawns: grafting upon boughs of old trees: making of a haſty coppice: planting of oſiers in wet grounds: making of candles to laſt long: building of chimnies, furnaces, and ovens, to give heat with leſs wood: fixing of logwood: other means to make yellow and green fixed: conſerving of oranges, lemons, citrons, pomegranates, *etc.* all ſummer: recovering of pearl, coral, turcoiſe colour, by a conſervatory of ſnow: ſowing of fenel: brewing with hay, haws, trefoil, broom, hips, bramble-berries, woodbines, wild thyme, inſtead of hops, thiſtles: multiplying and dreſſing artichokes.

Certain experiments of the Lord Bacon's, *about the commixture of liquors only, not ſolids, without heat or agitation, but only by ſimple compoſition and ſettling.*

SPIRIT of wine mingled with common water, although it be much lighter than oil, yet ſo as if the firſt fall be broken, by means of a ſop, or otherwiſe, it ſtayeth above; and if it be once mingled, it ſevereth not again, as oil doth. Tried with water coloured with ſaffron.

Spirit

Spirit of wine mingled with common water hath a kind of clouding, and motion ſhewing no ready commixture. Tried with ſaffron.

A dram of gold diſſolved in *aqua regis*, with a dram of copper in *aqua fortis* commixed, gave a green colour, but no viſible motion in the parts. Note, that the diſſolution of the gold was, twelve parts water to one part body: and of the copper was, ſix parts water to one part body.

Oil of almonds commixed with ſpirit of wine, ſevereth, and the ſpirit of wine remaineth on the top, and the oil at the bottom.

Gold diſſolved commixed with ſpirit of wine, a dram of each, doth commix, and no other apparent alteration.

Quick-ſilver diſſolved with gold diſſolved, a dram of each, doth turn to a mouldy liquor, black, and like ſmiths water.

Note; the diſſolution of the gold was twelve parts water *ut ſupra*, and one part metal: that of water was two parts, and one part metal.

Spirit of wine and quick-ſilver commixed, a dram of each, at the firſt ſhewed a white milky ſubſtance at the top, but ſoon after mingled.

Oil of vitriol commixed with oil of cloves, a dram of each, turneth into a red dark colour; and a ſubſtance thick almoſt like pitch, and upon the firſt motion gathereth an extreme heat, not to be endured by touch.

Diſſolution of gold, and oil of vitriol commixed, a dram of each, gathereth a great heat at the firſt, and darkeneth the gold, and maketh a thick yellow.

Spirit of wine and oil of vitriol, a dram of each, hardly mingle; the oil of vitriol going to the bottom, and the ſpirit of wine lying above in a milky ſubſtance. It gathereth alſo a great heat, and a ſweetneſs in the taſte.

Oil of vitriol, and diſſolution of quick-ſilver, a dram of each, maketh an extreme ſtriſe, and caſteth up a very groſs fume, and after caſteth down a white kind of curds, or ſands; and on the top a ſlimiſh ſubſtance, and gathereth a great heat.

Oil of ſulphur, and oil of cloves commixed, a dram of each, turn into a thick and red coloured ſubſtance; but no ſuch heat as appeared in the commixture with the oil of vitriol.

Oil of *petroleum*, and ſpirit of wine, a dram of each, intermingle otherwiſe than by agitation, as wine and water do; and the *petroleum* remaineth on the top.

Oil of vitriol and *petroleum*, a dram of each, turn into a mouldy ſubſtance, and gathereth ſome warmth; there reſiding a black cloud at the bottom, and a monſtrous thick oil on the top.

Spirit of wine, and red wine vinegar, one ounce of each, at the firſt fall, one of them remaineth above, but by agitation they mingle.

Oil of vitriol, and oil of almonds, one ounce of each, mingle not; but the oil of almonds remaineth above.

Spirit of wine and vinegar, an ounce of each, commixed, do mingle, without any apparent ſeparation, which might be in reſpect of the colour.

Diſſolution of iron, and oil of vitriol, a dram of each, do firſt put a milky ſubſtance into the bottom, and after incorporate into a mouldy ſubſtance.

Spirit of wine commixed with milk, a third part ſpirit of wine, and two parts milk, coagulateth little, but mingleth; and the ſpirit ſwims not above.

Milk and oil of almonds mingled, in equal portions, do hardly incorporate, but the oil cometh above, the milk being poured in laſt; and the milk appeareth in ſome drops or bubbles.

Milk

Milk one ounce, oil of vitriol a ſcruple, doth coagulate; the milk at the bottom, where the vitriol goeth.

Diſſolution of gum tragacanth, and oil of ſweet almonds, do not commingle, the oil remaining on the top till they be ſtirred, and make the mucilage ſomewhat more liquid.

Diſſolution of gum tragacanth one ounce and a half, with half an ounce of ſpirit of wine being commixed by agitation, make the mucilage more thick.

The white of an egg with ſpirit of wine, doth bake the egg into clots as if it began to poch.

One ounce of blood, one ounce of milk, do eaſily incorporate.

Spirit of wine doth curdle the blood.

One ounce of whey unclarified, one ounce of oil of vitriol, make no apparent alteration.

One ounce of blood, one ounce of oil of almonds, incorporate not, but the oil ſwims above.

Three quarters of an ounce of wax being diſſolved upon the fire, and one ounce of oil of almonds put together and ſtirred, do not ſo incorporate, but that when it is cold the wax gathereth and ſwims upon the top of the oil.

One ounce of oil of almonds caſt into an ounce of ſugar ſeething, fever preſently, the ſugar ſhooting towards the bottom.

A catalogue of bodies, attractive and not attractive, together with experimental obſervations about attraction.

THESE following bodies draw: amber, jet, diamond, ſapphire, carbuncle, iris, the gem opale, amethyſt, *briſtollina*, cryſtal, clear glaſs, glaſs of antimony, divers flowers from mines, ſulphur, maſtic, hard ſealing-wax, the harder roſin, arſenic.

Theſe following bodies do not draw: ſmaragd, *achates*, *corneolus*, pearl *jaſpis*, *chalcedonius*, alabaſter, porphyry, coral, marble, touchſtone, *haematites*, or bloodſtone; *ſmyris*, ivory, bones, ebon-tree, cedar, cypreſs, pitch, ſofter roſin, camphire, *galbanum*, ammoniac, ſtorax, benzoin, loadſtone, *aſphaltum* *.

Theſe bodies, gold, ſilver, braſs, iron, draw not, though never ſo finely poliſhed.

In winter, if the air be ſharp and clear, *ſal gemmeum*, roch allum, and *lapis ſpecularis*, will draw.

Theſe following bodies are apt to be drawn, if the maſs of them be ſmall: chaff, woods, leaves, ſtones, all metals leaved, and in the mine; earth, water, oil.

* The drawing of iron excepted.

MEDICAL REMAINS.

Grains of youth.

TAKE of nitre four grains, of ambergriſe three grains, of orrice-powder two grains, of white poppy-ſeed the fourth part of a grain, of ſaffron half a grain, with water of orange-flowers, and a little tragacanth; make them into ſmall grains, four in number. To be taken at four a-clock, or going to bed.

Preſerving ointments.

TAKE of deers ſuet one ounce, of myrrh ſix grains, of ſaffron five grains, of bay-ſalt twelve grains, of Canary wine of two years old, a ſpoonful and a half. Spread it on the inſide of your ſhirt, and let it dry, and then put it on

A purge familiar for opening the liver.

TAKE rhubarb two drams, agaric trochiſcat one dram and a half, ſteep them in claret wine burnt with mace; take of wormwood one dram, ſteep it with the reſt, and make a maſs of pills, with *ſyrup. acetoſ. ſimplex.* But drink an opening broth before it, with ſuccory, fenel, and ſmallage roots, and a little of an onion.

Wine for the ſpirits.

TAKE gold perfectly refined three ounces, quench it ſix or ſeven times in good claret wine; add of nitre ſix grains for two draughts: add of ſaffron prepared three grains, of ambergriſe four grains, paſs it through an hippocras bag, wherein there is a dram of cinnamon groſs beaten, or, to avoid the dimming of the colour, of ginger. Take two ſpoonfuls of this to a draught of freſh claret wine.

The preparing of ſaffron.

TAKE ſix grains of ſaffron, ſteeped in half parts of wine and roſe-water, and a quarter part vinegar; then dry it in the ſun.

Wine againſt adverſe melancholy, preſerving the ſenſes and the reaſon.

TAKE the roots of bugloſs well ſcraped and cleanſed from their inner pith, and cut them into ſmall ſlices; ſteep them in wine of gold extinguiſhed *ut ſupra*, and add of nitre three grains, and drink it *ut ſupra*, mixed with freſh wine: the roots muſt not continue ſteeped above a quarter of an hour; and they muſt be changed thrice.

Breakfaſt preſervative againſt the gout and rheums.

To take once in the month at leaſt, and for two days together, one grain of *caſtorei* in my ordinary broth.

The preparation of garlick.

TAKE garlick four ounces, boil it upon a ſoft fire in claret wine, for half an hour. Take it out and ſteep it in vinegar; whereto add two drams of cloves, then take it forth, and keep it in a glaſs for uſe.

The artificial preparation of damaſk roſes for ſmell.

TAKE roſes, pull their leaves, then dry them in a clear day in the hot ſun; then their ſmell will be as gone. Then cram them into an earthen bottle, very dry and ſweet, and ſtop it very cloſe; they will remain in ſmell and colour both freſher, than thoſe that are otherwiſe dried. Note, the firſt drying, and cloſe keeping upon it, preventeth all putrefaction, and the ſecond ſpirit cometh forth, made of the remaining moiſture not diſſipated.

A reſtorative drink.

TAKE of Indian maiz half a pound, grind it not too ſmall, but to the fineneſs of ordinary meal, and then bolt and ſearce it, that all the huſky part may be taken away. Take of *eryngium* roots three ounces, of dates as much, of *enula* two drams, of mace three drams, and brew them with ten ſhilling beer to the quantity of four gallons: and this do, either by decocting them in a pottle of wort, to be after mingled with the beer, being new tapped, or otherwiſe infuſe it in the new beer in a bag. Uſe this familiarly at meals.

Againſt the waſte of the body by heat.

TAKE ſweet pomegranates, and ſtrain them lightly, not preſſing the kernel, into a glaſs; where put ſome little of the peel of a citron, and two or three cloves, and three grains of ambergriſe, and a pretty deal of fine ſugar. It is to be drunk every morning whilſt pomegranates laſt.

Methuſalem water. Againſt all aſperity and torrefaction of inward parts, and all aduſtion of the blood, and generally againſt the drineſs of age.

TAKE creviſes very new, *q. ſ.* boil them well in claret wine, of them take only the ſhells, and rub them very clean, eſpecially on the inſide, that they may be thoroughly cleanſed from the meat. Then waſh them three or four times in freſh claret wine, heated: ſtill changing the wine, till all the fiſh-taſte be quite taken away. But in the wine wherein they are waſhed, ſteep ſome tops of green roſemary; then dry the pure ſhell thoroughly, and bring them to an exquiſite powder. Of this powder take three drams. Take alſo pearl, and ſteep them in vinegar twelve hours, and dry off the vinegar; of this powder alſo three drams. Then put the ſhell powder and pearl powder together, and add to them of ginger one ſcruple, and of white poppy ſeed half a ſcruple, and ſteep them in ſpirit of wine, wherein ſix grains of ſaffron have been diſſolved ſeven hours. Then upon a gentle heat vapour away all the ſpirit of wine, and dry the powder againſt the ſun without fire. Add to it of nitre one dram, of ambergriſe one ſcruple and a half; and ſo keep this powder for uſe in a clean glaſs. Then take a pottle of milk, and ſlice in it of freſh cucumbers, the inner pith only, the rind being pared off, four ounces, and draw forth a water by diſtillation. Take of claret wine a pint, and quench gold in it four times.

Of the wine, and of the water of milk, take of each three ounces, of the powder one ſcruple, and drink it in the morning; ſtir up the powder when you drink, and walk upon it.

A cata-

A catalogue of aſtringents, openers and cordials inſtrumental to health.

ASTRINGENTS.

RED roſe, black-berry, myrtle, plantane, flower of pomegranate, mint, aloes well waſhed, myrobalanes, ſloes, *agreſtia fraga*, maſtich, myrrh, ſaffron, leaves of roſemary, rhubarb received by infuſion, cloves, ſervice-berries, *corna*, wormwood, bole armoniac, ſealed earth, cinquefoil, tincture of ſteel, *ſanguis draconis*, coral, amber, quinces, ſpikenard, galls, alum, blood-ſtone, mummy, *amomum*, galangal, cypreſs, ivy, *pſyllum*, houſleek, ſallow, mullein, vine, oak-leaves, *lignum aloës*, red ſanders, mulberry, medlars, flowers of peach-trees, pomegranates, pears, palmule, pith of kernels, purſlain, *acacia*, *laudanum*, *tragacanth*, *thus olibani*, comfrey, ſhepherds-purſe, *polygonium*.

Aſtringents, both hot and cold, which corroborate the parts, and which confirm and refreſh ſuch of them as are looſe or languiſhing.

ROSEMARY, mint, eſpecially with vinegar, cloves, cinnamon, cardamum, lign-aloes, roſe, myrtle, red ſanders, *cotonea*, red wine, chalybeat wine, five-finger graſs, plantane, apples of cypreſs, berberries, *fraga*, ſervice-berries, cornels, ribes, ſour pears, rambeſia.

Aſtringents ſtyptic, which by their ſtyptic virtue may ſtay fluxes.

SLOES, *acacia*, rind of pomegranates infuſed at leaſt three hours, the ſtyptic virtue not coming forth in leſſer time. Alum, galls, juice of ſallow, ſyrup of unripe quinces, *balauſtia*, the whites of eggs boiled hard in vinegar.

Aſtringents, which by their cold and earthy nature may ſtay the motion of the humours tending to a flux.

SEALED earth, *ſanguis draconis*, coral, pearls, the ſhell of the fiſh *dactylus*.

Aſtringents, which by the thickneſs of their ſubſtance ſtuff as it were the thin humours, and thereby ſtay fluxes.

RICE, beans, millet, cauls, dry cheeſe, freſh goats milk.

Aſtringents, which by virtue of their glutinous ſubſtance reſtrain a flux, and ſtrengthen the looſer parts.

KARABE†, maſtich, *ſpodium*, hartſhorn, frankincenſe, dried bulls piſtle, gum tragacanth.

Aſtringents purgative, which, having by their purgative or expulſive power thruſt out the humours, leave behind them aſtrictive virtue.

RHUBARB, eſpecially that which is toaſted againſt the fire; myrobalanes, tartar, tamarinds, an Indian fruit like green damaſcenes.

Aſtringents which do very much ſuck and dry up the humours, and thereby ſtay fluxes.

RUST of iron, *crocus martis*, aſhes of ſpices.

† Perhaps he meant the fruit of Karobe.

Aſtringents, which by their nature do dull the ſpirits, and lay aſleep the expulſive virtue, and take away the acrimony of all humours.

LAUDANUM, mithridate, *diaſcordium*, *diacodium*.

Aſtringents, which by cheriſhing the ſtrength of the parts, do comfort and confirm their retentive power.

A ſtomacher of ſcarlet cloth: whelps, or young healthy boys, applied to the ſtomach: hippocratic wines, ſo they be made of auſtere materials.

OPENERS.

SUCCORY, endive, betony, liverwort, *petroſelinum*, ſmallage, *aſparagus*, roots of graſs, dodder, tamariſk, *juncus odoratus*, *lacca*, *cupparus*, wormwood, *chamaepitys*, *fumaria*, ſcurvy-graſs, eringo, nettle, *ireos*, alder, hyſſop, *ariſtolochia*, gentian, *coſtus*, fenel-root, maiden-hair, harts-tongue, daffodilly, aſarum, ſarſaparilla, ſaſſafras, acorns, *abretonum*, aloes, agaric, rhubarb infuſed, onions, garlic, bother, *ſquilla*, ſow-bread, Indian nard, Celtic nard, bark of laurel tree, bitter almonds, holy thiſtle, camomile, gun-powder, ſows *(millepedes)* ammoniac, man's urine, rue, park leaves *(vitex)* centaury, lupines, *chamaedrys*, *coſtum*, *ammios*, biſtort, camphire, *daucus* ſeed, Indian balſam, *ſcordium*, ſweet cane, galingal, agrimony.

CORDIALS.

FLOWERS of baſil royal, *flores caryophillati*, flowers of bugloſs and borage, rind of citron, orange flowers, roſemary and its flowers, ſaffron, muſk, amber, *folium*, *i. e. nardi folium*, balm-gentle, pimpernel, gems, gold, generous wines, fragrant apples, roſe, *roſa moſchata*, cloves, lign-aloes, mace, cinnamon, nutmeg, cardamum, galingal, vinegar, kermes berry, *herba moſchata*, betony, white ſanders, camphire, flowers of heliotrope, peny-royal, *ſcordium*, *opium* corrected, white pepper, *naſturtium*, white and red bean, *caſtum dulce*, *dactylus*, pine, fig, egg-ſhell, *vinum malvaticum*, ginger, kidneys, oiſters, creviſes, or river crabs, ſeed of nettle, oil of ſweet almonds, *jeſaminum oleum*, *aſparagus*, bulbous roots, onions, garlic, *eruca*, *daucus* ſeed, eringo, *ſiler montanus*, the ſmell of muſk, *cynethi odor*, caraway-ſeed, flower of puls, aniſeed, pellitory, anointing of the teſticles with oil of alder in which pellitory hath been boiled, cloves with goats milk, *olibanum*.

An extract by the Lord BACON, *for his own uſe, out of the book* Of the prolongation of life, *together with ſome new advices in order to health.*

1. ONCE in the week, or at leaſt in the fortnight, to take the water of mithridate diſtilled, with three parts to one, or ſtrawberry water to allay it; and ſome grains of nitre and ſaffron, in the morning between ſleeps.

2. To continue my broth with nitre; but to interchange it every other two days, with the juice of pomegranates expreſſed, with a little cloves, and rind of citron.

3. To

3. To order the taking of the maceration *(a)* as followeth.

To add to the maceration ſix grains of *cremor tartari*, and as much *enula*.

To add to the oxymel ſome infuſion of fenel roots in the vinegar, and four grains of angelica ſeed, and juice of lemons, a third part to the vinegar.

To take it not ſo immediately before ſupper, and to have the broth ſpecially made with barley, roſemary, thyme, and creſſes.

Sometimes to add to the maceration three grains of tartar, and two of *enula*, to cut the more heavy and viſcous humours; leſt rhubarb work only upon the lighteſt.

To take ſometimes the oxymel before it, and ſometimes the Spaniſh honey ſimple.

4. To take once in the month at leaſt, and for two days together, a grain and a half of caſtor in my broth, and breakfaſt.

5. A cooling clyſter to be uſed once a month, after the working of the maceration is ſettled.

Take of barley water, in which the roots of bugloſs are boiled, three ounces, with two drams of red ſanders, and two ounces of raiſins of the ſun, and one ounce of dactyles, and an ounce and a half of fat caricks; let it be ſtrained, and add to it an ounce and a half of ſyrup of violets: let a clyſter be made. Let this be taken, with veal, in the aforeſaid decoction.

6. To take every morning the fume of lign-aloes, roſemary and bays dried, which I uſe; but once in a week to add a little tobacco, without otherwiſe taking it in a pipe.

7. To appoint every day an hour *ad affectus intentionales et ſanos. Query, de particulari.*

8. To remember maſticatories for the mouth.

9. And orange-flower water to be ſmelt to or ſnuffed up.

10. In the third hour, after the ſun is riſen, to take in air from ſome high and open place, with a ventilation of *roſae muſchatae*, and freſh violets; and to ſtir the earth, with infuſion of wine and mint.

11. To uſe ale with a little *enula campana, carduus*, germander, ſage, angelica ſeed, creſſes of a middle age, to beget a robuſt heat.

12. Mithridate thrice a year.

13. A bit of bread dipt *in vino odorato*, with ſyrup of dry roſes, and a little amber, at going to bed.

14. Never to keep the body in the ſame poſture above half an hour at a time.

15. Four precepts. To break off cuſtom. To ſhake off ſpirits ill diſpoſed. To meditate on youth. To do nothing againſt a man's genius.

16. Syrup of quinces for the mouth of the ſtomach. Inquire concerning other things uſeful in that kind.

17. To uſe once during ſupper time wine in which gold is quenched.

18. To uſe anointing in the morning lightly with oil of almonds, with ſalt and ſaffron, and a gentle rubbing.

19. Ale of the ſecond infuſion of the vine of oak.

20. Methuſalem water, of pearls and ſhells of crabs, and a little chalk.

21. Ale of raiſins, dactyles, potatoes, piſtachios, honey, tragacanth, maſtic.

22. Wine with ſwines fleſh, or harts fleſh.

(a) Viz. 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. See the lord Bacon's life by Dr. Rawley, towards the end.

23. To

23. To drink the firſt cup at ſupper hot, and half an hour before ſupper ſomething hot and aromatis'd.

24. CHALYBEATS, four times a year.

25. PILULAE *ex tribus*, once in two months, but after the maſs has been macerated in oil of almonds.

26. HEROIC deſires.

27. BATHING of the feet once in a month, with lye *ex ſale nigro*, camomile, ſweet marjoram, fenel, ſage, and a little *aqua vitae*.

28. To provide always an apt breakfaſt.

29. To beat the fleſh before roaſting of it.

30. MACERATIONS in pickles.

31. AGITATION of beer by ropes, or in wheel-barrows.

32. THAT diet is good which makes lean, and then renews. Conſider of the ways to effect it.

MEDICAL RECEIPTS of the lord BACON.

His lordſhip's uſual receipt for the Gout.

To which he refers Nat. Hiſt. Cent. I. *N.* 60.

1. *The poultis.*

TAKE of manchet about three ounces, the crumb 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 oil of roſes an ounce; let it be ſpread upon a linen cloth, and applied lukewarm, and continued for three hours ſpace.

2. *The bath or fomentation.*

TAKE of ſage leaves half a 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 a handful of bay ſalt. Let it be uſed with ſcarlet cloth, or ſcarlet wool, dipped in the liquor hot, and ſo renewed ſeven times; all in the ſpace of a quarter of an hour, or little more.

3. *The plaiſter.*

TAKE *Emplaſtrum diachalciteos*, as much as is ſufficient for the part you mean to cover. Let it be diſſolved with oil of roſes, in ſuch a conſiſtence as will ſtick; and ſpread upon a piece of holland, and applied.

His lordſhip's broth and fomentation for the ſtone.

The broth.

TAKE one dram of *eryngium* roots, cleanſed and ſliced; and boil them together with a chicken. In the end, add of alder flowers, and marigold flowers together, one

one pugil; of angelica ſeed half a dram, of raiſins of the ſun ſtoned fifteen; of roſemary, thyme, mace, together, a little.

In ſix ounces of this broth, or thereabouts, let there be diſſolved of white *cremor tartari* three grains.

Every third or fourth day, take a ſmall toaſt of manchet, dipped in oil of ſweet almonds new drawn, and ſprinkled with a little loaf ſugar. You may make the broth for two days, and take the one half every day. If you find the ſtone to ſtir, forbear the toaſt for a courſe or two. The intention of this broth is, not to void, but to undermine the quarry of the ſtones in the kidneys.

The fomentation.

TAKE of leaves of violets, mallows, pellitory of the wall, together, one handful; of flowers of camomile and melilot, together, one pugil; the root of marſh-mallows, one ounce; of anis and fenel ſeeds, together, one ounce and a half; of flax-ſeed, two drams. Make a decoction in ſpring water.

The ſecond receipt, ſhewing the way of making a certain ointment, which his lordſhip called Unguentum fragrans, ſive Romanum, *the fragrant or Roman unguent.*

TAKE of the fat of a deer half a pound; of oil of ſweet almonds two ounces: let them be ſet upon a very gentle fire, and ſtirred with a ſtick of juniper till they are melted. Add of root of flower-de-luce powdered, damaſk roſes powdered, together, one dram; of myrrh diſſolved in roſe-water half a dram; of cloves half a ſcruple; of civet four grains; of muſk ſix grains; of oil of mace expreſſed one drop; as much of roſe-water as ſufficeth to keep the unguent from being too thick. Let all theſe be put together in a glaſs, and ſet upon the embers for the ſpace of an hour, and ſtirred with a ſtick of juniper.

Note; that in the confection of this ointment, there was not uſed above a quarter of a pound, and a tenth part of a quarter of deer's ſuet: and that all the ingredients, except the oil of almonds, were doubled when the ointment was half made, becauſe the fat things ſeemed to be too predominant.

The third receipt. A manus Chriſti *for the ſtomach.*

TAKE of the beſt pearls very finely pulverized, one dram; of ſal nitre one ſcruple; of tartar two ſcruples; of ginger and galingal together, one ounce and a half; of *calamus*, root of *enula campana*, nutmeg, together, one ſcruple and a half; of amber ſixteen grains; of the beſt muſk ten grains; with roſe-water and the fineſt ſugar, let there be made a *manus Chriſti*.

The fourth receipt. A ſecret for the ſtomach.

TAKE *lignum aloës* in groſs ſhavings, ſteep them in ſack, or alicant, changed twice, half an hour at a time, till the bitterneſs be drawn forth. Then take the ſhavings forth, and dry them in the ſhade, and beat them to an excellent powder. Of that powder, with the ſyrup of citrons, make a ſmall pill, to be taken before ſupper.

WORKS MORAL.

A FRAGMENT of the COLOURS OF GOOD and EVIL.

TO THE LORD MOUNTJOYE.

I Send you the laſt part of the beſt book of Ariſtotle of Stagira, who, as your lordſhip knoweth, goeth for the beſt author. But ſaving the civil reſpect which is due to a received eſtimation, the man being a Grecian, and of a haſty wit, having hardly a diſcerning patience, much leſs a teaching patience, hath ſo delivered the matter, as I am glad to do the part of a good houſe-hen, which without any ſtrangeneſs will ſit upon pheaſants eggs. And yet perchance, ſome that ſhall compare my lines with Ariſtotle's lines, will muſe by what art, or rather by what revelation, I could draw theſe conceits out of that place. But I, that ſhould know beſt, do freely acknowledge, that I had my light from him; for where he gave me not matter to perfect, at the leaſt he gave me occaſion to invent. Wherein as I do him right, being myſelf a man that am as free from envying the dead in contemplation, as from envying the living in action or fortune: ſo yet nevertheleſs ſtill I ſay, and I ſpeak it more largely than before, that in peruſing the writings of this perſon ſo much celebrated, whether it were the impediment of his wit, or that he did it upon glory and affectation to be ſubtile, as one that if he had ſeen his own conceits clearly and perſpicuouſly delivered, perhaps would have been out of love with them himſelf; or elſe upon policy, to keep himſelf cloſe, as one that had been a challenger of all the world, and had raiſed infinite contradiction: to what cauſe ſoever it is to be aſcribed, I do not find him to deliver and unwrap himſelf well of that he ſeemeth to conceive; nor to be a maſter of his own knowledge. Neither do I for my part alſo, though I have brought in a new manner of handling this argument, to make it pleaſant and lightſome, pretend ſo to have overcome the nature of the ſubject; but that the full underſtanding and uſe of it will be ſomewhat dark, and beſt pleaſing the taſte of ſuch wits as are patient to ſtay the digeſting and ſoluting unto themſelves of that which is ſharp and ſubtile. Which was the cauſe, joined with the love and honour which I bear to your lordſhip, as the perſon I know to have many virtues, and an excellent order of them, which moved me to dedicate this writing to your lordſhip after the ancient manner: chooſing both a friend, and one to whom I conceived the argument was agreeable.

OF THE
COLOURS of GOOD and EVIL.

IN deliberatives, the point is, what is good, and what is evil; and of good, what is greater, and of evil, what is leſs.

So that the perſuader's labour is, to make things appear good or evil, and that in higher or lower degree: which as it may be performed by true and ſolid reaſons, ſo it may be repreſented alſo by colours, popularities and circumſtances; which are of ſuch force, as they ſway the ordinary judgment either of a weak man, or of a wiſe man, not fully and conſiderately attending and pondering the matter. Beſides their power to alter the nature of the ſubject in appearance, and ſo to lead to error, they are of no leſs uſe to quicken and ſtrengthen the opinions and perſuaſions which are true; for reaſons plainly delivered, and always after one manner, eſpecially with fine and faſtidious minds, enter but heavily and dully: whereas if they be varied, and have more life and vigour put into them by theſe forms and inſinuations, they cauſe a ſtronger apprehenſion, and many times ſuddenly win the mind to a reſolution. Laſtly, to make a true and ſafe judgment, nothing can be of greater uſe and defence to the mind, than the diſcovering and reprehenſion of theſe colours, ſhewing in what caſes they hold, and in what they deceive: which, as it cannot be done but out of a very univerſal knowledge of the nature of things, ſo being performed, it ſo cleareth man's judgment and election, as it is the leſs apt to ſlide into any error.

A TABLE of the colours, or appearances of GOOD and EVIL, and their degrees, as places of perſuaſion and diſſuaſion, and their ſeveral fallacies, and the elenches of them.

I.

Cui caeterae partes vel ſectae ſecundas unanimiter deferunt, cum ſingulae principatum ſibi vindicent, melior reliquis videtur. Nam primas quaeque ex zelo videtur ſumere, ſecundas autem ex vero et merito tribuere.

SO Cicero went about to prove the ſect of Academics, which ſuſpended all aſſeveration, to be the beſt; For, ſaith he, aſk a Stoic which philoſophy is true, he will prefer his own. Then aſk him, which approacheth next the truth, he will confeſs the Academics. So deal with the Epicure, that will ſcarce endure the Stoic to be in ſight of him; ſo ſoon as he hath placed himſelf, he will place the Academics next him. So if a prince took divers competitors to a place, and examined them ſeverally, whom next themſelves they would rareſt commend, it were like the ableſt man ſhould have the moſt ſecond voices.

The fallax of this colour happeneth oft in reſpect of envy, for men are accuſtomed, after themſelves and their own faction, to incline unto them which are ſofteſt, and are leaſt in their way, in deſpite and derogation of them that hold them hardeſt to it. So that this colour of meliority and preeminence is a ſign of enervation and weakneſs.

Cujus

II.

Cujus excellentia vel exuperantia melior, id toto genere melius.

APPERTAINING to this, are the forms: "Let us not wander in generalities: Let us compare particular with particular," *etc.* This appearance, though it ſeem of ſtrength, and rather logical than rhetorical, yet is very oft a fallax.

Sometime becauſe ſome things are in kind very caſual, which if they eſcape prove excellent; ſo that the kind is inferior, becauſe it is ſo ſubject to peril, but that which is excellent being proved is ſuperior: as the bloſſom of March, and the bloſſom of May, whereof the French verſe goeth:

Burgeon de Mars, enfans de Paris,
Si un eſchape, il en vaut dix.

So that the bloſſom of May is generally better than the bloſſom of March; and yet the beſt bloſſom of March is better than the beſt bloſſom of May. Sometimes becauſe the nature of ſome kinds is to be more equal, and more indifferent, and not to have very diſtant degrees: as hath been noted, in the warmer climates the people are generally more wiſe, but in the northern climates the wits of chief are greater. So in many armies, if the matter ſhould be tried by duel between two champions, the victory ſhould go on the one ſide; and yet if it be tried by the groſs, it would go on the other ſide: for excellencies go as it were by chance, but kinds go by a more certain nature; as by diſcipline in war.

Laſtly; many kinds have much refuſe, which countervail that which they have excellent: and therefore generally metal is more precious than ſtone; and yet a diamond is more precious than gold.

III.

Quod ad veritatem refertur, majus eſt, quam quod ad opinionem. Modus autem et probatio ejus, quod ad opinionem pertinet, haec eſt: quod quis, ſi clam putaret fore, facturus non eſſet.

SO the Epicures ſay of the Stoic felicity placed in virtue, that it is like the felicity of a player, who if he were left of his auditory and their applauſe, he would ſtraight be out of heart and countenance; and therefore they call virtue *bonum theatrale*: but of riches the poet ſaith,

Populus me ſibilat; at mihi plaudo.

And of pleaſure,

Grata ſub imo
Gaudia corde premens, vultu ſimulante pudorem.

The fallax of this colour is ſomewhat ſubtile, though the anſwer to the example be ready, for virtue is not choſen *propter auram popularem*; but contrariwiſe, *maxime omnium teipſum reverere*: ſo as a virtuous man will be virtuous *in ſolitudine*, and not only *in theatro*, though percaſe it will be more ſtrong by glory and fame, as an heat which is doubled by reflexion. But that denieth the ſuppoſition, it doth not reprehend the fallax; whereof the reprehenſion is: Allow that virtue, ſuch as is joined with labour and conflict, would not be choſen but for fame and opinion; yet it followeth not that the chief motive of the election ſhould not be real and for itſelf; for fame may be only *cauſa impulſiva*, and not *cauſa conſtituens* or *efficiens*. As if there were two horſes, and the one would do better without the ſpur than the other: but again

again, the other with the ſpur would far exceed the doing of the former, giving him the ſpur alſo; yet the latter will be judged to be the better horſe. And the form, as to ſay, "Tuſh, the life of this horſe is but in the ſpur," will not ſerve as to a wiſe judgment: for ſince the ordinary inſtrument of horſemanſhip is the ſpur, and that it is no matter of impediment or burden, the horſe is not to be accounted the leſs of, which will not do well without the ſpur; but rather the other is to be reckoned a delicacy than a virtue. So glory and honour are the ſpurs to virtue: and although virtue would languiſh without them, yet ſince they be always at hand to attend virtue, virtue is not to be ſaid the leſs choſen for itſelf, becauſe it needeth the ſpur of fame and reputation: and therefore that poſition, *nota ejus, quod propter opinionem et non propter veritatem eligitur, haec eſt; quod quis, ſi clam putaret fore, facturus non eſſet*, is reprehended.

IV.

Quod rem integram ſervat, bonum; quod ſine receptu eſt, malum: nam ſe recipere non poſſe, impotentiae genus eſt; potentia autem bonum.

HEREOF Æſop framed the fable of the two frogs, that conſulted together in the time of drought, when many plaſhes, that they had repaired to, were dry, what was to be done; and the one propounded to go down into a deep well, becauſe it was like the water would not fail there; but the other anſwered, "Yea, but "if it do fail, how ſhall we get up again?" And the reaſon is, that human actions are ſo uncertain and ſubject to perils, as that ſeemeth the beſt courſe which hath moſt paſſages out of it. Appertaining to this perſuaſion, the forms are: You ſhall engage yourſelf; on the other ſide, *Non tantum, quantum voles, ſumes ex fortuna, etc.* You ſhall keep the matter in your own hand.

The reprehenſion of it is, that proceeding and reſolving in all actions is neceſſary. For as he ſaith well, Not to reſolve, is to reſolve; and many times it breeds as many neceſſities, and engageth as far in ſome other ſort, as to reſolve. So it is but the covetous man's diſeaſe, tranſlated into power; for the covetous man will enjoy nothing, becauſe he will have his full ſtore and poſſibility to enjoy the more; ſo by this reaſon a man ſhould execute nothing, becauſe he ſhould be ſtill indifferent, and at liberty to execute any thing. Beſides, neceſſity and this ſame *jacta eſt alea*, hath many times an advantage, becauſe it awaketh the powers of the mind, and ſtrengtheneth endeavour; *Caeteris pares, neceſſitate certe ſuperiores eſtis.*

V.

Quod ex pluribus conſtat et diviſibilibus eſt majus, quam quod ex paucioribus, et magis unum; nam omnia per partes conſiderata majora videntur: quare et pluralitas partium magnitudinem prae ſe fert: fortius autem operatur pluralitas partium ſi ordo abſit; nam inducit ſimilitudinem infiniti, et impedit comprehenſionem.

THIS colour ſeemeth palpable; for it is not plurality of parts without majority of parts, that maketh the total greater; yet nevertheleſs it often carries the mind away, yea, it deceiveth the ſenſe; as it ſeemeth to the eye a ſhorter diſtance of way, if it be all dead and continued, than if it have trees or buildings, or any other marks whereby the eye may divide it. So when a great moneyed man hath divided his cheſts, and coins, and bags, he ſeemeth to himſelf richer than he was; and therefore a way to amplify any thing is, to break it, and to make anatomy of it in ſeveral parts, and to examine it according to ſeveral circumſtances. And this maketh

maketh the greater ſhew if it be done without order, for confuſion maketh things muſter more; and beſides, what is ſet down by order and diviſion, doth demonſtrate that nothing is left out or omitted, but all is there; whereas if it be without order, both the mind comprehendeth leſs that which is ſet down; and beſides, it leaveth a ſuſpicion, as if more might be ſaid than is expreſſed.

This colour deceiveth, if the mind of him that is to be perſuaded, do of itſelf over-conceive, or prejudge of the greatneſs of any thing; for then the breaking of it will make it ſeem leſs, becauſe it maketh it to appear more according to the truth: and therefore if a man be in ſickneſs or pain, the time will ſeem longer without a clock or hour-glaſs, than with it; for the mind doth value every moment, and then the hour doth rather ſum up the moments, than divide the day. So in a dead plain the way ſeemeth the longer, becauſe the eye hath preconceived it ſhorter than the truth, and the fruſtrating of that maketh it ſeem longer than the truth. Therefore if any man have an over-great opinion of any thing, then if another think by breaking it into ſeveral conſiderations he ſhall make it ſeem greater to him, he will be deceived; and therefore in ſuch caſes it is not ſafe to divide, but to extol the intire ſtill in general. Another caſe wherein this colour deceiveth, is when the matter broken or divided is not comprehended by the ſenſe or made at once, in reſpect of the diſtracting or ſcattering of it; and being intire and not divided, is comprehended: as an hundred pounds in heaps of five pounds will ſhew more than in one groſs heap, ſo as the heaps be all upon one table to be ſeen at once, otherwiſe not: as flowers growing ſcattered in divers beds will ſhew more than if they did grow in one bed, ſo as all thoſe beds be within a plot, that they be object to view at once, otherwiſe not: and therefore men, whoſe living lieth together in one ſhire, are commonly counted greater landed than thoſe whoſe livings are diſperſed, though it be more becauſe of the notice and comprehenſion. A third caſe wherein this colour deceiveth, and it is not ſo properly a caſe of reprehenſion, as it is a counter colour, being in effect as large as the colour itſelf; and that is, *omnis compoſitio indigentiae cujuſdam in ſingulis videtur eſſe particeps*, becauſe if one thing would ſerve the turn, it were ever beſt, but the defect and imperfections of things hath brought in that help to piece them up; as it is ſaid, *Martha, Martha, attendis ad plurima, unum ſufficit*. So likewiſe hereupon Æſop framed the fable of the fox and the cat; whereas the fox bragged what a number of ſhifts and devices he had to get from the hounds, and the cat ſaid he had but one, which was to climb a tree, which in proof was better worth than all the reſt; whereof the proverb grew, *Multa novit vulpes, ſed felis unum magnum*. And in the moral of this fable it comes likewiſe to paſs, that a good ſure friend is a better help at a pinch, than all the ſtratagems and policies of a man's own wit. So it falleth out to be a common error in negotiating, whereas men have many reaſons to induce or perſuade, they ſtrive commonly to utter and uſe them all at once, which weakeneth them. For it argueth, as was ſaid, a needineſs in every of the reaſons by itſelf, as if one did not truſt to any of them, but fled from one to another, helping himſelf only with that: *Et quae non proſunt ſingula, multa juvant*. Indeed in a ſet ſpeech in an aſſembly, it is expected a man ſhould uſe all his reaſons in the caſe he handleth, but in private perſuaſions it is always a great error. A fourth caſe wherein this colour may be reprehended, is in reſpect of that ſame *vis unita fortior*, according to the tale of the French king, that when the emperor's ambaſſador had recited his maſter's ſtile at large, which conſiſteth of many countries and dominions; the French king willed his chancellor, or other miniſter, to repeat

peat over France as many times as the other had recited the ſeveral dominions; intending it was equivalent with them all, and more compacted and united. There is alſo appertaining to this colour another point, why breaking of a thing doth help it, not by way of adding a ſhew of magnitude unto it, but a note of excellency and rarity; whereof the forms are, Where ſhall you find ſuch a concurrence? Great but not complete; for it ſeems a leſs work of nature or fortune, to make any thing in his kind greater than ordinary, than to make a ſtrange compoſition. Yet if it be narrowly conſidered, this colour will be reprehended or encountered, by imputing to all excellencies in compoſitions a kind of poverty, or at leaſt a caſualty or jeopardy; for from that which is excellent in greatneſs, ſomewhat may be taken, or there may be a decay, and yet ſufficient left; but from that which hath his price in compoſition if you take away any thing, or any part do fail, all is diſgrace.

VI.

Cujus privatio bona, malum; cujus privatio mala, bonum.

THE forms to make it conceived, that that was evil which is changed for the better, are, He that is in hell thinks there is no other heaven. *Satis quercus*, Acorns were good till bread was found, *etc.* And of the other ſide, the forms to make it conceived, that that was good which was changed for the worſe, are, *Bona magis carendo quam fruendo ſentimus: Bona à tergo formoſiſſima:* Good things never appear in their full beauty, till they turn their back and be going away, *etc.*

The reprehenſion of this colour is, that the good or evil which is removed, may be eſteemed good or evil comparatively, and not poſitively or ſimply. So that if the privation be good, it follows not the former condition was evil, but leſs good; for the flower or bloſſom is a poſitive good, although the remove of it to give place to the fruit, be a comparative good. So in the tale of Æſop, when the old fainting man in the heat of the day caſt down his burden, and called for Death; and when Death came to know his will with him, ſaid, it was for nothing but to help him up with his burden again: it doth not follow, that becauſe death, which was the privation of the burden, was ill, therefore the burden was good. And in this part, the ordinary form of *malum neceſſarium* aptly reprehendeth this colour; for *privatio mali neceſſarii eſt mala*, and yet that doth not convert the nature of the neceſſary evil, but it is evil.

Again, it cometh ſometimes to paſs, that there is an equality in the change of privation, and as it were a *dilemma boni*, or a *dilemma mali:* ſo that the corruption of the one good, is a generation of the other. *Sorti pater aequus utrique eſt:* and contrary, the remedy of the one evil is the occaſion and commencement of another, as in Scylla and Charybdis.

VII.

Quod bono vicinum, bonum; quod à bono remotum, malum.

SUCH is the nature of things, that things contrary, and diſtant in nature and quality, are alſo ſevered and disjoined in place; and things like and conſenting in quality, are placed, and as it were quartered together: for, partly in regard of the nature to ſpread, multiply, and infect in ſimilitude; and partly in regard of the nature

nature to break, expel, and alter that which is disagreeable and contrary, most things do either associate, and draw near to themselves the like, or at least assimilate to themselves that which approacheth near them, and do also drive away, chase and exterminate their contraries. And that is the reason commonly yielded, why the middle region of the air should be coldest, because the sun and stars are either hot by direct beams, or by reflection. The direct beams heat the upper region, the reflected beams from the earth and seas, heat the lower region. That which is in the midst, being farthest distant in place from these two regions of heat, are most distant in nature, that is, coldest; which is that they term cold or hot *per antiperistasin*, that is, environing by contraries: which was pleasantly taken hold of by him that said, that an honest man, in these days, must needs be more honest than in ages heretofore, *propter antiperistasin*, because the shutting of him in the midst of contraries, must needs make the honesty stronger and more compact in itself.

The reprehension of this colour is: first, many things of amplitude in their kind do as it were ingross to themselves all, and leave that which is next them most destitute: as the shoots or under-wood, that grow near a great and spread tree, is the most pined and shrubby wood of the field, because the great tree doth deprive and deceive them of sap and nourishment; so he saith well, *divitis servi maxime servi:* and the comparison was pleasant of him, that compared courtiers attendant in the courts of princes without great place or office, to fasting-days, which were next the holy-days, but otherwise were the leanest days in all the week.

Another reprehension is, that things of greatness and predominancy, though they do not extenuate the things adjoining in substance, yet they drown them and obscure them in shew and appearance; and therefore the astronomers say, That whereas in all other planets conjunction is the perfectest amity; the sun contrariwise is good by aspect, but evil by conjunction.

A third reprehension is, because evil approacheth to good sometimes for concealment, sometimes for protection; and good to evil for conversion and reformation. So hypocrisy draweth near to religion for covert, and hiding itself; *saepe latet vitium proximitate boni*: and sanctuary men, which were commonly inordinate men and malefactors, were wont to be nearest to priests and prelates, and holy men; for the majesty of good things is such, as the confines of them are reverend. On the other side, our Saviour, charged with nearness of publicans and rioters, said, *the physician approacheth the sick, rather than the whole.*

VIII.

Quod quis culpa sua contraxit, majus malum; quod ab externis imponitur, minus malum.

THE reason is, because the sting and remorse of the mind accusing itself doubleth all adversity: contrariwise, the considering and recording inwardly, that a man is clear and free from fault and just imputation, doth attemper outward calamities. For if the evil be in the sense, and in the conscience both, there is a gemination of it; but if evil be in the one, and comfort in the other, it is a kind of compensation: so the poets in tragedies do make the most passionate lamentation, and those that forerun final despair, to be accusing, questioning, and torturing of a man's life.

Seque unum clamat causamque caputque malorum.

And contrariwise, the extremities of worthy persons have been annihilated in the consideration of their own good deserving. Besides, when the evil cometh from without,

there is left a kind of evaporation of grief, if it come by human injury, either by indignation, and meditating of revenge from ourſelves, or by expecting or fore-conceiving that Nemeſis and retribution will take hold of the authors of our hurt: or if it be by fortune or accident, yet there is left a kind of expoſtulation againſt the divine powers;

Atque deos atque aſtra vocat crudelia mater.

But where the evil is derived from a man's own fault, there all ſtrikes deadly inwards, and ſuffocateth.

The reprehenſion of this colour is, firſt in reſpect of hope, for reformation of our faults is *in noſtra poteſtate*; but amendment of our fortune ſimply is not. Therefore Demoſthenes, in many of his orations, ſaith thus to the people of Athens: "That "having regard to the time paſt, is the worſt point and circumſtance of all the reſt; "that as to the time to come is the beſt: what is that? Even this, that by your ſloth, "irreſolution and miſgovernment, your affairs are grown to this declination and decay. "For had you uſed and ordered your means and forces to the beſt, and done your "parts every way to the full, and, notwithſtanding, your matters ſhould have gone "backward in this manner as they do, there had been no hope left of recovery or re-"paration; but ſince it hath been only by our own errors," *etc.* So Epictetus in his degrees ſaith, The worſt ſtate of man is to accuſe external things, better that to accuſe a man's ſelf, and beſt of all to accuſe neither.

Another reprehenſion of this colour, is in reſpect of the well bearing of evils wherewith a man can charge no body but himſelf, which maketh them the leſs.

Leve fit quod bene fertur onus.

And therefore many natures that are either extremely proud, and will take no fault to themſelves, or elſe very true and cleaving to themſelves, when they ſee the blame of any thing that falls out ill muſt light upon themſelves, have no other ſhift but to bear it out well, and to make the leaſt of it; for as we ſee when ſometimes a fault is committed, and before it be known who is to blame, much ado is made of it; but after, if it appear to be done by a ſon, or by a wife, or by a near friend, then it is light made of: ſo much more when a man muſt take it upon himſelf. And therefore it is commonly ſeen, that women that marry huſbands of their own chooſing againſt their friends conſents, if they be never ſo ill uſed, yet you ſhall ſeldom ſee them complain, but ſet a good face on it.

IX.

Quod opera et virtute noſtra partum eſt, majus bonum; quod ab alieno beneficio vel ab indulgentia fortunae delatum eſt, minus bonum.

The reaſons are, firſt, the future hope, becauſe in the favours of others, or the good winds of fortune, we have no ſtate or certainty; in our endeavours or abilities we have. So as when they have purchaſed one good fortune, we have them as ready, and better edged, and inured to procure another.

The forms be: You have won this by play, You have not only the water, but you have the receipt, you can make it again if it be loſt, *etc.*

Next, becauſe theſe properties which we enjoy by the benefit of others, carry with them an obligation, which ſeemeth a kind of burden; whereas the other, which derive from ourſelves, are like the freeſt patents, *abſque aliquo inde reddendo*; and if they proceed from fortune or providence, yet they ſeem to touch us ſecretly with the reverence of the divine powers, whoſe favours we taſte, and therefore work a kind of religious

ligious fear and reſtraint: whereas in the other kind, that comes to paſs which the prophet ſpeaketh, *laetantur et exultant, immolant plagis ſuis, et ſacrificant reti ſuo.*

Thirdly, Becauſe that which cometh unto us without our own virtue, yielded not that commendation and reputation; for actions of great felicity may draw wonder, but praiſe leſs; as Cicero ſaid to Cæſar, *Quae miremur, habemus; quae laudemus, expectamus.*

Fourthly, Becauſe the purchaſes of our own induſtry are joined commonly with labour and ſtrife, which gives an edge and appetite, and makes the fruition of our deſires more pleaſant. *Suavis cibus à venatu.*

On the other ſide, there be four counter colours to this colour, rather than reprehenſions, becauſe they be as large as the colour itſelf. Firſt, becauſe felicity ſeemeth to be a character of the favour and love of the divine powers, and accordingly worketh both confidence in ourſelves, and reſpect and authority from others. And this felicity extendeth to many caſual things, whereunto the care or virtue of man cannot extend, and therefore ſeemeth to be a larger good; as when Cæſar ſaid to the ſailor, *Caeſarem portas et fortunam ejus*; if he had ſaid *et virtutem ejus*, it had been ſmall comfort againſt a tempeſt, otherwiſe than if it might ſeem upon merit to induce fortune.

Next, whatſoever is done by virtue and induſtry, ſeems to be done by a kind of habit and art, and therefore open to be imitated and followed; whereas felicity is inimitable: ſo we generally ſee, that things of nature ſeem more excellent than things of art, becauſe they be inimitable: for, *quod imitabile eſt, potentia quadam vulgatum eſt.*

Thirdly, Felicity commendeth thoſe things which come without our own labour; for they ſeem gifts, and the other ſeem pennyworths: whereupon Plutarch ſaith elegantly of the act of Timoleon, who was ſo fortunate, compared with the acts of Ageſilaus and Epaminondas; that they were like Homer's verſes, they ran ſo eaſily and ſo well. And therefore it is the word we give unto poeſy, terming it a happy vein, becauſe facility ſeemeth ever to come from happineſs.

Fourthly, This ſame *praeter ſpem, vel praeter expectatum*, doth increaſe the price and pleaſure of many things; and this cannot be incident to thoſe things that proceed from our own care and compaſs.

X.

Gradus privationis major videtur, quam gradus diminutionis; et rurſus gradus inceptionis major videtur, quam gradus incrementi.

IT is a poſition in the mathematics, that there is no proportion between ſomewhat and nothing, therefore the degree of nullity and quiddity or act, ſeemeth larger than the degrees of increaſe and decreaſe; as to a *monoculus* it is more to loſe one eye than to a man that hath two eyes. So if one have loſt divers children, it is more grief to him to loſe the laſt, than all the reſt; becauſe he is *ſpes gregis*. And therefore Sibylla when ſhe brought her three books, and had burned two, did double the whole price of both the other, becauſe the burning of that had been *gradus privationis*, and not *diminutionis*.

This colour is reprehended firſt in thoſe things, the uſe and ſervice whereof reſteth in ſufficiency, competency, or determinate quantity: as if a man be to pay one hundred pounds upon a penalty, it is more to him to want twelve pence, than after that twelve pence ſuppoſed to be wanting, to want ten ſhillings more; ſo the decay of a

man's eſtate ſeems to be moſt touched in the degree, when he firſt grows behind, more than afterwards, when he proves nothing worth. And hereof the common forms are *Sera in fundo parſimonia*, and As good never a whit, as never the better, *etc.* It is reprehended alſo in reſpect of that notion, *Corruptio unius, generatio alterius:* ſo that *gradus privationis* is many times leſs matter, becauſe it gives the cauſe and motive to ſome new courſe. As when Demoſthenes reprehended the people for hearkening to the conditions offered by king Philip, being not honourable nor equal, he ſaith they were but aliments of their ſloth and weakneſs, which if they were taken away, neceſſity would teach them ſtronger reſolutions. So doctor Hector was wont to ſay to the dames of London, when they complained they were they could not tell how, but yet they could not endure to take any medicine; he would tell them, their way was only to be ſick, for then they would be glad to take any medicine.

Thirdly, This colour may be reprehended, in reſpect that the degree of decreaſe is more ſenſitive than the degree of privation; for in the mind of man *gradus diminutionis* may work a wavering between hope and fear, and ſo keep the mind in ſuſpence, from ſettling and accommodating in patience and reſolution. Hereof the common forms are, Better eye out, than always ache; Make or mar, *etc.*

For the ſecond branch of this colour, it depends upon the ſame general reaſon: hence grew the common place of extolling the beginning of every thing: *dimidium facti qui bene coepit habet.* This made the aſtrologers ſo idle as to judge of a man's nature and deſtiny, by the conſtellation of the moment of his nativity or conception. This colour is reprehended, becauſe many inceptions are but, as Epicurus termeth them, *tentamenta*, that is, imperfect offers and eſſays, which vaniſh and come to no ſubſtance without an iteration; ſo as in ſuch caſes the ſecond degree ſeems the worthieſt, as the body-horſe in the cart, that draweth more than the fore-horſe. Hereof the common forms are, The ſecond blow makes the fray, the ſecond word makes the bargain; *Alter malo principium dedit, alter modum abſtulit, etc.* Another reprehenſion of this colour is in reſpect of defatigation, which makes perſeverance of greater dignity than inception: for chance or inſtinct of nature may cauſe inception; but ſettled affection, or judgment, maketh the continuance.

Thirdly, This colour is reprehended in ſuch things, which have a natural courſe and inclination contrary to an inception. So that the inception is continually evacuated and gets no ſtart; as in the common form, *Non progredi eſt regredi, Qui non proficit deficit:* running againſt the hill; rowing againſt the ſtream, *etc.* For if it be with the ſtream or with the hill, then the degree of inception is more than all the reſt.

Fourthly, This colour is to be underſtood of *gradus inceptionis à potentia ad actum, comparatus cum gradu ab actu ad incrementum.* For otherwiſe *major videtur gradus ab impotentia ad potentiam, quàm à potentia ad actum.*

ESSAYS

OR

COUNSELS

CIVIL and MORAL.

To Mr. ANTHONY BACON *his dear Brother.*

Loving and beloved brother,

I Do now, like ſome that have an orchard ill neighboured, that gather their fruit before it is ripe, to prevent ſtealing. Theſe fragments of my conceits were going to print; to labour the ſtay of them had been troubleſome, and ſubject to interpretation; to let them paſs had been to adventure the wrong they might receive by untrue copies, or by ſome garniſhment which it might pleaſe any that ſhould ſet them forth to beſtow upon them. Therefore I held it beſt diſcretion to publiſh them myſelf, as they paſſed long ago from my pen, without any further diſgrace than the weakneſs of the author. And as I did ever hold, there might be as great a vanity in retiring and withdrawing mens conceits, except they be of ſome nature, from the world, as in obtruding them; ſo in theſe particulars I have played myſelf the inquiſitor, and find nothing to my underſtanding in them contrary or infectious to the ſtate of religion, or manners, but rather, as I ſuppoſe, medicinable. Only I diſliked now to put them out, becauſe they will be like the late new half-pence, which though the ſilver were good, yet the pieces were ſmall. But ſince they would not ſtay with their maſter, but would needs travel abroad, I have preferred them to you that are next myſelf; dedicating them, ſuch as they are, to our love, in the depth whereof, I aſſure you, I ſometimes wiſh your infirmities tranſlated upon myſelf, that her majeſty might have the ſervice of ſo active and able a mind; and I might be with excuſe confined to theſe contemplations and ſtudies, for which I am fitteſt: ſo commend I you to the preſervation of the divine Majeſty.

From my chamber at Grays-Inn,
this 30th of January 1597. *Your intire loving brother,* FRAN. BACON.

To my loving Brother Sir JOHN CONSTABLE, *Kt.*

MY laſt eſſays I dedicated to my dear brother, Mr. Anthony Bacon, who is with God. Looking amongſt my papers this vacation, I found others of the ſame nature: which if I myſelf ſhall not ſuffer to be loſt, it ſeemeth the world will not, by the often printing of the former. Miſſing my brother, I found you next; in reſpect of bond both of near alliance, and of ſtrait friendſhip and ſociety, and particularly of communication in ſtudies: wherein I muſt acknowledge myſelf beholden to you. For as my buſineſs found reſt in my contemplations, ſo my contemplations ever found reſt in your loving conference and judgment. So wiſhing you all good, I remain,

1612. *Your loving brother and friend,* FRAN. BACON.

To the right honourable my very good lord the duke of BUCKINGHAM, *his grace, lord high admiral of England.*

Excellent Lord,

SOLOMON ſays, *A good name is as a precious ointment*; and I aſſure myſelf ſuch will your grace's name be with poſterity. For your fortune and merit both have been eminent: and you have planted things that are like to laſt. I do now publiſh my *Eſſays*; which of all my other works have been moſt current: for that, as it ſeems, they come home to mens buſineſs and boſoms. I have enlarged them both in number and weight; ſo that they are indeed a new work. I thought it therefore agreeable to my affection and obligation to your grace, to prefix your name before them both in Engliſh and in Latin: For I do conceive, that the Latin volume of them, being in the univerſal language, may laſt as long as books laſt. My *Inſtauration* I dedicated to the king: my *Hiſtory of Henry the ſeventh*, which I have now alſo tranſlated into Latin, and my portions of *Natural Hiſtory*, to the prince: and theſe I dedicate to your grace; being of the beſt fruits, that by the good increaſe which God gives to my pen and labours I could yield. God lead your grace by the hand.

1625. *Your grace's moſt obliged and faithful ſervant,* FRAN. ST. ALBAN.

Eſſays Civil and Moral.

I. *Of* Truth.

WHAT is truth? ſaid jeſting Pilate; and would not ſtay for an anſwer. Certainly there be that delight in giddineſs; and count it a bondage to fix a belief; affecting free-will in thinking, as well as in acting. And though the ſects of philoſophers of that kind be gone, yet there remain certain diſcourſing wits, which are of the ſame veins, though there be not ſo much blood in them as was in thoſe of the ancients. But it is not only the difficulty and labour which men take in finding out of truth; nor again, that when it is found, it impoſeth upon mens thoughts; that doth bring lyes in favour: but a natural though corrupt love of the lye itſelf. One of the later ſchool of the Grecians examineth the matter, and is at a ſtand to think what ſhould be in it, that men ſhould love lyes; where neither they make for pleaſure, as with poets; nor for advantage, as with the merchant; but for the lye's ſake. But I cannot tell: this ſame truth is a naked and open day-light, that doth not ſhew the maſks, and mummeries, and triumphs of the world, half ſo ſtately and daintily as candle-lights. Truth may perhaps come to the price of a pearl, that ſheweth beſt by day: but it will not riſe to the price of a diamond or carbuncle, that ſheweth beſt in varied lights. A mixture of a lye doth ever add pleaſure. Doth any man doubt, that if there were taken out of mens minds, vain opinions, flattering hopes, falſe valuations, imaginations as one would, and the like; but it would leave the minds of a number of men, poor ſhrunken things; full of melancholy and indiſpoſition, and unpleaſing to themſelves? One of the fathers, in great ſeverity, called poeſy, *vinum daemonum*; becauſe it filleth the imagination, and yet it is but with the ſhadow of a lye. But it is not the lye that paſſeth through the mind, but the lye that ſinketh in, and ſettleth in it, that doth the hurt, ſuch as we ſpake of before. But howſoever theſe things are thus in mens depraved judgments and affections, yet truth, which only doth judge itſelf, teacheth, that the inquiry of truth, which is the love making, or wooing of it; the knowledge of truth, which is the preſence of it; and the belief of truth, which is the enjoying of it; is the ſovereign good of human nature. The firſt creature of God, in the works of the days, was the light of the ſenſe; the laſt was the light of reaſon; and his ſabbath work ever ſince is the illumination of his Spirit. Firſt he breathed light upon the face of the matter, or chaos; then he breathed light into the face of man; and ſtill he breatheth and inſpireth light into the face of his choſen. The poet that beautified the ſect, that was otherwiſe inferior to the reſt, ſaith yet excellently well: "It is a pleaſure to ſtand upon the ſhore and to ſee ſhips toſt upon the "ſea: a pleaſure to ſtand in the window of a caſtle, and to ſee a battle, and the ad-"ventures thereof below: but no pleaſure is comparable to the ſtanding upon the "vantage ground of truth, a hill not to be commanded, and where the air is always "clear and ſerene: and to ſee the errors, and wandrings, and miſts, and tempeſts, in "the vale below:" ſo always, that this proſpect be with pity, and not with ſwelling

or

or pride. Certainly, it is heaven upon earth, to have a man's mind move in charity, reſt in providence, and turn upon the poles of truth.

To paſs from theological and philoſophical truth, to the truth of civil buſineſs; it will be acknowledged, even by thoſe that practiſe it not, that clear and round dealing is the honour of man's nature; and that mixture of falſhood is like allay in coin of gold and ſilver; which may make the metal work the better, but it embaſeth it. For theſe winding and crooked courſes are the goings of the ſerpent; which goeth baſely upon the belly, and not upon the feet. There is no vice that doth ſo cover a man with ſhame, as to be found falſe and perfidious. And therefore Montagne ſaith prettily, when he inquired the reaſon, why the word of the lye ſhould be ſuch a diſgrace, and ſuch an odious charge? Saith he, "If it be well weighed, to ſay a man "lyeth, is as much as to ſay, that he is brave towards God, and a coward towards "men. For a lye faces God, and ſhrinks from man." Surely the wickedneſs of falſhood, and breach of faith, cannot poſſibly be ſo highly expreſſed, as in that it ſhall be the laſt peal to call the judgments of God upon the generations of men: it being foretold, that when Chriſt cometh *he ſhall not find faith upon the earth.*

II. *Of* Death.

MEN fear death, as children fear to go in the dark: and as that natural fear in children is increaſed with tales, ſo is the other. Certainly, the contemplation of death, as the wages of ſin, and paſſage to another world, is holy and religious; but the fear of it, as a tribute due unto nature, is weak. Yet in religious meditations, there is ſometimes mixture of vanity and of ſuperſtition. You ſhall read in ſome of the friars books of mortification, that a man ſhould think with himſelf, what the pain is, if he have but his finger's end preſſed or tortured; and thereby imagine what the pains of death are, when the whole body is corrupted and diſſolved; when many times death paſſeth with leſs pain than the torture of a limb: for the moſt vital parts are not the quickeſt of ſenſe. And by him that ſpake only as a philoſopher, and natural man, it was well ſaid; *Pompa mortis magis terret, quam mors ipſa.* Groans, and convulſions, and a diſcoloured face, and friends weeping, and blacks, and obſequies, and the like, ſhew death terrible. It is worthy the obſerving, that there is no paſſion in the mind of man ſo weak, but it mates and maſters the fear of death: and therefore death is no ſuch terrible enemy, when a man hath ſo many attendants about him, that can win the combat of him. Revenge triumphs over death; love ſlights it; honour aſpireth to it; grief flieth to it; fear pre-occupateth it: nay, we read, after Otho the emperor had ſlain himſelf, pity, which is the tendereſt of affections, provoked many to die, out of mere compaſſion to their ſovereign, and as the trueſt ſort of followers. Nay, Seneca adds, niceneſs and ſatiety; *cogita quamdiu eadem feceris; mori velle, non tantum fortis, aut miſer ſed etiam faſtidioſus poteſt.* A man would die, though he were neither valiant nor miſerable, only upon a wearineſs to do the ſame thing ſo oft over and over. It is no leſs worthy to obſerve, how little alteration in good ſpirits the approaches of death make; for they appear to be the ſame men till the laſt inſtant. Auguſtus Cæſar died in a compliment; *Livia, conjugii noſtri memor vive, et vale.* Tiberius in diſſimulation; as Tacitus ſaith of him; *Jam Tiberium vires et corpus, non diſſimulatio, deſerebant.* Veſpaſian in a jeſt; ſitting upon the ſtool; *Ut puto Deus fio.* Galba with a ſentence; *Feri, ſi ex re ſit populi Romani*; holding forth his neck. Septimius Severus in diſpatch; *Adeſte, ſi quid mihi reſtat agendum:* and the like.

like. Certainly the Stoics beſtowed too much coſt upon death, and by their great preparations made it appear more fearful. Better ſaith he, *qui finem vitae extremum inter munera ponit naturae.* It is as natural to die, as to be born; and to a little infant, perhaps, the one is as painful as the other. He that dies in an earneſt purſuit, is like one that is wounded in hot blood; who, for the time, ſcarce feels the hurt; and therefore a mind fixt and bent upon ſomewhat that is good, doth avert the dolors of death: but above all, believe it, the ſweeteſt canticle is, *Nunc dimittis*; when a man hath obtained worthy ends and expectations. Death hath this alſo; that it openeth the gate to good fame, and extinguiſheth envy ------ *Extinctus amabitur idem.*

III. *Of* Unity in Religion.

RELIGION being the chief band of human ſociety, it is a happy thing, when itſelf is well contained within the true band of unity. The quarrels and diviſions about religion were evils unknown to the heathen. The reaſon was, becauſe the religion of the heathen conſiſted rather in rites and ceremonies, than in any conſtant belief. For you may imagine what kind of faith theirs was, when the chief doctors and fathers of their church were the poets. But the true God hath this attribute, that he is a jealous God; and therefore his worſhip and religion will endure no mixture nor partner. We ſhall therefore ſpeak a few words concerning the unity of the church; what are the fruits thereof; what the bounds; and what the means.

The fruits of unity, next unto the well-pleaſing of God, which is all in all, are two; the one towards thoſe that are without the church; the other towards thoſe that are within. For the former; it is certain, that hereſies and ſchiſms are of all others the greateſt ſcandals; yea more than corruption of manners. For as in the natural body, a wound or ſolution of continuity, is worſe than a corrupt humour; ſo in the ſpiritual. So that nothing doth ſo much keep men out of the church, and drive men out of the church, as breach of unity: and therefore, whenſoever it cometh to that paſs, that one ſaith, *ecce in deſerto*; another ſaith, *ecce in penetralibus*; that is, when ſome men ſeek Chriſt in the conventicles of heretics, and others in an outward face of a church, that voice had need continually to ſound in mens ears, *nolite exire*, go not out. The doctor of the Gentiles, the propriety of whoſe vocation drew him to have a ſpecial care of thoſe without, ſaith; *If an heathen come in, and hear you ſpeak with ſeveral tongues, will he not ſay that you are mad?* And certainly it is little better, when atheiſts, and profane perſons, do hear of ſo many diſcordant and contrary opinions in religion; it doth avert them from the church, and maketh them *to ſit down in the chair of the ſcorners.* It is but a light thing to be vouched in ſo ſerious a manner, but yet it expreſſeth well the deformity: There is a maſter of ſcoffing; that in his catalogue of books of a feigned library ſets down this title of a book; "The "Morris-dance of Heritiques." For indeed every ſect of them hath a diverſe poſture or cringe by themſelves, which cannot but move deriſion in worldlings and depraved politics, who are apt to contemn holy things.

As for the fruit towards thoſe that are within, it is peace; which containeth infinite bleſſings: it eſtabliſheth faith; it kindleth charity; the outward peace of the church diſtilleth into peace of conſcience; and it turneth the labours of writing and reading of controverſies into treatiſes of mortification and devotion.

Concerning the bonds of unity; the true placing of them importeth exceedingly. There appear to be two extremes. For to certain zealots all ſpeech of pacification is odious. *Is it peace, Jehu? What haſt thou to do with peace? turn thee behind me.* Peace is not the matter, but following and party. Contrariwiſe, certain Laodiceans, and lukewarm perſons think they may accommodate points of religion by middle-ways, and taking part of both, and witty reconcilements; as if they would make an arbitrement between God and man. Both theſe extremes are to be avoided; which will be done, if the league of Chriſtians, penned by our Saviour himſelf, were in the two croſs clauſes thereof, ſoundly and plainly expounded: *he that is not with us is againſt us:* and again, *he that is not againſt us is with us:* that is, if the points fundamental, and of ſubſtance in religion, were truly diſcerned and diſtinguiſhed from points not merely of faith, but of opinion, order or good intention. This is a thing may ſeem to many a matter trivial, and done already; but if it were done leſs partially, it would be embraced more generally.

Of this I may give only this advice, according to my ſmall model. Men ought to take heed of rending God's church by two kinds of controverſies. The one is, when the matter of the point controverted is too ſmall and light, not worth the heat and ſtrife about it, kindled only by contradiction. For, as it is noted by one of the fathers, Chriſt's coat indeed had no ſeam; but the church's veſture was of divers colours: whereupon he ſaith, *in veſte varietas ſit, ſciſſura non ſit*; they be two things, unity, and uniformity. The other is, when the matter of the point controverted is great; but it is driven to an over-great ſubtilty and obſcurity; ſo that it becometh a thing rather ingenious than ſubſtantial. A man that is of judgment and underſtanding, ſhall ſometimes hear ignorant men differ, and know well within himſelf, that thoſe who ſo differ mean one thing, and yet they themſelves would never agree. And if it come ſo to paſs in that diſtance of judgment which is between man and man; ſhall we not think that God above, that knows the heart, doth not diſcern that frail men, in ſome of their contradictions, intend the ſame thing, and accepteth of both? The nature of ſuch controverſies is excellently expreſſed by St. Paul, in the warning and precept that he giveth concerning the ſame, *devita profanas vocum novitates, et oppoſitiones falſi nominis ſcientiae.* Men create oppoſitions which are not; and put them into new terms ſo fixed, as, whereas the meaning ought to govern the term, the term in effect governeth the meaning. There be alſo two falſe peaces or unities; the one when the peace is grounded but upon an implicit ignorance; for all colours will agree in the dark: the other, when it is pieced up upon a direct admiſſion of contraries in fundamental points. For truth and falſhood, in ſuch things, are like the iron and clay in the toes of Nebuchadnezzar's image; they may cleave, but they will not incorporate.

Concerning the means of procuring unity; men muſt beware, that in the procuring or muniting of religious unity, they do not diſſolve and deface the laws of charity, and of human ſociety. There be two ſwords amongſt Chriſtians, the ſpiritual and temporal; and both have their due office and place in the maintenance of religion. But we may not take up the third ſword, which is Mahomet's ſword, or like unto it; that is, to propagate religion by wars, or by ſanguinary perſecutions to force conſciences; except it be in caſes of overt ſcandal, blaſphemy, or intermixture of practice againſt the ſtate; much leſs to nouriſh ſeditions; to authoriſe conſpiracies and rebellions; to put the ſword into the peoples hands, and the like, tending to the ſubverſion of all government, which is the ordinance of God. For this is but to daſh the firſt table againſt

againſt the ſecond; and ſo to conſider men as Chriſtians, as we forget that they are men. Lucretius the poet, when he beheld the act of Agamemnon, that could endure the ſacrificing of his own daughter, exclaimed;

Tantum religio potuit ſuadere malorum.

What would he have ſaid, if he had known of the maſſacre in France, or the powder-treaſon of England? He would have been ſeven times more epicure and atheiſt than he was: for as the temporal ſword is to be drawn with great circumſpection, in caſes of religion; ſo it is a thing monſtrous to put it into the hands of the common people. Let that be left unto the anabaptiſts, and other furies. It was great blaſphemy, when the devil ſaid, *I will aſcend and be like the Higheſt*; but it is greater blaſphemy to perſonate God, and bring him in ſaying, "I will deſcend, and be like the prince of "darkneſs." And what is it better to make the cauſe of religion to deſcend to the cruel and execrable actions of murthering princes, butchery of people, and ſubverſion of ſtates and governments? Surely, this is to bring down the Holy Ghoſt, inſtead of the likeneſs of a dove, in the ſhape of a vulture or raven: and to ſet, out of the bark of a chriſtian church, a flag of a bark of pirates and aſſaſſins. Therefore it is moſt neceſſary, that the church by doctrine and decree; princes by their ſword; and all learnings both chriſtian and moral, as by their mercury rod; do damn and ſend to hell for ever thoſe facts and opinions, tending to the ſupport of the ſame; as hath been already in good part done. Surely in counſels concerning religion, that counſel of the apoſtle ſhould be prefixed; *Ira hominis non implet juſtitiam Dei.* And it was a notable obſervation of a wiſe father, and no leſs ingenuouſly confeſſed; That thoſe which held and perſuaded preſſure of conſciences, were commonly intereſted therein themſelves for their own ends.

IV. *Of* Revenge.

REVENGE is a kind of wild juſtice, which the more man's nature runs to, the more ought law to weed it out. For as for the firſt wrong, it doth but offend the law; but the revenge of that wrong putteth the law out of office. Certainly in taking revenge, a man is but even with his enemy; but in paſſing it over, he is ſuperior: for it is a prince's part to pardon. And Solomon, I am ſure, ſaith, *It is the glory of a man to paſs by an offence.* That which is paſt is gone and irrevocable, and wiſe men have enough to do with things preſent and to come: therefore they do but triſle with themſelves that labour in paſt matters. There is no man doth a wrong for the wrong's ſake; but thereby to purchaſe himſelf profit, or pleaſure, or honour, or the like. Therefore why ſhould I be angry with a man for loving himſelf better than me? And if any man ſhould do wrong, merely out of ill nature, why? yet it is but like the thorn or brier, which prick and ſcratch, becauſe they can do no other. The moſt tolerable ſort of revenge is for thoſe wrongs which there is no law to remedy: but then let a man take heed the revenge be ſuch as there is no law to puniſh; elſe a man's enemy is ſtill beforehand, and it is two for one. Some, when they take revenge, are deſirous the party ſhould know whence it cometh: this is the more generous. For the delight ſeemeth to be not ſo much in doing the hurt, as in making the party repent: but baſe and crafty cowards are like the arrow that flieth in the dark. Coſmus, duke of Florence, had a deſperate ſaying againſt perfidious or neglecting friends, as if thoſe wrongs were unpardonable. "You ſhall read, ſaith he, that we "are commanded to forgive our enemies; but you never read, that we are command-

" ed to forgive our friends." But yet the ſpirit of Job was in a better tune; *Shall we*, ſaith he, *take good at God's hands, and not be content to take evil alſo?* And ſo of friends in a proportion. This is certain, that a man that ſtudieth revenge, keeps his own wounds green, which otherwiſe would heal, and do well. Public revenges are for the moſt part fortunate; as that for the death of Cæſar; for the death of Pertinax; for the death of Henry the third of France; and many more; but in private revenges it is not ſo; nay rather, vindictive perſons live the life of witches; who as they are miſchievous, ſo end they unfortunate.

V. *Of* Adversity.

IT was an high ſpeech of Seneca, after the manner of the Stoics, that the good things which belong to proſperity are to be wiſhed, but the good things that belong to adverſity are to be admired: *Bona rerum ſecundarum optabilia, adverſarum mirabilia.* Certainly if miracles be the command over nature, they appear moſt in adverſity. It is yet a higher ſpeech of his than the other much too high for a heathen, It is true greatneſs to have in one the frailty of a man, and the ſecurity of a God: *Vere magnum, habere fragilitatem hominis, ſecuritatem Dei.* This would have done better in poeſy, where tranſcendencies are more allowed. And the poets indeed have been buſy with it; for it is in effect the thing which is figured in that ſtrange fiction of the ancient poets, which ſeemeth not to be without myſtery; nay, and to have ſome approach to the ſtate of a Chriſtian: that Hercules, when he went to unbind Prometheus, by whom human nature is repreſented, ſailed the length of the great ocean in an earthen pot or pitcher; lively deſcribing chriſtian reſolution, that ſaileth in the frail bark of the fleſh through the waves of the world. But to ſpeak in a mean: the virtue of proſperity, is temperance; the virtue of adverſity, is fortitude; which in morals is the more heroical virtue. Proſperity is the bleſſing of the Old Teſtament; adverſity is the bleſſing of the New, which carrieth the greater benediction, and the clearer revelation of God's favour. Yet, even in the Old Teſtament, if you liſten to David's harp, you ſhall hear as many herſe-like airs as carols: and the pencil of the Holy Ghoſt hath laboured more in deſcribing the afflictions of Job than the felicities of Solomon. Proſperity is not without many fears and diſtaſtes; and adverſity is not without comforts and hopes. We ſee in needle-works and embroideries, it is more pleaſing to have a lively work upon a ſad and ſolemn ground, than to have a dark and melancholy work upon a lightſome ground: judge therefore of the pleaſure of the heart by the pleaſure of the eye. Certainly virtue is like precious odours, moſt fragrant when they are incenſed, or cruſhed; for proſperity doth beſt diſcover vice, but adverſity doth beſt diſcover virtue.

VI. *Of* Simulation *and* Dissimulation.

DISSIMULATION is but a faint kind of policy, or wiſdom; for it aſketh a ſtrong wit, and a ſtrong heart, to know when to tell truth, and to do it. Therefore it is the weaker ſort of politicians that are the great diſſemblers.

Tacitus ſaith, Livia ſorted well with the arts of her huſband, and diſſimulation of her ſon; attributing arts or policy to Auguſtus, and diſſimulation to Tiberius. And again, when Mucianus encourageth Veſpaſian to take arms againſt Vitellius, he ſaith; We riſe not againſt the piercing judgment of Auguſtus, nor the extreme caution or cloſeneſs of Tiberius. Theſe properties of arts or policy, and diſſimulation or cloſeneſs, are

are indeed habits and faculties ſeveral, and to be diſtinguiſhed. For if a man have that penetration of judgment as he can diſcern what things are to be laid open, and what to be ſecreted, and what to be ſhewed at half lights, and to whom and when, which indeed are arts of ſtate, and arts of life, as Tacitus well calleth them, to him a habit of diſſimulation is a hindrance and a poorneſs. But if a man cannot obtain to that judgment, then it is left to him, generally to be cloſe and a diſſembler. For where a man cannot chooſe, or vary in particulars, there it is good to take the ſafeſt and warieſt way in general; like the going ſoftly by one that cannot well ſee. Certainly the ableſt men that ever were, have had all an openneſs and frankneſs of dealing, and a name of certainty and veracity; but then they were like horſes well managed; for they could tell paſſing well when to ſtop or turn: and at ſuch times, when they thought the caſe indeed required diſſimulation, if then they uſed it, it came to paſs, that the former opinion ſpread abroad of their good faith and clearneſs of dealing made them almoſt inviſible.

There be three degrees of this hiding and veiling of a man's ſelf. The firſt, cloſeneſs, reſervation, and ſecrecy, when a man leaveth himſelf without obſervation, or without hold to be taken, what he is. The ſecond, diſſimulation in the negative, when a man lets fall ſigns and arguments, that he is not that he is. And the third, ſimulation in the affirmative, when a man induſtriouſly and expreſly feigns and pretends to be that he is not.

For the firſt of theſe, ſecrecy; it is indeed the virtue of a confeſſor; and aſſuredly the ſecret man heareth many confeſſions; for who will open himſelf to a blab or a babler? but if a man be thought ſecret, it inviteth diſcovery; as the more cloſe air ſucketh in the more open: and as in confeſſion the revealing is not for worldly uſe, but for the eaſe of a man's heart; ſo ſecret men come to knowledge of many things in that kind; while men rather diſcharge their minds, than impart their minds. In few words, myſteries are due to ſecrecy. Beſides, to ſay truth, nakedneſs is uncomely as well in mind as body; and it addeth no ſmall reverence to mens manners and actions if they be not altogether open. As for talkers and futile perſons, they are commonly vain and credulous withal. For he that talketh what he knoweth, will alſo talk what he knoweth not. Therefore ſet it down, that an habit of ſecrecy is both politic and moral. And in this part it is good that a man's face give his tongue leave to ſpeak. For the diſcovery of a man's ſelf by the tracts of his countenance is a great weakneſs and betraying; by how much it is many times more marked and believed than a man's words.

For the ſecond, which is diſſimulation; it followeth many times upon ſecrecy, by a neceſſity: ſo that he that will be ſecret muſt be a diſſembler in ſome degree. For men are too cunning to ſuffer a man to keep an indifferent carriage between both, and to be ſecret, without ſwaying the balance on either ſide. They will ſo beſet a man with queſtions, and draw him on, and pick it out of him, that, without an abſurd ſilence, he muſt ſhew an inclination one way; or if he do not, they will gather as much by his ſilence as by his ſpeech. As for equivocations or oraculous ſpeeches, they cannot hold out long. So that no man can be ſecret, except he give himſelf a little ſcope of diſſimulation; which is as it were but the ſkirts or train of ſecrecy.

But for the third degree, which is ſimulation and falſe profeſſion; that I hold more culpable and leſs politic, except it be in great and rare matters. And therefore a general cuſtom of ſimulation, which is this laſt degree, is a vice riſing either of a natural falſeneſs or fearfulneſs; or of a mind that hath ſome main faults; which becauſe a man

man muſt needs diſguiſe, it maketh them practiſe ſimulation in other things; leſt his hand ſhould be out of uſe.

The great advantages of ſimulation and diſſimulation are three. Firſt, to lay aſleep oppoſition, and to ſurpriſe. For where a man's intentions are publiſhed, it is an alarm to call up all that are againſt them. The ſecond is, to reſerve to a man's ſelf a fair retreat: for if a man engage himſelf by a manifeſt declaration, he muſt go through or take a fall. The third is, the better to diſcover the mind of another. For to him that opens himſelf, men will hardly ſhew themſelves adverſe; but will fairly let him go on, and turn their freedom of ſpeech to freedom of thought. And therefore it is a good ſhrewd proverb of the Spaniard, Tell a lye, and find a truth. As if there were no way of diſcovery but by ſimulation. There be alſo three diſadvantages to ſet it even. The firſt, that ſimulation and diſſimulation commonly carry with them a ſhew of fearfulneſs, which in any buſineſs doth ſpoil the feathers of round flying up to the mark. The ſecond, that it puzzleth and perplexeth the conceits of many, that perhaps would otherwiſe co-operate with him; and makes a man walk, almoſt alone, to his own ends. The third and greateſt is, that it depriveth a man of one of the moſt principal inſtruments for action; which is truſt and belief. The beſt compoſition and temperature is, to have openneſs in fame and opinion; ſecrecy in habit; diſſimulation in ſeaſonable uſe; and a power to feign, if there be no remedy.

VII. *Of* PARENTS *and* CHILDREN.

THE joys of parents are ſecret; and ſo are their griefs and fears: they cannot utter the one, nor they will not utter the other. Children ſweeten labours; but they make misfortunes more bitter: they increaſe the cares of life, but they mitigate the remembrance of death. The perpetuity by generation is common to beaſts; but memory, merit, and noble works, are proper to men: and ſurely a man ſhall ſee the nobleſt works and foundations have proceeded from childleſs men; which have ſought to expreſs the images of their minds, where thoſe of their bodies have failed: ſo the care of poſterity is moſt in them that have no poſterity. They that are the firſt raiſers of their houſes, are moſt indulgent towards their children; beholding them as the continuance, not only of their kind, but of their work; and ſo both children and creatures.

The difference in affection of parents towards their ſeveral children is many times unequal; and ſometimes unworthy; eſpecially in the mother; as Solomon ſaith, *A wiſe ſon rejoiceth the father; but an ungracious ſon ſhames the mother.* A man ſhall ſee, where there is a houſe full of children, one or two of the eldeſt reſpected, and the youngeſt made wantons; but in the midſt, ſome that are as it were forgotten, who many times nevertheleſs prove the beſt. The illiberality of parents in allowance towards their children, is an harmful error; makes them baſe; acquaints them with ſhifts; makes them ſort with mean company; and makes them ſurfeit more when they come to plenty: and therefore the proof is beſt when men keep their authority towards their children, but not their purſe. Men have a fooliſh manner, both parents, and ſchoolmaſters, and ſervants, in creating and breeding an emulation between brothers during childhood, which many times ſorteth to diſcord when they are men, and diſturbeth families. The Italians make little difference between children and nephews, or near kinſfolks; but ſo they be of the lump they care not, though they paſs not through

through their own body. And, to ſay truth, in nature it is much a like matter; inſomuch that we ſee a nephew ſometimes reſembleth an uncle, or a kinſman, more than his own parent; as the blood happens. Let parents chooſe betimes the vocations and courſes they mean their children ſhould take; for then they are moſt flexible; and let them not too much apply themſelves to the diſpoſition of their children, as thinking they will take beſt to that which they have moſt mind to. It is true, that if the affection or aptneſs of the children be extraordinary, then it is good not to croſs it; but generally the precept is good, *Optimum elige, ſuave et facile illud faciet conſuetudo.* Younger brothers are commonly fortunate, but ſeldom or never where the elder are diſinherited.

VIII. *Of* Marriage *and* Single Life.

He that hath wife and children, hath given hoſtages to fortune; for they are impediments to great enterpriſes, either of virtue or miſchief. Certainly the beſt works and of greateſt merit for the public, have proceeded from the unmarried or childleſs men; which both in affection and means have married and endowed the public. Yet it were great reaſon, that thoſe that have children ſhould have greateſt care of future times; unto which they know they muſt tranſmit their deareſt pledges. Some there are, who though they lead a ſingle life, yet their thoughts do end with themſelves, and account future times impertinences. Nay, there are ſome other, that account wife and children but as bills of charges. Nay more, there are ſome fooliſh rich covetous men, that take a pride in having no children, becauſe they may be thought ſo much the richer. For perhaps they have heard ſome talk, Such a one is a great rich man; and another except to it, Yea, but he hath a great charge of children: as if it were an abatement to his riches. But the moſt ordinary cauſe of a ſingle life is liberty, eſpecially in certain ſelf-pleaſing and humourous minds, which are ſo ſenſible of every reſtraint, as they will go near to think their girdles and garters to be bonds and ſhackles. Unmarried men are beſt friends, beſt maſters, beſt ſervants, but not always beſt ſubjects; for they are light to run away; and almoſt all fugitives are of that condition. A ſingle life doth well with churchmen: for charity will hardly water the ground, where it muſt firſt fill a pool. It is indifferent for judges and magiſtrates: for if they be facile and corrupt, you ſhall have a ſervant five times worſe than a wife. For ſoldiers, I find the generals commonly, in their hortatives, put men in mind of their wives and children. And I think the deſpiſing of marriage amongſt the Turks, maketh the vulgar ſoldiers more baſe. Certainly, wife and children are a kind of diſcipline of humanity: and ſingle men, though they be many times more charitable, becauſe their means are leſs exhauſted; yet on the other ſide, they are more cruel and hard-hearted, good to make ſevere inquiſitors, becauſe their tenderneſs is not ſo oft called upon. Grave natures, led by cuſtom, and therefore conſtant, are commonly loving huſbands; as was ſaid of Ulyſſes, *vetulam ſuam praetulit immortalitati.* Chaſte women are often proud and froward, as preſuming upon the merit of their chaſtity. It is one of the beſt bonds, both of chaſtity and obedience, in the wife, if ſhe think her huſband wiſe; which ſhe will never do if ſhe find him jealous. Wives are young mens miſtreſſes; companions for middle age; and old mens nurſes. So as a man may have a quarrel to marry when he will. But yet he was reputed one of the wiſe men, that made anſwer to the queſtion, when a man ſhould marry? "A young man not yet, an elder man not at all." It is often ſeen, that bad huſbands have very good wives; whether

ther it be, that it raiſeth the price of their huſbands kindneſs when it comes; or that the wives take a pride in their patience. But this never fails if the bad huſbands were of their own chooſing, againſt their friends conſent; for then they will be ſure to make good their own folly.

IX. *Of* Envy.

THERE be none of the affections which have been noted to faſcinate or bewitch, but love and envy. They both have vehement wiſhes; they frame themſelves readily into imaginations and ſuggeſtions: and they come eaſily into the eye; eſpecially upon the preſence of the objects; which are the points that conduce to faſcination, if any ſuch thing there be. We ſee likewiſe, the Scripture calleth envy an *evil eye*: and the aſtrologers call the evil influences of the ſtars, evil aſpects; ſo that ſtill there ſeemeth to be acknowledged in the act of envy, an ejaculation, or irradiation of the eye. Nay, ſome have been ſo curious, as to note, that the times when the ſtroke or percuſſion of an envious eye doth moſt hurt, are, when the party envied is beheld in glory or triumph; for that ſets an edge upon envy: and beſides, at ſuch times, the ſpirits of the perſon envied do come forth moſt into the outward parts, and ſo meet the blow.

But leaving theſe curioſities, though not unworthy to be thought on in fit place, we will handle, what perſons are apt to envy others; what perſons are moſt ſubject to be envied themſelves; and what is the difference between public and private envy.

A man that hath no virtue in himſelf, ever envieth virtue in others. For mens minds will either feed upon their own good, or upon others evil; and who wanteth the one, will prey upon the other: and whoſo is out of hope to attain another's virtue, will ſeek to come at even hand by depreſſing another's fortune.

A man that is buſy and inquiſitive, is commonly envious: for to know much of other mens matters cannot be, becauſe all that ado may concern his own eſtate: therefore it muſt needs be, that he taketh a kind of play-pleaſure in looking upon the fortunes of others; neither can he that mindeth but his own buſineſs find much matter for envy. For envy is a gadding paſſion, and walketh the ſtreets, and doth not keep at home: *Non eſt curioſus, quin idem ſit malevolus.*

Men of noble birth are noted to be envious towards new men when they riſe: for the diſtance is altered; and it is like a deceit of the eye, that when others come on, they think themſelves go back.

Deformed perſons and eunuchs, and old men and baſtards, are envious: for he that cannot poſſibly mend his own caſe, will do what he can to impair another's; except theſe defects light upon a very brave and heroical nature, which thinketh to make his natural wants part of his honour; in that it ſhould be ſaid, that an eunuch or a lame man did ſuch great matters; affecting the honour of a miracle; as it was in Narſes the eunuch, and Ageſilaus and Tamerlane, that were lame men.

The ſame is the caſe of men that riſe after calamities and misfortunes; for they are as men fallen out with the times; and think other mens harms a redemption of their own ſufferings.

They that deſire to excel in too many matters, out of levity and vainglory, are ever envious, for they cannot want work; it being impoſſible but many, in ſome one

one of thoſe things, ſhould ſurpaſs them. Which was the character of Adrian the emperor, that mortally envied poets, and painters, and artificers, in works wherein he had a vein to excel.

Laſtly, near kinsfolks, and fellows in office, and thoſe that have been bred together, are more apt to envy their equals when they are raiſed. For it doth upbraid unto them their own fortunes and pointeth at them, and cometh oftener into their remembrance, and incurreth likewiſe more into the note of others; and envy ever redoubleth from ſpeech and fame. Cain's envy was the more vile and malignant towards his brother Abel, becauſe, when his ſacrifice was better accepted, there was no body to look on. Thus much for thoſe that are apt to envy.

Concerning thoſe that are more or leſs ſubject to envy: Firſt, perſons of eminent virtue, when they are advanced, are leſs envied. For their fortune ſeemeth but due unto them; and no man envieth the payment of a debt, but rewards, and liberality rather. Again, envy is ever joined with the comparing of a man's ſelf; and where there is no compariſon, no envy; and therefore kings are not envied but by kings. Nevertheleſs it is to be noted, that unworthy perſons are moſt envied at their firſt coming in, and afterwards overcome it better; whereas contrariwiſe, perſons of worth and merit are moſt envied when their fortune continueth long. For by that time, though their virtue be the ſame, yet it hath not the ſame luſtre; for freſh men grow up that darken it.

Perſons of noble blood are leſs envied in their riſing; for it ſeemeth but right done to their birth: beſides, there ſeemeth not much added to their fortune; and envy is as the ſun-beams, that beat hotter upon a bank or ſteep riſing ground than upon a flat. And for the ſame reaſon, thoſe that are advanced by degrees, are leſs envied than thoſe that are advanced ſuddenly, and *per ſaltum*.

Thoſe that have joined with their honour, great travels, cares, or perils, are leſs ſubject to envy: for men think that they earn their honours hardly, and pity them ſometimes; and pity ever healeth envy: wherefore you ſhall obſerve that the more deep and ſober ſort of politic perſons, in their greatneſs, are ever bemoaning themſelves what a life they lead, chanting a *Quanta patimur*: not that they feel it ſo, but only to abate the edge of envy. But this is to be underſtood of buſineſs that is laid upon men, and not ſuch as they call unto themſelves: for nothing increaſeth envy more, than an unneceſſary and ambitious ingroſſing of buſineſs: and nothing doth extinguiſh envy more, than for a great perſon to preſerve all other inferior officers in their full rights and preeminences of their places: for by that means there be ſo many ſcreens between him and envy.

Above all, thoſe are moſt ſubject to envy, which carry the greatneſs of their fortunes in an inſolent and proud manner; being never well but while they are ſhewing how great they are, either by outward pomp, or by triumphing over all oppoſition or competition: whereas wiſe men will rather do ſacrifice to envy, in ſuffering themſelves ſometimes of purpoſe to be croſſed and overborn in things that do not much concern them. Notwithſtanding, ſo much is true; that the carriage of greatneſs in a plain and open manner, ſo it be without arrogancy and vainglory, doth draw leſs envy, than if it be in a more crafty and cunning faſhion. For in that courſe a man doth but diſavow fortune, and ſeemeth to be conſcious of his own want in worth, and doth but teach others to envy him.

Laſtly, to conclude this part; as we ſaid in the beginning, that the act of envy had ſomewhat in it of witchcraft, ſo there is no other cure of envy, but the cure

of witchcraft: and that is, to remove the lot, as they call it, and to lay it upon another. For which purpoſe, the wiſer ſort of great perſons bring in ever upon the ſtage ſomebody upon whom to derive the envy that would come upon themſelves; ſometimes upon miniſters and ſervants; ſometimes upon collegues and aſſociates, and the like: and for that turn, there are never wanting ſome perſons of violent and undertaking natures, who, ſo they may have power and buſineſs, will take it at any coſt.

Now to ſpeak of public envy. There is yet ſome good in public envy, whereas in private there is none. For public envy is as an oſtraciſm, that eclipſeth men when they grow too great: and therefore it is a bridle alſo to great ones, to keep them within bounds.

This envy, being in the Latin word *invidia*, goeth in the modern languages by the name of diſcontentment; of which we ſhall ſpeak in handling ſedition. It is a diſeaſe in a ſtate like to infection: for as infection ſpreadeth upon that which is ſound, and tainteth it; ſo when envy is gotten once into a ſtate, it traduceth even the beſt actions thereof, and turneth them into an ill odour; and therefore there is little won by intermingling of plauſible actions: for that doth argue but a weakneſs and fear of envy, which hurteth ſo much the more; as it is likewiſe uſual in infections, which if you fear them, you call them upon you.

This public envy ſeemeth to beat chiefly upon principal officers or miniſters, rather than upon kings and eſtates themſelves. But this is a ſure rule, that if the envy upon the miniſter be great, when the cauſe of it in him is ſmall; or if the envy be general in a manner upon all the miniſters of an eſtate, then the envy, though hidden, is truly upon the ſtate itſelf. And ſo much of public envy or diſcontentment, and the difference thereof from private envy, which was handled in the firſt place.

We will add this in general touching the affection of envy; that of all other affections, it is the moſt importunate and continual: for of other affections there is occaſion given but now and then; and therefore it is well ſaid, *Invidia feſtos dies non agit:* for it is ever working upon ſome or other. And it is alſo noted, that love and envy do make a man pine, which other affections do not, becauſe they are not ſo continual. It is alſo the vileſt affection, and the moſt depraved; for which cauſe it is the proper attribute of the devil, who is called, *the envious man, that ſoweth tares amongſt the wheat by night:* as it always cometh to paſs, that envy worketh ſubtilly and in the dark; and to the prejudice of good things, ſuch as is the wheat.

X. *Of* Love.

THE ſtage is more beholden to love, than the life of man. For as to the ſtage, love is ever matter of comedies, and now and then of tragedies; but in life it doth much miſchief, ſometimes like a ſiren, ſometimes like a fury. You may obſerve, that amongſt all the great and worthy perſons, whereof the memory remaineth, either ancient or recent, there is not one that hath been tranſported to the mad degree of love; which ſhews, that great ſpirits and great buſineſs do keep out this weak paſſion. You muſt except nevertheleſs Marcus Antonius the partner of the empire of Rome, and Appius Claudius the decemvir and lawgiver; whereof the former was indeed a voluptuous man and inordinate; but the latter

was

was an auſtere and wiſe man: and therefore it ſeems, though rarely, that love can find entrance, not only into an open heart, but alſo into a heart well fortified, if watch be not well kept. It is a poor ſaying of Epicurus; *Satis magnum alter alteri theatrum ſumus:* as if man, made for the contemplation of heaven, and all noble objects, ſhould do nothing but kneel before a little idol, and make himſelf the ſubject though not of the mouth, as beaſts are, yet of the eye, which was given him for higher purpoſes. It is a ſtrange thing to note the exceſs of this paſſion; and how it braves the nature and value of things by this, that the ſpeaking in a perpetual hyperbole is comely in nothing but in love. Neither is it merely in the phraſe; for whereas it hath been well ſaid, that the arch flatterer, with whom all the petty flatterers have intelligence, is a man's ſelf; certainly the lover is more. For there was never proud man thought ſo abſurdly well of himſelf, as the lover doth of the perſon loved; and therefore it was well ſaid, that it is impoſſible to love, and to be wiſe. Neither doth this weakneſs appear to others only, and not to the party loved, but to the loved moſt of all; except the love be reciprocal. For it is a true rule, that love is ever rewarded either with the reciprocal, or with an inward and ſecret contempt: by how much the more men ought to beware of this paſſion, which loſeth not only other things, but itſelf. As for the other loſſes, the poet's relation doth well figure them; that he that preferred Helena, quitted the gifts of Juno and Pallas: for whoſoever eſteemeth too much of amorous affection, quitted both riches and wiſdom. This paſſion hath its floods in the very times of weakneſs, which are great proſperity, and great adverſity; though this latter hath been leſs obſerved: both which times kindle love, and make it more fervent, and therefore ſhew it to be the child of folly. They do beſt, who, if they cannot but admit love, yet make it keep quarter; and ſever it wholly from their ſerious affairs and actions of life: for if it check once with buſineſs, it troubleth mens fortunes, and maketh men that they can no ways be true to their own ends. I know not how, but martial men are given to love: I think it is, but as they are given to wine; for perils commonly aſk to be paid in pleaſures. There is in man's nature a ſecret inclination and motion towards love of others, which, if it be not ſpent upon ſome one or a few, doth naturally ſpread itſelf towards many, and maketh men become humane and charitable; as it is ſeen ſometimes in friers. Nuptial love maketh mankind; friendly love perfecteth it; but wanton love corrupteth and embaſeth it.

XI. *Of* Great Place.

MEN in great place are thrice ſervants; ſervants of the ſovereign or ſtate; ſervants of fame; and ſervants of buſineſs: ſo as they have no freedom, neither in their perſons, nor in their actions, nor in their times. It is a ſtrange deſire, to ſeek power, and to loſe liberty; or to ſeek power over others, and to loſe power over a man's ſelf. The riſing unto place is laborious; and by pains men come to greater pains; and it is ſometimes baſe and by indignities men come to dignities. The ſtanding is ſlippery, and the regreſs is either a downfal, or at leaſt an eclipſe, which is a melancholy thing. *Cum non ſis qui fueris, non eſſe cur velis vivere?* Nay, men cannot retire when they would; neither will they when it were reaſon: but are impatient of privateneſs, even in age and ſickneſs, which require the ſhadow: like old townſmen, that will be ſtill ſitting at their ſtreet door, though thereby they offer age to ſcorn. Certainly great perſons had need to borrow other mens opinions to

think themſelves happy; for if they judge by their own feeling, they cannot find it; but if they think with themſelves what other men think of them, and that other men would fain be as they are, then they are happy as it were by report, when perhaps they find the contrary within. For they are the firſt that find their own griefs; though they be the laſt that find their own faults. Certainly men in great fortunes are ſtrangers to themſelves, and while they are in the puzzle of buſineſs, they have no time to tend their health either of body or mind. *Illi mors gravis incubat, qui notus nimis omnibus, ignotus moritur ſibi.* In place there is licence to do good and evil; whereof the latter is a curſe; for in evil the beſt condition is not to will; the ſecond not to can. But power to do good is the true and lawful end of aſpiring. For good thoughts, though God accept them, yet towards men are little better than good dreams, except they be put in act; and that cannot be without power and place; as the vantage and commanding ground. Merit and good works is the end of man's motion; and conſcience of the ſame is the accompliſhment of man's reſt. For if a man can be partaker of God's theatre, he ſhall likewiſe be partaker of God's reſt. *Et converſus Deus, ut aſpiceret opera, quae fecerunt manus ſuae, vidit quod omnia eſſent bona nimis*; and then the ſabbath. In the diſcharge of thy place, ſet before thee the beſt examples; for imitation is a globe of precepts. And after a time ſet before thee thine own example; and examine thyſelf ſtrictly, whether thou didſt not beſt at firſt. Neglect not alſo the examples of thoſe, that have carried themſelves ill in the ſame place: not to ſet off thyſelf by taxing their memory; but to direct thyſelf what to avoid. Reform therefore, without bravery or ſcandal of former times and perſons; but yet ſet it down to thyſelf, as well to create good precedents, as to follow them. Reduce things to the firſt inſtitution, and obſerve wherein and how they have degenerated; but yet aſk counſel of both times: of the ancient time what is beſt; and of the latter time what is fitteſt. Seek to make thy courſe regular; that men may know beforehand what they may expect: but be not too poſitive and peremptory; and expreſs thyſelf well when thou digreſſeſt from thy rule. Preſerve the right of thy place, but ſtir not queſtions of juriſdiction: and rather aſſume thy right in ſilence, and *de facto*, than voice it with claims and challenges. Preſerve likewiſe the rights of inferior places; and think it more honour to direct in chief, than to be buſy in all. Embrace and invite helps and advices touching the execution of thy place; and do not drive away ſuch as bring thee information, as medlers, but accept of them in good part. The vices of authority are chiefly four; delays, corruption, roughneſs, and facility. For delays; give eaſy acceſs; keep times appointed; go through with that which is in hand; and interlace not buſineſs but of neceſſity. For corruption; do not only bind thine own hands, or thy ſervants hands, from taking, but bind the hands of ſuitors alſo from offering. For integrity uſed doth the one; but integrity profeſſed, and with a manifeſt deteſtation of bribery, doth the other: and avoid not only the fault, but the ſuſpicion. Whoſoever is found variable, and changeth manifeſtly without manifeſt cauſe, giveth ſuſpicion of corruption. Therefore always when thou changeſt thine opinion or courſe, profeſs it plainly, and declare it, together with the reaſons that move thee to change: and do not think to ſteal it. A ſervant, or a favourite, if he be inward, and no other apparent cauſe of eſteem, is commonly thought but a by-way to cloſe corruption. For roughneſs; it is a needleſs cauſe of diſcontent; ſeverity breedeth fear, but roughneſs breedeth hate. Even reproofs from authority ought to be grave, and not taunting. As for facility, it is worſe than bribery. For bribes come but now and then; but if importunity

tunity or idle reſpects lead a man, he ſhall never be without. As Solomon ſaith; *to reſpect perſons is not good; for ſuch a man will tranſgreſs for a piece of bread.* It is moſt true what was anciently ſpoken, A place ſheweth the man: and it ſheweth ſome to the better, and ſome to the worſe; *omnium conſenſu, capax imperii, niſi imperaſſet*, ſaith Tacitus of Galba: but of Veſpaſian he ſaith; *ſolus imperantium Veſpaſianus mutatus in melius.* Though the one was meant of ſufficiency, the other of manners and affection. It is an aſſured ſign of a worthy and generous ſpirit, whom honour amends. For honour is or ſhould be the place of virtue: and as in nature things move violently to their place, and calmly in their place; ſo virtue in ambition is violent, in authority ſettled and calm. All riſing to great place is by a winding ſtair; and if there be factions, it is good to ſide a man's ſelf whilſt he is in the riſing; and to balance himſelf when he is placed. Uſe the memory of thy predeceſſor fairly and tenderly; for if thou doſt not, it is a debt will ſurely be paid when thou art gone. If thou have collegues, reſpect them, and rather call them when they look not for it, than exclude them when they have reaſon to look to be called. Be not too ſenſible, or too remembring of thy place in converſation, and private anſwers to ſuitors; but let it rather be ſaid, When he ſits in place he is another man.

XII. *Of* Boldness.

IT is a trivial grammar ſchool text, but yet worthy a wiſe man's conſideration. Queſtion was aſked of Demoſthenes, what was the chief part of an orator? He anſwered, Action. What next? Action. What next again? Action. He ſaid it that knew it beſt; and had by nature himſelf no advantage in that he commended. A ſtrange thing, that that part of an orator, which is but ſuperficial, and rather the virtue of a player, ſhould be placed ſo high above thoſe other noble parts of invention, elocution, and the reſt: nay almoſt alone, as if it were all in all. But the reaſon is plain. There is in human nature generally, more of the fool than of the wiſe; and therefore thoſe faculties by which the fooliſh part of mens minds is taken, are moſt potent. Wonderful like is the caſe of boldneſs in civil buſineſs; what firſt? Boldneſs. What ſecond and third? Boldneſs. And yet boldneſs is a child of ignorance and baſeneſs, far inferior to other parts. But nevertheleſs it doth faſcinate, and bind hand and foot thoſe that are either ſhallow in judgment or weak in courage, which are the greateſt part; yea, and prevaileth with wiſe men at weak times: therefore we ſee it hath done wonders in popular ſtates, but with ſenates and princes leſs; and more ever upon the firſt entrance of bold perſons into action, than ſoon after; for boldneſs is an ill keeper of promiſe. Surely, as there are mountebanks for the natural body, ſo there are mountebanks for the politic body: men that undertake great cures, and perhaps have been lucky in two or three experiments, but want the grounds of ſcience, and therefore cannot hold out: nay, you ſhall ſee a bold fellow many times do Mahomet's miracle. Mahomet made the people believe that he would call an hill to him, and from the top of it offer up his prayers for the obſervers of his law. The people aſſembled: Mahomet called the hill to come to him again and again; and when the hill ſtood ſtill he was never a whit abaſhed, but ſaid, "If "the hill will not come to Mahomet, Mahomet will go to the hill." So theſe men, when they have promiſed great matters, and failed moſt ſhamefully, yet, if they have the perfection of boldneſs, they will but ſlight it over, and make a turn, and no more ado. Certainly to men of great judgment bold perſons are a ſport to behold;

behold; nay, and to the vulgar alſo boldneſs hath ſomewhat of the ridiculous: for if abſurdity be the ſubject of laughter, doubt you not but great boldneſs is ſeldom without ſome abſurdity: eſpecially it is a ſport to ſee when a bold fellow is out of countenance, for that puts his face into a moſt ſhrunken and wooden poſture, as needs it muſt; for in baſhfulneſs the ſpirits do a little go and come; but with bold men, upon like occaſion, they ſtand at a ſtay; like a ſtale at cheſs, where it is no mate, but yet the game cannot ſtir: but this laſt were fitter for a ſatire, than for a ſerious obſervation. This is well to be weighed, that boldneſs is ever blind; for it ſeeth not dangers and inconveniencies: therefore it is ill in counſel, good in execution: ſo that the right uſe of bold perſons is, that they never command in chief, but be ſeconds, and under the direction of others. For in counſel, it is good to ſee dangers; and in execution not to ſee them, except they be very great.

XIII. *Of* Goodness, *and* Goodness of Nature.

I Take goodneſs in this ſenſe, the affecting of the weal of men, which is what the Grecians called *philanthropia*; and the word humanity, as it is uſed, is a little too light to expreſs it. Goodneſs I call the habit, and goodneſs of nature the inclination. This of all virtues and dignities of the mind is the greateſt, being the character of the Deity; and without it man is a buſy, miſchievous, wretched thing, no better than a kind of vermin. Goodneſs anſwers to the theological virtue charity, and admits no exceſs but error. The deſire of power in exceſs cauſed the angels to fall; the deſire of knowledge in exceſs cauſed man to fall: but in charity there is no exceſs; neither can angel or man come in danger by it. The inclination to goodneſs is imprinted deeply in the nature of man; inſomuch, that if it iſſue not towards men, it will take unto other living creatures; as it is ſeen in the Turks, a cruel people, who nevertheleſs are kind to beaſts, and give alms to dogs and birds: inſomuch, as Buſbechius reporteth, a chriſtian boy in Conſtantinople had like to have been ſtoned for gagging, in a waggiſhneſs, a long-billed fowl. Errors indeed in this virtue of goodneſs or charity may be committed. The Italians have an ungracious proverb; *Tanto buon che val niente*; So good, that he is good for nothing. And one of the doctors of Italy, Nicholas Machiavel, had the confidence to put in writing, almoſt in plain terms, that the chriſtian faith had given up good men in prey to thoſe that are tyrannical and unjuſt: which he ſpake, becauſe indeed there was never law, or ſect, or opinion, did ſo much magnify goodneſs, as the chriſtian religion doth: therefore to avoid the ſcandal, and the danger both, it is good to take knowledge of the errors of an habit ſo excellent. Seek the good of other men, but be not in bondage to their faces or fancies; for that is but facility or ſoftneſs, which taketh an honeſt mind priſoner. Neither give thou Æſop's cock a gem, who would be better pleaſed, and happier if he had a barley-corn. The example of God teacheth the leſſon truly; *he ſendeth his rain, and maketh his ſun to ſhine upon the juſt and the unjuſt*; but he doth not rain wealth, nor ſhine honour and virtues upon men equally: common benefits are to be communicated with all, but peculiar benefits with choice. And beware, how in making the portraiture thou breakeſt the pattern; for divinity maketh the love of ourſelves the pattern, the love of our neighbours but the portraiture: *Sell all thou haſt, and give it to the poor, and follow me.* But ſell not all thou haſt, except thou come and follow me; that is, except thou have a vocation, wherein thou mayeſt do as much good with little means as with great: for otherwiſe,

otherwiſe, in feeding the ſtreams thou dryeſt the fountain. Neither is there only a habit of goodneſs directed by right reaſon; but there is in ſome men, even in nature, a diſpoſition towards it; as on the other ſide there is a natural malignity. For there be, that in their nature do not affect the good of others. The lighter ſort of malignity turneth but to a croſſneſs, or frowardneſs, or aptneſs to oppoſe, or difficilneſs, or the like; but the deeper ſort to envy, and mere miſchief. Such men, in other mens calamities, are as it were in ſeaſon, and are ever on the loading part; not ſo good as the dogs that licked Lazarus' ſores, but like flies that are ſtill buzzing upon any thing that is raw; *Miſanthropi*, that make it their practice to bring men to the bough, and yet have never a tree for the purpoſe in their gardens, as Timon had. Such diſpoſitions are the very errors of human nature, and yet they are the fitteſt timber to make great politics of; like to knee timber, that is good for ſhips that are ordained to be toſſed, but not for building houſes that ſhall ſtand firm. The parts and ſigns of goodneſs are many. If a man be gracious and courteous to ſtrangers, it ſhews he is a citizen of the world, and that his heart is no iſland cut off from other lands, but a continent that joins to them. If he be compaſſionate towards the afflictions of others, it ſhews that his heart is like the noble tree that is wounded itſelf when it gives the balm. If he eaſily pardons and remits offences, it ſhews that his mind is planted above injuries, ſo that he cannot be ſhot. If he be thankful for ſmall benefits, it ſhews that he weighs mens minds, and not their traſh. But above all, if he have St. Paul's perfection, that he would wiſh to be an *anathema* from Chriſt for the ſalvation of his brethren, it ſhews much of a divine nature, and a kind of conformity with Chriſt himſelf.

XIV. *Of* Nobility.

WE will ſpeak of nobility firſt as a portion of an eſtate, then as a condition of particular perſon. A monarchy, where there is no nobility at all, is ever a pure and abſolute tyranny; as that of the Turks: for nobility attempers ſovereignty, and draws the eyes of the people ſomewhat aſide from the line royal. But for democracies, they need not; and they are commonly more quiet, and leſs ſubject to ſedition, than where there are ſtirps of nobles; for mens eyes are upon the buſineſs, and not upon the perſons: or if upon the perſons, it is for the buſineſs ſake, as fitteſt, and not for flags and pedigree. We ſee the Switzers laſt well, notwithſtanding their diverſity of religion, and of cantons: for utility is their bond, and not reſpects. The United Provinces of the Low Countries, in their government, excel: for where there is an equality, the conſultations are more indifferent, and the payments and tributes more chearful. A great and potent nobility addeth majeſty to a monarch, but diminiſheth power; and putteth life and ſpirit into the people, but preſſeth their fortune. It is well when nobles are not too great for ſovereignty, nor for juſtice; and yet maintained in that height, as the inſolency of inferiors may be broken upon them, before it come on too faſt upon the majeſty of kings. A numerous nobility cauſeth poverty and inconvenience in a ſtate, for it is a ſurcharge of expence; and beſides, it being of neceſſity that many of the nobility fall in time to be weak in fortune, it maketh a kind of diſproportion between honour and means.

As for nobility in particular perſons: it is a reverend thing to ſee an ancient caſtle or building not in decay; or to ſee a fair timber tree ſound and perfect; how much more to behold an ancient noble family, which hath ſtood againſt the waves and weathers

weathers of time? for new nobility is but the act of power, but ancient nobility is the act of time. Thoſe that are firſt raiſed to nobility, are commonly more virtuous, but leſs innocent, than their deſcendents; for there is rarely any riſing, but by a commixture of good and evil arts: but it is reaſon the memory of their virtues remain to their poſterity, and their faults die with themſelves. Nobility of birth commonly abateth induſtry; and he that is not induſtrious, envieth him that is. Beſides, noble perſons cannot go much higher; and he that ſtandeth at a ſtay, when others riſe, can hardly avoid motions of envy. On the other ſide, nobility extinguiſheth the paſſive envy from others towards them, becauſe they are in poſſeſſion of honour. Certainly kings that have able men of their nobility, ſhall find eaſe in employing them, and a better ſlide into their buſineſs: for people naturally bend to them, as born in ſome ſort to command.

XV. *Of* Seditions *and* Troubles.

SHEPHERDS of people had need know the kalendars of tempeſts in ſtate; which are commonly greateſt when things grow to equality; as natural tempeſts are greateſt about the *aequinoctia*. And as there are certain hollow blaſts of wind, and ſecret ſwellings of ſeas, before a tempeſt, ſo are there in ſtates:

Ille etiam caecos inſtare tumultus
Saepe monet, fraudeſque et operta tumeſcere bella.

Libels and licentious diſcourſes againſt the ſtate, when they are frequent and open, and in like ſort falſe news often running up and down to the diſadvantage of the ſtate, and haſtily embraced, are amongſt the ſigns of troubles. Virgil giving the pedigree of Fame, ſaith, ſhe was ſiſter to the giants.

Illam Terra parens, ira irritata deorum,
Extremam, ut perhibent, Coeo Enceladoque ſororem
Progenuit.

As if fames were the relicks of ſeditions paſt: but they are no leſs indeed the preludes of ſeditions to come. Howſoever he noteth it right, that ſeditious tumults and ſeditious fames, differ no more, but as brother and ſiſter, maſculine and feminine; eſpecially if it come to that, that the beſt actions of a ſtate, and the moſt plauſible, and which ought to give greateſt contentment, are taken in ill ſenſe and traduced: for that ſhews the envy great, as Tacitus ſaith; *conflata magna invidia, ſeu bene, ſeu male, geſta premunt.* Neither doth it follow, that becauſe theſe fames are a ſign of troubles, that the ſuppreſſing of them with too much ſeverity ſhould be a remedy of troubles. For the deſpiſing of them many times checks them beſt; and the going about to ſtop them, doth but make a wonder long-lived. Alſo that kind of obedience which Tacitus ſpeaketh of, is to be held ſuſpected; *Erant in officio, ſed tamen qui mallent mandata imperantium interpretari, quam exequi*; diſputing, excuſing, cavilling upon mandates and directions, is a kind of ſhaking off the yoke, and aſſay of diſobedience: eſpecially if in thoſe diſputings they which are for the direction, ſpeak fearfully and tenderly; and thoſe that are againſt it, audaciouſly.

Alſo, as Machiavel noteth well, when princes, that ought to be common parents, make themſelves as a party, and lean to a ſide, it is as a boat that is overthrown by uneven weight on the one ſide: as was well ſeen in the time of Henry the third of France; for firſt, himſelf entered league for the extirpation of the proteſtants; and preſently after the ſame league was turned upon himſelf. For when the authority

rity of princes is made but an acceſſary to a cauſe, and that there be other bands that tie faſter than the band of ſovereignty, kings begin to be put almoſt out of poſſeſſion.

Alſo, when diſcords, and quarrels, and factions, are carried openly and audaciouſly, it is a ſign the reverence of government is loſt. For the motions of the greateſt perſons in a government ought to be as the motions of the planets under *primum mobile*, according to the old opinion; which is, that every one of them is carried ſwiftly by the higheſt motion, and ſoftly in their own motion. And therefore when great ones in their own particular motion move violently, and, as Tacitus expreſſeth it well, *liberius, quam ut imperantium meminiſſent*; it is a ſign the orbs are out of frame. For reverence is that wherewith princes are girt from God, who threatneth the diſſolving thereof; *ſolvam cingula regum.*

So when any of the four pillars of government are mainly ſhaken or weakened, which are religion, juſtice, counſel, and treaſure, men had need to pray for fair weather. But let us paſs from this part of predictions, concerning which, nevertheleſs, more light may be taken from that which followeth, and let us ſpeak firſt of the materials of ſeditions; then of the motives of them; and thirdly of the remedies.

Concerning the materials of ſeditions. It is a thing well to be conſidered; for the ſureſt way to prevent ſeditions, if the times do bear it, is to take away the matter of them. For if there be fuel prepared, it is hard to tell whence the ſpark ſhall come that ſhall ſet it on fire. The matter of ſeditions is of two kinds: much poverty, and much diſcontentment. It is certain, ſo many overthrown eſtates, ſo many votes for troubles. Lucan noteth well the ſtate of Rome before the civil war;

Hinc uſura vorax, rapidumque in tempore foenus,
Hinc concuſſa fides, et multis utile bellum.

This ſame *multis utile bellum* is an aſſured and infallible ſign of a ſtate diſpoſed to ſeditions and troubles. And if this poverty and broken eſtate in the better ſort be joined with a want and neceſſity in the mean people, the danger is imminent and great. For the rebellions of the belly are the worſt. As for diſcontentments, they are in the politic body like to humours in the natural, which are apt to gather a preternatural heat, and to inflame. And let no prince meaſure the danger of them by this; whether they be juſt, or unjuſt; for that were to imagine people to be too reaſonable; who do often ſpurn at their own good: nor yet by this; whether the griefs whereupon they riſe be in fact great or ſmall. For they are the moſt dangerous diſcontentments, where the fear is greater than the feeling. *Dolendi modus, timendi non item.* Beſides, in great oppreſſions, the ſame things that provoke the patience, do withal mate the courage; but in fears it is not ſo. Neither let any prince or ſtate be ſecure concerning diſcontentments, becauſe they have been often, or have been long, and yet no peril hath enſued; for as it is true that every vapour or fume, doth not turn into a ſtorm; ſo it is nevertheleſs true, that ſtorms, though they blow over divers times, yet may fall at laſt; and as the Spaniſh proverb noteth well, the cord breaketh at the laſt by the weakeſt pull.

The cauſes and motives of ſeditions are, innovation in religion, taxes, alteration of laws and cuſtoms, breaking of privileges, general oppreſſion, advancement of unworthy perſons, ſtrangers, dearths, diſbanded ſoldiers, factions grown deſperate; and whatſoever in offending people joineth and knitteth them in a common cauſe.

For the remedies, there may be ſome general preſervatives, whereof we will ſpeak; as for the juſt cure, it muſt anſwer to the particular diſeaſe: and ſo be left to counſel, rather than rule.

The firſt remedy or prevention, is to remove by all means poſſible that material cauſe of ſedition, whereof we ſpake; which is want and poverty in the eſtate. To which purpoſe ſerveth the opening and well balancing of trade; the cheriſhing of manufactures; the baniſhing of idleneſs; the repreſſing of waſte and exceſs by ſumptuary laws; the improvement and huſbanding of the ſoil; the regulating of prices of things vendible; the moderating of taxes and tributes, and the like. Generally it is to be foreſeen, that the population of a kingdom, eſpecially if it be not mown down by wars, do not exceed the ſtock of the kingdom, which ſhould maintain them. Neither is the population to be reckoned only by number: for a ſmaller number, that ſpend more, and earn leſs, do wear out an eſtate ſooner than a greater number that live lower and gather more. Therefore the multiplying of nobility, and other degrees of quality, in an over proportion to the common people, doth ſpeedily bring a ſtate to neceſſity: and ſo doth likewiſe an overgrown clergy; for they bring nothing to the ſtock; and in like manner, when more are bred ſcholars, than preferments can take off.

It is likewiſe to be remembered, that foraſmuch as the increaſe of any eſtate muſt be upon the foreigner, for whatſoever is ſomewhere gotten is ſomewhere loſt, there be but three things which one nation ſelleth unto another; the commodity as nature yieldeth it; the manufacture; and the vecture or carriage. So that if theſe three wheels go, wealth will flow as in a ſpring tide. And it cometh many times to paſs, that *materiam ſuperabit opus*, that the work and carriage is more worth than the material, and enricheth a ſtate more; as is notably ſeen in the Low-Country men, who have the beſt mines above ground in the world.

Above all things good policy is to be uſed, that the treaſure and moneys in a ſtate be not gathered into few hands. For otherwiſe a ſtate may have a great ſtock, and yet ſtarve. And money is like muck, not good except it be ſpread. This is done chiefly by ſuppreſſing, or at the leaſt keeping a ſtrait hand upon the devouring trades of uſury, ingroſſing, great paſturages, and the like.

For removing diſcontentments, or at leaſt the danger of them: there is in every ſtate, as we know, two portions of ſubjects, the nobleſſe, and the commonalty. When one of theſe is diſcontent, the danger is not great; for common people are of ſlow motion, if they be not excited by the greater ſort; and the greater ſort are of ſmall ſtrength, except the multitude be apt and ready to move of themſelves. Then is the danger, when the greater ſort do but wait for the troubling of the waters amongſt the meaner, that then they may declare themſelves. The poets feign, that the reſt of the Gods would have bound Jupiter; which he hearing of, by the counſel of Pallas, ſent for Briareus with his hundred hands to come in to his aid. An emblem, no doubt, to ſhew, how ſafe it is for monarchs to make ſure of the good will of common people.

To give moderate liberty for griefs and diſcontentments to evaporate, ſo it be without too great inſolency or bravery, is a ſafe way. For he that turneth the humours back, and maketh the wound bleed inwards, endangereth malign ulcers and pernicious impoſtumations.

The part of Epimetheus might well become Prometheus, in the caſe of diſcontentments, for there is not a better proviſion againſt them. Epimetheus, when griefs

griefs and evils flew abroad, at laſt ſhut the lid and kept hope in the bottom of the veſſel. Certainly the politic and artificial nouriſhing and entertaining of hopes, and carrying men from hopes to hopes, is one of the beſt antidotes againſt the poiſon of diſcontentments. And it is a certain ſign of a wiſe government and proceeding, when it can hold mens hearts by hopes, when it cannot by ſatisfaction: and when it can handle things in ſuch manner, as no evil ſhall appear ſo peremptory, but that it hath ſome outlet of hope; which is the leſs hard to do, becauſe both particular perſons and factions are apt enough to flatter themſelves, or at leaſt to brave that which they believe not.

Alſo, the foreſight and prevention that there be no likely or fit head, whereunto diſcontented perſons may reſort, and under whom they may join, is a known but an excellent point of caution. I underſtand a fit head to be one that hath greatneſs and reputation; that hath confidence with the diſcontented party, and upon whom they turn their eyes; and that is thought diſcontented in his own particular: which kind of perſons are either to be won and reconciled to the ſtate, and that in a faſt and true manner; or to be confronted with ſome other of the ſame party that may oppoſe them, and ſo divide the reputation. Generally, the dividing and breaking of all factions and combinations that are adverſe to the ſtate, and ſetting them at diſtance, or at leaſt diſtruſt amongſt themſelves, is not one of the worſt remedies. For it is a deſperate caſe, if thoſe that hold with the proceeding of the ſtate, be full of diſcord and faction; and thoſe that are againſt it be entire and united.

I have noted, that ſome witty and ſharp ſpeeches which have fallen from princes, have given fire to ſeditions. Cæſar did himſelf infinite hurt in that ſpeech; *Sylla neſcivit literas, non potuit dictare:* for it did utterly cut off that hope which men had entertained, that he would at one time or other give over his dictatorſhip. Galba undid himſelf by that ſpeech; *Legi à ſe militem, non emi:* for it put the ſoldiers out of hope of the donative. Probus likewiſe by that ſpeech, *Si vixero, non opus erit amplius Romano imperio militibus*; a ſpeech of great deſpair for the ſoldiers: and many the like. Surely princes had need, in tender matters and tickliſh times, to beware what they ſay; eſpecially in theſe ſhort ſpeeches, which fly abroad like darts, and are thought to be ſhot out of their ſecret intentions. For, as for large diſcourſes, they are flat things, and not ſo much noted.

Laſtly, let princes, againſt all events, not be without ſome great perſon, one, or rather more, of military valour near unto them, for the repreſſing of ſeditions in their beginnings. For without that, there uſeth to be more trepidation in court upon the firſt breaking out of troubles, than were fit. And the ſtate runneth the danger of that which Tacitus ſaith, *atque is habitus animorum fuit, ut peſſimum facinus auderent pauci, plures vellent, omnes paterentur.* But let ſuch military perſons be aſſured and well reputed of, rather than factious and popular; holding alſo good correſpondence with the other great men in the ſtate; or elſe the remedy is worſe than the diſeaſe.

XVI. *Of* Atheism.

I Had rather believe all the fables in the Legend, and the Talmud, and the Alcoran, than that this univerſal frame is without a mind. And therefore God never wrought miracle to convince atheiſm, becauſe his ordinary works convince it. It is true, that a little philoſophy inclineth man's mind to atheiſm; but depth in philo-

philoſophy bringeth mens minds about to religion: for while the mind of man looketh upon ſecond cauſes ſcattered, it may ſometimes reſt in them and go no farther; but when it beholdeth the chain of them confederate and linked together, it muſt needs fly to Providence and Deity. Nay even that ſchool which is moſt accuſed of atheiſm, doth moſt demonſtrate religion: that is the ſchool of Leucippus, and Democritus, and Epicurus. For it is a thouſand times more credible, that four mutable elements, and one immutable fifth eſſence duly and eternally placed, need no God; than that an army of infinite ſmall portions, or ſeeds unplaced, ſhould have produced this order and beauty without a divine marſhal. The Scripture ſaith, *The fool hath ſaid in his heart, There is no God:* it is not ſaid, *the fool hath thought in his heart.* So as he rather ſaith it by rote to himſelf, as that he would have, than that he can thoroughly believe it, or be perſuaded of it. For none deny there is a God, but thoſe for whom it maketh that there were no God. It appeareth in nothing more, that atheiſm is rather in the lip than in the heart of man, than by this; that atheiſts will ever be talking of that their opinion, as if they fainted in it within themſelves, and would be glad to be ſtrengthened by the conſent of others: nay more, you ſhall have atheiſts ſtrive to get diſciples, as it fareth with other ſects: and, which is moſt of all, you ſhall have of them that will ſuffer for atheiſm, and not recant; whereas if they did truly think that there were no ſuch thing as God, why ſhould they trouble themſelves? Epicurus is charged, that he did but diſſemble, for his credit's ſake, when he affirmed there were bleſſed natures, but ſuch as enjoyed themſelves without having reſpect to the government of the world. Wherein they ſay he did temporize, though in ſecret he thought there was no God. But certainly he is traduced; for his words are noble and divine: *Non deos vulgi negare profanum; ſed vulgi opiniones diis applicare profanum.* Plato could have ſaid no more. And although he had the confidence to deny the adminiſtration, he had not the power to deny the nature. The Indians of the weſt have names for their particular gods, though they have no name for God: as if the heathens ſhould have had the names Jupiter, Apollo, Mars, *etc.* but not the word *Deus:* which ſhews, that even thoſe barbarous people have the notion, though they have not the latitude and extent of it. So that againſt atheiſts the very ſavages take part with the very ſubtileſt philoſophers. The contemplative atheiſt is rare; a Diagoras, a Bion, a Lucian perhaps, and ſome others: and yet they ſeem to be more than they are; for that all that impugn a received religion or ſuperſtition, are by the adverſe part branded with the name of atheiſts. But the great atheiſts indeed are hypocrites; which are ever handling holy things, but without feeling; ſo as they muſt needs be cauterized in the end. The cauſes of atheiſm are; diviſions in religion, if they be many; for any one main diviſion addeth zeal to both ſides; but many diviſions introduce atheiſm. Another is, ſcandal of prieſts; when it is come to that which S. Bernard ſaith, *non eſt jam dicere, ut populus, ſic ſacerdos: quia nec ſic populus, ut ſacerdos.* A third is, cuſtom of profane ſcoffing in holy matters; which doth by little and little deface the reverence of religion. And laſtly, learned times, eſpecially with peace and proſperity: for troubles and adverſities do more bow mens minds to religion. They that deny a God, deſtroy man's nobility: for certainly man is of kin to the beaſts by his body; and if he be not of kin to God by his ſpirit, he is a baſe and ignoble creature. It deſtroys likewiſe magnanimity, and the raiſing of human nature: for take an example of a dog, and mark what a generoſity and courage he will put on, when he finds himſelf maintained by a man; who to him

him is inſtead of a God, or *melior natura:* which courage is manifeſtly ſuch, as that creature, without that confidence of a better nature than his own, could never attain. So man, when he reſteth and aſſureth himſelf upon divine protection and favour, gathereth a force and faith, which human nature in itſelf could not obtain: therefore as atheiſm is in all reſpects hateful, ſo in this, that it depriveth human nature of the means to exalt itſelf above human frailty. As it is in particular perſons, ſo it is in nations: never was there ſuch a ſtate for magnanimity as Rome; of this ſtate hear what Cicero ſaith: *Quam volumus, licet, patres conſcripti, nos amemus, tamen nec numero Hiſpanos, nec robore Gallos, nec calliditate Poenos, nec artibus Graecos, nec denique hoc ipſo hujus gentis et terrae domeſtico nativoque ſenſu Italos ipſos et Latinos; ſed pietate, ac religione, atque hac una ſapientia, quod deorum immortalium numine omnia regi gubernarique perſpeximus, omnes gentes nationeſque ſuperavimus.*

XVII. *Of* Superstition.

IT were better to have no opinion of God at all, than ſuch an opinion as is unworthy of him: for the one is unbelief, the other is contumely: and certainly ſuperſtition is the reproach of the Deity. Plutarch ſaith well to that purpoſe: "Surely, "ſaith he, I had rather a great deal men ſhould ſay, there was no ſuch man at all as "Plutarch, than that they ſhould ſay, that there was one Plutarch, that would eat "his children as ſoon as they were born; as the poets ſpeak of Saturn." And as the contumely is greater towards God, ſo the danger is greater towards men. Atheiſm leaves a man to ſenſe, to philoſophy, to natural piety, to laws, to reputation; all which may be guides to an outward moral virtue, though religion were not: but ſuperſtition diſmounts all theſe, and erecteth an abſolute monarchy in the minds of men. Therefore atheiſm did never perturb ſtates; for it makes men wary of themſelves, as looking no farther: and we ſee the times inclined to atheiſm, as the time of Auguſtus Cæſar, were civil times. But ſuperſtition hath been the confuſion of many ſtates; and bringeth in a new *primum mobile*, that raviſheth all the ſpheres of government. The maſter of ſuperſtition is the people; and in all ſuperſtition wiſe men follow fools; and arguments are fitted to practice, in a reverſed order. It was gravely ſaid by ſome of the prelates in the council of Trent, where the doctrine of the ſchoolmen bare great ſway; that the ſchoolmen were like aſtronomers, which did feign eccentrics and epicycles, and ſuch engines of orbs, to ſave the phænomena, though they knew there were no ſuch things; and in like manner, that the ſchoolmen had framed a number of ſubtile and intricate axioms and theorems, to ſave the practice of the church. The cauſes of ſuperſtition are: pleaſing and ſenſual rites and ceremonies: exceſs of outward and phariſaical holineſs: over-great reverence of traditions, which cannot but load the church: the ſtratagems of prelates for their own ambition and lucre: the favouring too much of good intentions, which openeth the gate to conceits and novelties: the taking an aim at divine matters by human, which cannot but breed mixture of imaginations: and laſtly, barbarous times, eſpecially joined with calamities and diſaſters. Superſtition without a veil is a deformed thing: for as it addeth deformity to an ape to be ſo like a man; ſo the ſimilitude of ſuperſtition to religion makes it the more deformed. And as wholeſome meat corrupteth to little worms; ſo good forms and orders corrupt into a number of petty obſervances. There is a ſuperſtition in avoiding ſuperſtition; when men think to do beſt, if they go fartheſt from the ſuperſtition formerly received:

ceived: therefore care ſhould be had, that, as it fareth in ill purgings, the good be not taken away with the bad, which commonly is done when the people is the reformer.

XVIII. *Of* TRAVEL.

TRAVEL in the younger ſort is a part of education; in the elder a part of experience. He that travelleth into a country before he hath ſome entrance into the language, goeth to ſchool, and not to travel. That young men travel under ſome tutor, or grave ſervant, I allow well; ſo that he be ſuch a one that hath the language, and hath been in the country before; whereby he may be able to tell them what things are worthy to be ſeen in the country where they go, what acquaintances they are to ſeek, what exerciſes or diſcipline the place yieldeth. For elſe young men ſhall go hooded, and look abroad little. It is a ſtrange thing, that in ſea-voyages, where there is nothing to be ſeen but ſky and ſea, men ſhould make diaries; but in land travel, wherein ſo much is to be obſerved, for the moſt part they omit it; as if chance were fitter to be regiſtered than obſervation. Let diaries therefore be brought in uſe. The things to be ſeen and obſerved are: the courts of princes, eſpecially when they give audience to ambaſſadors: the courts of juſtice while they ſit and hear cauſes: and ſo of conſiſtories eccleſiaſtic: the churches and monaſteries, with the monuments which are therein extant: the walls and fortifications of cities and towns, and ſo the havens and harbours: antiquities and ruins; libraries, colleges, diſputations, and lectures, where any are; ſhipping and navies; houſes, and gardens of ſtate and pleaſure near great cities; armories, arſenals, magazines, exchanges, burſes, warehouſes; exerciſes of horſemanſhip, fencing, training of ſoldiers, and the like; comedies, ſuch whereunto the better ſort of perſons do reſort; treaſuries of jewels and robes, cabinets and rarities: and to conclude, whatſoever is memorable in the places where they go. After all which the tutors or ſervants ought to make diligent inquiry. As for triumphs, maſks, feaſts, weddings, funerals, capital executions, and ſuch ſhews, men need not to be put in mind of them; yet they are not to be neglected. If you will have a young man to put his travel into a little room, and in ſhort time to gather much, this you muſt do: firſt, as was ſaid, he muſt have ſome entrance into the language before he goeth. Then he muſt have ſuch a ſervant, or tutor, as knoweth the country, as was likewiſe ſaid. Let him carry with him alſo ſome card or book deſcribing the country where he travelleth, which will be a good key to his inquiry. Let him keep alſo a diary. Let him not ſtay long in one city or town; more or leſs as the place deſerveth, but not long: nay, when he ſtayeth in one city or town, let him change his lodging from one end and part of the town to another, which is a great adamant of acquaintance. Let him ſequeſter himſelf from the company of his countrymen, and diet in ſuch places where there is good company of the nation where he travelleth. Let him, upon his removes from one place to another, procure recommendation to ſome perſon of quality reſiding in the place whither he removeth; that he may uſe his favour in thoſe things he deſireth to ſee or know. Thus he may abridge his travel with much profit. As for the acquaintance which is to be ſought in travel, that which is moſt of all profitable, is acquaintance with the ſecretaries and employed men of ambaſſadors; for ſo in travelling in one country he ſhall ſuck the experience of many. Let him alſo ſee and viſit eminent perſons in all kinds, which are of great name abroad;

abroad; that he may be able to tell how the life agreeth with the fame. For quarrels, they are with care and diſcretion to be avoided: they are commonly for miſtreſſes, healths, place, and words. And let a man beware how he keepeth company with choleric and quarrelſome perſons; for they will engage him into their own quarrels. When a traveller returneth home, let him not leave the countries where he hath travelled altogether behind him; but maintain a correſpondence by letters with thoſe of his acquaintance which are of moſt worth. And let his travel appear rather in his diſcourſe than in his apparel or geſture; and in his diſcourſe let him be rather adviſed in his anſwers than forward to tell ſtories: and let it appear that he doth not change his country manners for thoſe of foreign parts; but only prick in ſome flowers of that he hath learned abroad, into the cuſtoms of his own country.

XIX. *Of* Empire.

IT is a miſerable ſtate of mind to have few things to deſire, and many things to fear: and yet that commonly is the caſe of kings, who being at the higheſt, want matter of deſire, which makes their minds more languiſhing: and have many repreſentations of perils and ſhadows, which makes their minds the leſs clear. And this is one reaſon alſo of that effect which the Scripture ſpeaketh of, *that the king's heart is inſcrutable.* For multitude of jealouſies, and lack of ſome predominant deſire, that ſhould marſhal and put in order all the reſt, maketh any man's heart hard to find or ſound. Hence it comes likewiſe, that princes many times make themſelves deſires, and ſet their hearts upon toys; ſometimes upon a building; ſometimes upon erecting of an order; ſometimes upon the advancing of a perſon; ſometimes upon obtaining excellency in ſome art or feat of the hand; as Nero for playing on the harp; Domitian for certainty of the hand with the arrow; Commodus for playing at fence; Caracalla for driving chariots; and the like. This ſeemeth incredible unto thoſe that know not the principle, That the mind of man is more cheared and refreſhed by profiting in ſmall things, than by ſtanding at a ſtay in great. We ſee alſo that kings that have been fortunate conquerors in their firſt years, it being not poſſible for them to go forward infinitely, but that they muſt have ſome check or arreſt in their fortunes, turn in their latter years to be ſuperſtitious and melancholy: as did Alexander the Great, Dioclеſian, and in our memory Charles the fifth, and others; for he that is uſed to go forward and findeth a ſtop, falleth out of his own favour, and is not the thing he was.

To ſpeak now of the true temper of empire: it is a thing rare and hard to keep; for both temper and diſtemper conſiſt of contraries. But it is one thing to mingle contraries, another to interchange them. The anſwer of Apollonius to Veſpaſian is full of excellent inſtruction: Veſpaſian aſked him, what was Nero's overthrow? He anſwered, Nero could touch and tune the harp well, but in government ſometimes he uſed to wind the pins too high, ſometimes to let them down too low. And certain it is that nothing deſtroyeth authority ſo much, as the unequal and untimely interchange of power preſſed too far, and relaxed too much.

This is true, that the wiſdom of all theſe latter times, in princes affairs, is rather fine deliveries, and ſhiftings of dangers and miſchiefs, when they are near; than ſolid and grounded courſes to keep them aloof. But this is but to try maſteries with fortune: and let men beware, how they neglect, and ſuffer matter of trouble to be prepared;

pared; for no man can forbid the ſpark, nor tell whence it may come. The difficulties in princes buſineſs are many and great; but the greateſt difficulty is often in their own mind. For it is common with princes, ſaith Tacitus, to will contradictories. *Sunt plerumque regum voluntates vehementes, et inter ſe contrariae.* For it is the ſoliciſm of power, to think to command the end, and yet not to endure the mean.

Kings have to deal with their neighbours; their wives; their children; their prelates or clergy; their nobles; their ſecond nobles or gentlemen; their merchants; their commons; and their men of war; and from all theſe ariſe dangers, if care and circumſpection be not uſed.

Firſt for their neighbours, there can no general rule be given, the occaſions are ſo variable, ſave one, which ever holdeth; which is, that princes do keep due centinel that none of their neighbours do overgrow ſo, by increaſe of territory, by embracing of trade, by approaches, or the like, as they become more able to annoy them, than they were. And this is generally the work of ſtanding counſels, to foreſee, and to hinder it. During that triumvirate of kings, king Henry the eighth of England, Francis the firſt, king of France, and Charles the fifth, emperor, there was ſuch a watch kept, that none of the three could win a palm of ground, but the other two would ſtraightways balance it, either by confederation, or if need were by a war: and would not, in any wiſe, take up peace at intereſt. And the like was done by that league, which Guicciardine ſaith, was the ſecurity of Italy, made between Ferdinando king of Naples; Lorenzius Medices and Ludovicus Sforza, potentates, the one of Florence, the other of Milan. Neither is the opinion of ſome of the ſchoolmen to be received, that a war cannot juſtly be made but upon a precedent injury, or provocation. For there is no queſtion, but a juſt fear of an imminent danger, though there be no blow given, is a lawful cauſe of a war.

For their wives, there are cruel examples of them. Livia is infamed for the poiſoning of her huſband: Roxolana, Solyman's wife, was the deſtruction of that renowned prince, Sultan Muſtapha; and otherwiſe troubled his houſe and ſucceſſion: Edward the ſecond of England his queen had the principal hand in the depoſing and murder of her huſband. This kind of danger is then to be feared, chiefly, when the wives have plots for the raiſing of their own children, or elſe that they be advowtreſſes.

For their children: the tragedies likewiſe of the dangers from them have been many: and generally, the entring of fathers into ſuſpicion of their children hath been ever unfortunate. The deſtruction of Muſtapha, that we named before, was ſo fatal to Solyman's line, as the ſucceſſion of the Turks, from Solyman until this day, is ſuſpected to be untrue, and of ſtrange blood; for that Selymus the ſecond was thought to be ſuppoſititious. The deſtruction of Criſpus, a young prince of rare towardneſs, by Conſtantinus the Great, his father, was in like manner fatal to his houſe, for both Conſtantinus and Conſtance, his ſons, died violent deaths; and Conſtantius his other ſon did little better; who died indeed of ſickneſs, but after that Julianus had taken arms againſt him. The deſtruction of Demetrius, ſon to Philip the ſecond of Macedon, turned upon the father, who died of repentance. And many like examples there are; but few or none where the fathers had good by ſuch diſtruſt, except it were where the ſons were up in open arms againſt them; as was Selymus the firſt againſt Bajazet: and the three ſons of Henry the ſecond, king of England.

For

For their prelates, when they are proud and great, there is alſo danger from them: as it was in the times of Anſelmus and Thomas Becket, archbiſhops of Canterbury, who with their croſiers did almoſt try it with the king's ſword; and yet they had to deal with ſtout and haughty kings, William Rufus, Henry the firſt, and Henry the ſecond. The danger is not from that ſtate, but where it hath a dependence of foreign authority; or where the churchmen come in, and are elected, not by the collation of the king or particular patrons, but by the people.

For their nobles; to keep them at a diſtance it is not amiſs; but to depreſs them, may make a king more abſolute, but leſs ſafe; and leſs able to perform any thing that he deſires: I have noted it in my *Hiſtory of king Henry the ſeventh of England*, who depreſſed his nobility; whereupon it came to paſs that his times were full of difficulties and troubles: for the nobility, though they continued loyal unto him, yet did they not co-operate with him in his buſineſs. So that in effect he was fain to do all things himſelf.

For their ſecond nobles; there is not much danger from them, being a body diſperſed. They may ſometimes diſcourſe high, but that doth little hurt: beſides, they are a counterpoiſe to the higher nobility, that they grow not too potent: and laſtly, being the moſt immediate in authority with the common people, they do beſt temper popular commotions.

For their merchants, they are *vena porta*; and if they flouriſh not, a kingdom may have good limbs, but will have empty veins, and nouriſh little. Taxes and impoſts upon them do ſeldom good to the king's revenue, for that that he wins in the hundred, he loſeth in the ſhire; the particular rates being increaſed, but the total bulk of trading rather decreaſed.

For their commons, there is little danger from them, except it be where they have great and potent heads; or where you meddle with the point of religion, or their cuſtoms or means of life.

For their men of war, it is a dangerous ſtate where they live and remain in a body, and are uſed to donatives, whereof we ſee examples in the janizaries and pretorian bands of Rome; but trainings of men, and arming them in ſeveral places, and under ſeveral commanders, and without donatives, are things of defence and no danger.

Princes are like to heavenly bodies, which cauſe good or evil times; and which have much veneration, but no reſt. All precepts concerning kings are in effect comprehended in thoſe two remembrances: *Memento quod es homo*; and *Memento quod es Deus*, or *vice Dei*: the one bridleth their power, and the other their will.

XX. *Of* Counsel.

THE greateſt truſt between man and man is the truſt of giving counſel. For in other confidences, men commit the parts of life; their lands, their goods, their children, their credit, ſome particular affair; but to ſuch as they make their counſellors they commit the whole: by how much the more they are obliged to all faith and integrity. The wiſeſt princes need not think it any diminution to their greatneſs, or derogation to their ſufficiency, to rely upon counſel. God himſelf is not without: but hath made it one of the great names of his bleſſed Son, *the counſellor*. Solomon hath pronounced, that *in counſel is ſtability*. Things will have their firſt or ſecond agitation; if they be not toſſed upon the arguments of

counſel, they will be toſſed upon the waves of fortune; and be full of inconſtancy, doing and undoing, like the reeling of a drunken man. Solomon's ſon found the force of counſel, as his father ſaw the neceſſity of it. For the beloved kingdom of God was firſt rent and broken by ill counſel; upon which counſel there are ſet, for our inſtruction, the two marks whereby bad counſel is for ever beſt diſcerned: that it was young counſel, for the perſons; and violent counſel, for the matter.

The ancient times do ſet forth in figure both the incorporation and inſeparable conjunction of counſel with kings, and the wiſe and politic uſe of counſel by kings: the one, in that they ſay Jupiter did marry Metis, which ſignifieth counſel; whereby they intend, that ſovereignty is married to counſel: the other in that which followeth, which was thus: they ſay, after Jupiter was married to Metis, ſhe conceived by him, and was with child, but Jupiter ſuffered her not to ſtay till ſhe brought forth, but eat her up; whereby he became himſelf with child, and was delivered of Pallas armed out of his head. Which monſtrous fable containeth a ſecret of empire; how kings are to make uſe of their council of ſtate: that, firſt, they ought to refer matters unto them, which is the firſt begetting or impregnation; but when they are elaborate, moulded and ſhaped in the womb of their council, and grow ripe and ready to be brought forth, that then they ſuffer not their council to go through with the reſolution and direction, as if it depended on them; but take the matter back into their own hands, and make it appear to the world, that the decrees and final directions, which, becauſe they come forth with prudence and power, are reſembled to Pallas armed, proceeded from themſelves, and not only from their authority, but, the more to add reputation to themſelves, from their head and device.

Let us now ſpeak of the inconveniencies of counſel, and of the remedies. The inconveniencies that have been noted in calling and uſing counſel are three. Firſt, the revealing of affairs, whereby they become leſs ſecret. Secondly, the weakening of the authority of princes, as if they were leſs of themſelves. Thirdly, the danger of being unfaithfully counſelled, and more for the good of them that counſel, than of him that is counſelled. For which inconveniencies the doctrine of Italy, and practice of France, in ſome kings times, hath introduced cabinet counſels; a remedy worſe than the diſeaſe.

As to ſecrecy, princes are not bound to communicate all matters with all counſellors, but may extract and ſelect. Neither is it neceſſary, that he that conſulteth what he ſhould do, ſhould declare what he will do. But let princes beware, that the unſecreting of their affairs comes not from themſelves. And as for cabinet counſels, it may be their motto; *Plenus rimarum ſum:* one futile perſon, that maketh it his glory to tell, will do more hurt than many that know it their duty to conceal. It is true, there be ſome affairs which require extreme ſecrecy, which will hardly go beyond one or two perſons beſides the king: neither are thoſe counſels unproſperous; for beſides the ſecrecy they commonly go on conſtantly in one ſpirit of direction without diſtraction. But then it muſt be a prudent king, ſuch as is able to grind with a hand-mill; and thoſe inward counſellors had need alſo be wiſe men, and eſpecially true and truſty to the king's ends; as it was with king Henry the ſeventh of England, who in his greateſt buſineſs imparted himſelf to none, except it were to Morton and Fox.

For

For weakening of authority; the fable ſheweth the remedy. Nay, the majeſty of kings is rather exalted than diminiſhed, when they are in the chair of counſel; neither was there ever prince bereaved of his dependences by his council, except where there hath been either an over-greatneſs in one counſellor, or an over-ſtrict combination in divers; which are things ſoon found and holpen.

For the laſt inconvenience, that men will counſel with an eye to themſelves; certainly *Non inveniet fidem ſuper terram*, is meant of the nature of times, and not of all particular perſons. There be that are in nature faithful and ſincere, and plain and direct; not crafty and involved: let princes above all draw to themſelves ſuch natures. Beſides, counſellors are not commonly ſo united, but that one counſellor keepeth centinel over another; ſo that if any do counſel out of faction or private ends, it commonly comes to the king's ear. But the beſt remedy is, if princes know their counſellors, as well as their counſellors know them:

Principis eſt virtus maxima noſſe ſuos

And on the other ſide, counſellors ſhould not be too ſpeculative into their ſovereign's perſon. The true compoſition of a counſellor is rather to be ſkilful in their maſter's buſineſs, than in his nature; for then he is like to adviſe him, and not to feed his humour. It is of ſingular uſe to princes, if they take the opinions of their council both ſeparately and together: for private opinion is more free, but opinion before others is more reverend. In private, men are more bold in their own humours; and in conſort, men are more obnoxious to others humours; therefore it is good to take both: and of the inferior ſort, rather in private, to preſerve freedom; of the greater rather in conſort, to preſerve reſpect. It is in vain for princes to take counſel concerning matters, if they take no counſel likewiſe concerning perſons: for all matters are as dead images; and the life of the execution of affairs reſteth in the good choice of perſons. Neither is it enough to conſult concerning perſons *ſecundum genera*, as in an idea or mathematical deſcription, what the kind and character of the perſon ſhould be; for the greateſt errors are committed, and the moſt judgment is ſhewn in the choice of individuals. It was truly ſaid, *optimi conſiliarii mortui*; books will ſpeak plain, when counſellors blanch. Therefore it is good to be converſant in them, ſpecially the books of ſuch as themſelves have been actors upon the ſtage.

The councils at this day, in moſt places, are but familiar meetings; where matters are rather talked on, than debated: and they run too ſwift to the order or act of council. It were better, that in cauſes of weight the matter were propounded one day, and not ſpoken to till the next day; *in nocte conſilium*. So was it done in the commiſſion of union between England and Scotland; which was a grave and orderly aſſembly. I commend ſet days for petitions: for both it gives the ſuitors more certainty for their attendance; and it frees the meetings for matters of eſtate, that they may *hoc agere*. In choice of committees, for ripening buſineſs for the council, it is better to chooſe indifferent perſons, than to make an indifferency by putting in thoſe that are ſtrong on both ſides. I commend alſo ſtanding commiſſions; as for trade, for treaſure, for war, for ſuits, for ſome provinces: for where there be divers particular councils, and but one council of eſtate, as it is in Spain, they are, in effect, no more than ſtanding commiſſions; ſave that they have greater authority. Let ſuch as are to inform councils out of their particular profeſſions, as lawyers, ſeamen, mint-men, and the like, be firſt

heard before committees; and then, as occaſion ſerves, before the council. And let them not come in multitudes, or in a tribunitious manner; for that is to clamour councils, not to inform them. A long table, and a ſquare table, or ſeats about the walls, ſeem things of form, but are things of ſubſtance; for at a long table, a few at the upper end, in effect, ſway all the buſineſs; but in the other form, there is more uſe of the counſellors opinions that ſit lower. A king when he preſides in council, let him beware how he opens his own inclination too much in that which he propoundeth: for elſe counſellors will but take the wind of him, and inſtead of giving free counſel ſing him a ſong of *Placebo*.

XXI. *Of* Delays.

FORTUNE is like the market, where many times if you can ſtay a little, the price will fall. And again, it is ſometimes like Sibylla's offer, which at firſt offereth the commodity at full, then conſumeth part and part, and ſtill holdeth up the price. For occaſion, as it is in the common verſe, turneth a bald noddle, after ſhe hath preſented her locks in front, and no hold taken: or at leaſt turneth the handle of the bottle firſt to be received, and after the belly, which is hard to claſp. There is ſurely no greater wiſdom, than well to time the beginnings and onſets of things. Dangers are no more light, if they once ſeem light: and more dangers have deceived men, than forced them. Nay, it were better to meet ſome dangers half way, though they come nothing near, than to keep too long a watch upon their approaches; for if a man watch too long, it is odds he will fall aſleep. On the other ſide, to be deceived with too long ſhadows, as ſome have been when the moon was low, and ſhone on their enemies back, and ſo to ſhoot off before the time; or to teach dangers to come on, by over-early buckling towards them, is another extreme. The ripeneſs or unripeneſs of the occaſion, as we ſaid, muſt ever be well weighed; and generally it is good to commit the beginnings of all great actions to Argos with his hundred eyes, and the ends to Briareus with his hundred hands: firſt to watch, and then to ſpeed. For the helmet of Pluto, which maketh the politic man go inviſible, is ſecrecy in the counſel, and celerity in the execution. For when things are once come to the execution, there is no ſecrecy comparable to celerity; like the motion of a bullet in the air, which flieth ſo ſwift as it outruns the eye.

XXII. *Of* Cunning.

WE take cunning for a ſiniſter or crooked wiſdom. And certainly there is great difference between a cunning man and a wiſe man; not only in point of honeſty, but in point of ability. There be that can pack the cards, and yet cannot play well; ſo there are ſome that are good in canvaſſes and factions, that are otherwiſe weak men. Again it is one thing to underſtand perſons, and another thing to underſtand matters; for many are perfect in mens humours, that are not greatly capable of the real part of buſineſs; which is the conſtitution of one that hath ſtudied men more than books. Such men are fitter for practice than for counſel; and they are good but in their own alley: turn them to new men, and they have loſt their aim; ſo as the old rule to know a fool from a wiſe man, *Mitte ambos nudos ad ignotos, et videbis*, doth ſcarce hold for them. And becauſe theſe cunning men are like haberdaſhers of ſmall wares, it is not amiſs to ſet forth their ſhop.

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It is a point of cunning, to wait upon him with whom you ſpeak with your eye; as the Jeſuits give it in precept: for there be many wiſe men that have ſecret hearts and tranſparent countenances. Yet this ſhould be done with a demure abaſing of your eye ſometimes, as the Jeſuits alſo do uſe.

Another is, that when you have any thing to obtain of preſent diſpatch, you entertain and amuſe the party with whom you deal with ſome other diſcourſe; that he be not too much awake to make objections. I knew a counſellor and ſecretary, that never came to queen Elizabeth of England with bills to ſign, but he would always firſt put her into ſome diſcourſe of eſtate, that ſhe might the leſs mind the bills.

The like ſurpriſe may be made by moving things when the party is in haſte, and cannot ſtay to conſider adviſedly of what is moved.

If a man would croſs a buſineſs, that he doubts ſome other would handſomely and effectually move, let him pretend to wiſh it well, and move it himſelf in ſuch ſort as may foil it.

The breaking off in the midſt of what one was about to ſay, as if he took himſelf up, breeds a greater appetite in him with whom you confer, to know more.

And becauſe it works better when any thing ſeemeth to be gotten from you by queſtion, than if you offer it of yourſelf, you may lay a bait for a queſtion, by ſhewing another viſage and countenance than you are wont; to the end to give occaſion for the party to aſk what the matter is of the change; as Nehemiah did, *And I had not before that time been ſad before the king*.

In things that are tender and unpleaſing, it is good to break the ice by ſome whoſe words are of leſs weight, and to reſerve the more weighty voice to come in as by chance, ſo that he may be aſked the queſtion upon the other's ſpeech: as Narciſſus did, in relating to Claudius the marriage of Meſſalina and Silius.

In things that a man would not be ſeen in himſelf, it is a point of cunning to borrow the name of the world; as to ſay, The world ſays, or There is a ſpeech abroad.

I knew one, that when he wrote a letter, he would put that which was moſt material in the poſtſcript, as if it had been a bye-matter.

I know another that, when he came to have ſpeech, he would paſs over that that he intended moſt; and go forth, and come back again, and ſpeak of it as of a thing that he had almoſt forgot.

Some procure themſelves to be ſurpriſed at ſuch times, as it is like the party that they work upon will ſuddenly come upon them; and to be found with a letter in their hand, or doing ſomewhat which they are not accuſtomed to; to the end they may be appoſed of thoſe things, which of themſelves they are deſirous to utter.

It is a point of cunning to let fall thoſe words in a man's own name, which he would have another man learn and uſe, and thereupon take advantage. I knew two that were competitors for the ſecretary's place in queen Elizabeth's time, and yet kept good quarter between themſelves, and would confer one with another upon the buſineſs; and the one of them ſaid, that to be a ſecretary in the declination of a monarchy was a tickliſh thing, and that he did not affect it: the other ſtraight caught up thoſe words, and diſcourſed with divers of his friends, that he had no reaſon to deſire to be ſecretary in the declination of a monarchy. The firſt man took hold of it, and found means it was told the queen; who hearing of

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a declination of a monarchy, took it ſo ill, as ſhe would never after hear of the other's ſuit.

There is a cunning which we in England call, the turning of the cat in the pan; which is, when that which a man ſays to another, he lays it as if another had ſaid it to him; and to ſay truth, it is not eaſy, when ſuch a matter paſſed between two, to make it appear from which of them it firſt moved and began.

It is a way that ſome men have, to glance and dart at others, by juſtifying themſelves by negatives; as to ſay, This I do not: as Tigellinus did towards Burrhus, *ſe non diverſas ſpes, ſed incolumitatem imperatoris ſimpliciter ſpectare.*

Some have in readineſs ſo many tales and ſtories, as there is nothing they would inſinuate, but they can wrap it into a tale; which ſerveth both to keep themſelves more in guard, and to make others carry it with more pleaſure.

It is a good point of cunning, for a man to ſhape the anſwer he would have in his own words and propoſitions; for it makes the other party ſtick the leſs.

It is ſtrange how long ſome men will lie in wait to ſpeak ſomewhat they deſire to ſay; and how far about they will fetch, and how many other matters they will beat over to come near it; it is a thing of great patience, but yet of much uſe.

A ſudden, bold, and unexpected queſtion, doth many times ſurpriſe a man, and lay him open. Like to him, that having changed his name, and walking in Paul's, another ſuddenly came behind him and called him by his true name, whereat ſtraightways he looked back.

But theſe ſmall wares and petty points of cunning are infinite, and it were a good deed to make a liſt of them; for that nothing doth more hurt in a ſtate, than that cunning men paſs for wiſe.

But certainly ſome there are that know the reſorts and falls of buſineſs, that cannot ſink into the main of it; like a houſe that hath convenient ſtairs and entries, but never a fair room. Therefore you ſhall ſee them find out pretty looſes in the concluſion, but are no ways able to examine or debate matters. And yet commonly they take advantage of their inability, and would be thought wits of direction. Some build rather upon the abuſing of others, and, as we now ſay, putting tricks upon them, than upon ſoundneſs of their own proceedings. But Solomon ſaith, *Prudens advertit ad greſſus ſuos: ſtultus divertit ad dolos.*

XXIII. *Of* Wisdom for a Man's self.

An ant is a wiſe creature for itſelf: but it is a ſhrewd thing in an orchard or garden. And certainly men that are great lovers of themſelves waſte the public. Divide with reaſon between ſelf-love and ſociety; and be ſo true to thyſelf, as thou be not falſe to others; eſpecially to thy king and country. It is a poor center of a man's actions, Himſelf. It is right earth. For that only ſtands faſt upon its own center: whereas all things that have affinity with the heavens, move upon the center of another which they benefit. The referring of all to a man's ſelf is more tolerable in a ſovereign prince, becauſe themſelves are not only themſelves but their good and evil is at the peril of the public fortune. But it is a deſperate evil in a ſervant to a prince, or a citizen in a republic. For whatſoever affairs paſs ſuch a man's hands, he crooketh them to his own ends: which muſt needs be often eccentric to the ends of his maſter or ſtate. Therefore let princes or ſtates chooſe ſuch ſervants as have not this mark; except they mean their ſervice ſhould be made but

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the acceſſary. That which maketh the effect more pernicious is, that all proportion is loſt: it were diſproportion enough for the ſervant's good to be preferred before the maſter's; but yet it is a greater extreme, when a little good of the ſervant ſhall carry things againſt a great good of the maſter's. And yet that is the caſe of bad officers, treaſurers, ambaſſadors, generals, and other falſe and corrupt ſervants; which ſet a bias upon their bowl of their own petty ends and envies, to the overthrow of their maſters great and important affairs. And for the moſt part, the good ſuch ſervants receive, is after the model of their own fortune; but the hurt they ſell for that good, is after the model of their maſters fortune. And certainly it is the nature of extreme ſelf-lovers, as they will ſet an houſe on fire, and it were but to roſt their eggs: and yet theſe men many times hold credit with their maſters, becauſe their ſtudy is but to pleaſe them, and profit themſelves: and for either reſpect they will abandon the good of their affairs.

Wiſdom for a man's ſelf is in many branches thereof a depraved thing. It is the wiſdom of rats, that will be ſure to leave a houſe ſomewhat before it fall. It is the wiſdom of the fox, that thruſts out the badger, who digged and made room for him. It is the wiſdom of crocodiles, that ſhed tears when they would devour. But that which is ſpecially to be noted is, that thoſe which, as Cicero ſays of Pompey, are *ſui amantes ſine rivali*, are many times unfortunate. And whereas they have all their time ſacrificed to themſelves, they become in the end themſelves ſacrifices to the inconſtancy of fortune, whoſe wings they thought by their ſelf-wiſdom to have pinioned.

XXIV. *Of* Innovations.

AS the births of living creatures at firſt are ill ſhapen; ſo are all innovations, which are the births of time. Yet notwithſtanding as thoſe that firſt bring honour into their family, are commonly more worthy than moſt that ſucceed: ſo the firſt precedent, if it be good, is ſeldom attained by imitation. For ill, to man's nature, as it ſtands perverted, hath a natural motion ſtrongeſt in continuance: but good, as a forced motion, ſtrongeſt at firſt. Surely every medicine is an innovation, and he that will not apply new remedies, muſt expect new evils; for time is the greateſt innovator: and if time of courſe alter things to the worſe, and wiſdom and counſel ſhall not alter them to the better, what ſhall be the end? It is true, that what is ſettled by cuſtom, though it be not good, yet at leaſt it is fit. And thoſe things which have long gone together, are, as it were, confederate within themſelves: whereas new things piece not ſo well; but though they help by their utility, yet they trouble by their unconformity. Beſides, they are like ſtrangers, more admired, and leſs favoured. All this is true if time ſtood ſtill; which contrariwiſe moveth ſo round, that a froward retention of cuſtom is as turbulent a thing, as an innovation; and they that reverence too much old times are but a ſcorn to the new. It were good therefore, that men in their innovations would follow the example of time itſelf, which indeed innovateth greatly, but quietly and by degrees ſcarce to be perceived: for otherwiſe whatſoever is new is unlooked for; and ever it mends ſome, and impairs others: and he that is holpen takes it for a fortune, and thanks the time; and he that is hurt, for a wrong, and imputeth it to the author. It is good alſo not to try experiments in ſtates, except the neceſſity be urgent, or the utility evident; and well to beware that it be the reformation that draweth on the change; and not the-

the deſire of change that pretendeth the reformation. And laſtly, that the novelty, though it be not rejected, yet be held for a ſuſpect: and, as the Scripture ſaith, *that we make a ſtand upon the ancient way, and then look about us, and diſcover what is the ſtraight and right way, and ſo to walk in it.*

XXV. *Of* Dispatch.

AFFECTED diſpatch is one of the moſt dangerous things to buſineſs that can be. It is like that which the phyſicians call predigeſtion or haſty digeſtion; which is ſure to fill the body full of crudities and ſecret ſeeds of diſeaſes. Therefore meaſure not diſpatch by the times of ſitting, but by the advancement of the buſineſs. And as in races, it is not the large ſtride, or high lift, that makes the ſpeed; ſo in buſineſs, the keeping cloſe to the matter, and not taking of it too much at once, procureth diſpatch. It is the care of ſome, only to come off ſpeedily for the time; or to contrive ſome falſe periods of buſineſs, becauſe they may ſeem men of diſpatch. But it is one thing to abbreviate by contracting, another by cutting off; and buſineſs ſo handled at ſeveral ſittings or meetings, goeth commonly backward and forward in an unſteady manner. I knew a wiſe man that had it for a by-word, when he ſaw men haſten to a concluſion, "Stay a little, that we may make "an end the ſooner."

On the other ſide, true diſpatch is a rich thing. For time is the meaſure of buſineſs, as money is of wares: and buſineſs is bought at a dear hand, where there is ſmall diſpatch. The Spartans and Spaniards have been noted to be of ſmall diſpatch: *Mi venga la muerte de Spagna*; Let my death come from Spain; for then it will be ſure to be long in coming.

Give good hearing to thoſe that give the firſt information in buſineſs; and rather direct them in the beginning, than interrupt them in the continuance of their ſpeeches: for he that is put out of his own order, will go forward and backward, and be more tedious while he waits upon his memory, than he could have been if he had gone on in his own courſe. But ſometimes it is ſeen, that the moderator is more troubleſome than the actor.

Iterations are commonly loſs of time: but there is no ſuch gain of time, as to iterate often the ſtate of the queſtion; for it chaſeth away many a frivolous ſpeech as it is coming forth. Long and curious ſpeeches are as fit for diſpatch, as a robe or mantle with a long train is for a race. Prefaces, and paſſages, and excuſations, and other ſpeeches of reference to the perſon, are great waſtes of time; and though they ſeem to proceed of modeſty, they are bravery. Yet beware of being too material, when there is any impediment or obſtruction in mens wills; for pre-occupation of mind ever requireth preface of ſpeech; like a fomentation to make the unguent enter.

Above all things, order, and diſtribution, and ſingling out of parts, is the life of diſpatch; ſo as the diſtribution be not too ſubtile: for he that doth not divide, will never enter well into buſineſs; and he that divideth too much, will never come out of it clearly. To chooſe time, is to ſave time; and an unſeaſonable motion is but beating the air. There be three parts of buſineſs; the preparation, the debate or examination, and the perfection. Whereof, if you look for diſpatch, let the middle only be the work of many, and the firſt and laſt the work of few. The

proceeding

proceeding upon ſomewhat conceived in writing, doth for the moſt part facilitate diſpatch: for though it ſhould be wholly rejected, yet that negative is more pregnant of direction than an indefinite; as aſhes are more generative than duſt.

XXVI. *Of* Seeming wise.

IT hath been an opinion, that the French are wiſer than they ſeem, and the Spaniards ſeem wiſer than they are. But howſoever it be between nations, certainly it is ſo between man and man. For as the apoſtle ſaith of godlineſs, *having a ſhew of godlineſs, but denying the power thereof*; ſo certainly there are in point of wiſdom and ſufficiency that do nothing or little very ſolemnly; *magno conatu nugas*. It is a ridiculous thing, and fit for a ſatire to perſons of judgment, to ſee what ſhifts theſe formaliſts have, and what proſpectives to make ſuperficies to ſeem body that hath depth and bulk. Some are ſo cloſe and reſerved, as they will not ſhew their wares but by a dark light; and ſeem always to keep back ſomewhat; and when they know within themſelves, they ſpeak of that they do not well know, would nevertheleſs ſeem to others to know of that which they may not well ſpeak. Some help themſelves with countenance and geſture, and are wiſe by ſigns; as Cicero ſaith of Piſo, that when he anſwered him, he fetched one of his brows up to his forehead, and bent the other down to his chin: *reſpondes, altero ad frontem ſublato, altero ad mentum depreſſo ſupercilio, crudelitatem tibi non placere*. Some think to bear it by ſpeaking a great word, and being peremptory; and go on, and take by admittance that which they cannot make good. Some, whatſoever is beyond their reach, will ſeem to deſpiſe or make light of it as impertinent or curious; and ſo would have their ignorance ſeem judgment. Some are never without a difference, and commonly by amuſing men with a ſubtilty blanch the matter; of whom A. Gellius ſaith, *hominem delirum, qui verborum minutiis rerum frangit pondera*. Of which kind alſo, Plato in his *Protagoras* bringeth in Prodicus in ſcorn, and maketh him make a ſpeech that conſiſteth of diſtinctions from the beginning to the end. Generally ſuch men in all deliberations find eaſe to be of the negative ſide, and affect a credit to object and foretel difficulties: for when propoſitions are denied, there is an end of them; but if they be allowed, it requireth a new work: which falſe point of wiſdom is the bane of buſineſs. To conclude, there is no decaying merchant, or inward beggar, hath ſo many tricks to uphold the credit of their wealth, as theſe empty perſons have to maintain the credit of their ſufficiency. Seeming wiſe men may make ſhift to get opinion; but let no man chooſe them for employment, for certainly you were better take for buſineſs a man ſomewhat abſurd, than over-formal.

XXVII. *Of* Friendship.

IT had been hard for him that ſpake it to have put more truth and untruth together, in few words, than in that ſpeech; "Whoſoever is delighted in ſoli-"tude, is either a wild beaſt, or a God." For it is moſt true, that a natural and ſecret hatred, and averſation towards ſociety, in any man, hath ſomewhat of the ſavage beaſt: but it is moſt untrue, that it ſhould have any character at all of the divine nature, except it proceed, not out of a pleaſure in ſolitude, but out of a love and deſire to ſequeſter a man's ſelf for a higher converſation: ſuch

as is found to have been falſly and feignedly in ſome of the heathen; as Epimenides the Candian, Numa the Roman, Empedocles the Sicilian, and Apollonius of Tyana; and truly and really in divers of the ancient hermits, and holy fathers of the church. But little do men perceive what ſolitude is, and how far it extendeth. For a crowd is not company, and faces are but a gallery of pictures; and talk but a tinkling cymbal, where there isno love. The Latin adage meeteth with it a little; *Magna civitas, magna ſolitudo*; becauſe in a great town friends are ſcattered, ſo that there is not that fellowſhip, for the moſt part, which is in leſs neighbourhoods. But we may go farther, and affirm moſt truly, that it is a mere and miſerable ſolitude, to want true friends, without which the world is but a wilderneſs. And even in this ſenſe alſo of ſolitude, whoſoever in the frame of his nature and affections is unfit for friendſhip, he taketh it of the beaſt, and not from humanity.

A principal fruit of friendſhip is the eaſe and diſcharge of the fulneſs and ſwellings of the heart, which paſſions of all kinds do cauſe and induce. We know diſeaſes of ſtoppings and ſuffocations are the moſt dangerous in the body; and it is not much otherwiſe in the mind; you may take ſarza to open the liver; ſteel to open the ſpleen; flour of ſulphur for the lungs; *caſtoreum* for the brain; but no receipt openeth the heart but a true friend, to whom you may impart griefs, joys, fears, hopes, ſuſpicions, counſels, and whatſoever lieth upon the heart, to oppreſs it, in a kind of civil ſhrift or confeſſion.

It is a ſtrange thing to obſerve, how high a rate great kings and monarchs do ſet upon this fruit of friendſhip, whereof we ſpeak; ſo great, as they purchaſe it many times at the hazard of their own ſafety and greatneſs. For princes, in regard of the diſtance of their fortune from that of their ſubjects and ſervants, cannot gather this fruit, except, to make themſelves capable thereof, they raiſe ſome perſons to be as it were companions, and almoſt equals to themſelves; which many times ſorteth to inconvenience. The modern languages give unto ſuch perſons the name of favourites or privadoes; as if it were matter of grace or converſation: but the Roman name attaineth the true uſe and cauſe thereof; naming them *participes curarum*; for it is that which tieth the knot. And we ſee plainly, that this hath been done, not by weak and paſſionate princes only, but by the wiſeſt and moſt politic that ever reigned, who have oftentimes joined to themſelves ſome of their ſervants, whom both themſelves have called friends, and allowed others likewiſe to call them in the ſame manner, uſing the word which is received between private men.

L. Sylla, when he commanded Rome, raiſed Pompey, after ſurnamed the Great, to that height, that Pompey vaunted himſelf for Sylla's over-match. For when he had carried the conſulſhip for a friend of his againſt the purſuit of Sylla, and that Sylla did a little reſent thereat, and began to ſpeak great, Pompey turned upon him again, and in effect bad him be quiet; for that more men adore the ſun riſing, than the ſun ſetting. With Julius Cæſar Decimus Brutus had obtained that intereſt, as he ſet him down in his teſtament for heir in remainder after his nephew. And this was the man that had power with him to draw him forth to his death. For when Cæſar would have diſcharged the ſenate, in regard of ſome ill preſages, and ſpecially a dream of Calpurnia; this man lifted him gently by the arm out of his chair, telling him, He hoped he would not diſmiſs the ſenate, till his wife had dreamed a better dream. And it ſeemeth, his favour was ſo great, as Antonius, in a letter which is recited *verbatim* in one of Cicero's Philippics, calleth him *veneſica*, witch; as if he had enchanted Cæſar. Auguſtus raiſed Agrippa, though of mean birth, to that height,

height, as when he conſulted with Mæcenas about the marriage of his daughter Julia, Mæcenas took the liberty to tell him, That he muſt either marry his daughter to Agrippa, or take away his life; there was no third way, he had made him ſo great. With Tiberius Cæſar Sejanus had aſcended to that height, as they two were termed and reckoned as a pair of friends. Tiberius in a letter to him ſaith; *Hæc pro amicitia noſtra non occultavi:* and the whole ſenate dedicated an altar to Friendſhip as to a goddeſs, in reſpect of the great dearneſs of friendſhip between them two. The like or more was between Septimius Severus and Plantianus. For he forced his eldeſt ſon to marry the daughter of Plantianus; and would often maintain Plantianus in doing affronts to his ſon; and did write alſo in a letter to the ſenate, by theſe words: "I love the man ſo well, as I wiſh he may over-live me." Now if theſe princes had been as a Trajan, or a Marcus Aurelius, a man might have thought that this had proceeded of an abundant goodneſs of nature; but being men ſo wiſe, of ſuch ſtrength and ſeverity of mind, and ſo extreme lovers of themſelves, as all theſe were; it proveth moſt plainly, that they found their own felicity, though as great as ever happened to mortal men, but as an half piece, except they might have a friend to make it entire; and yet, which is more, they were princes that had wives, ſons, nephews; and yet all theſe could not ſupply the comfort of friendſhip.

It is not to be forgotten what Commineus obſerveth of his firſt maſter duke Charles the Hardy, namely, That he would communicate his ſecrets with none; and leaſt of all thoſe ſecrets which troubled him moſt. Whereupon he goeth on, and ſaith, That towards his latter time, that cloſeneſs did impair, and a little periſh his underſtanding. Surely Commineus might have made the ſame judgment alſo, if it had pleaſed him, of his ſecond maſter Lewis the eleventh, whoſe cloſeneſs was indeed his tormentor. The parable of Pythagoras is dark, but true; *Cor ne edito*, eat not the heart. Certainly, if a man would give it a hard phraſe, thoſe that want friends to open themſelves unto, are cannibals of their own hearts. But one thing is moſt admirable, wherewith I will conclude this firſt fruit of friendſhip, which is, that this communicating of a man's ſelf to his friend works two contrary effects; for it redoubleth joys, and cutteth griefs in halfs. For there is no man that imparteth his joys to his friend, but he joyeth the more; and no man that imparteth his griefs to his friend, but he grieveth the leſs. So that it is in truth of operation upon a man's mind of like virtue, as the alchemiſts uſe to attribute to their ſtone, for man's body; that it worketh all contrary effects, but ſtill to the good and benefit of nature. But yet, without praying in aid of alchemiſts, there is a manifeſt image of this in the ordinary courſe of nature. For in bodies, union ſtrengtheneth and cheriſheth any natural action; and, on the other ſide, weakeneth and dulleth any violent impreſſion; and even ſo is it of minds.

The ſecond fruit of friendſhip is healthful and ſovereign for the underſtanding, as the firſt is for the affections. For friendſhip maketh indeed a fair day in the affections, from ſtorm and tempeſts; but it maketh day-light in the underſtanding, out of darkneſs and confuſion of thoughts: neither is this to be underſtood only of faithful counſel, which a man receiveth from his friend; but before you come to that, certain it is, that whoſoever hath his mind fraught with many thoughts, his wits and underſtanding do clarify and break up in the communicating and diſcourſing with another: he toſſeth his thoughts more eaſily: he marſhalleth them more orderly; he ſeeth how they look when they are turned into words; finally, he waxeth wiſer than himſelf; and that more by an hour's diſcourſe, than by a day's meditation. It was

well ſaid by Themiſtocles to the king of Perſia, That ſpeech was like cloth of Arras, opened and put abroad, whereby the imagery doth appear in figure; whereas in thoughts they lie but as in packs. Neither is this ſecond fruit of friendſhip, in opening the underſtanding, reſtrained only to ſuch friends, as are able to give a man counſel, they indeed are beſt, but even, without that, a man learneth of himſelf, and bringeth his own thoughts to light, and whetteth his wits as againſt a ſtone, which itſelf cuts not. In a word; a man were better relate himſelf to a ſtatue or picture, than to ſuffer his thoughts to paſs in ſmother.

Add now, to make this ſecond fruit of friendſhip complete, that other point which lieth more open, and falleth within vulgar obſervation; which is faithful counſel from a friend. Heraclitus ſaith well in one of his aenigmas, Dry light is ever the beſt. And certain it is, that the light that a man receiveth by counſel from another, is drier and purer, than that which cometh from his own underſtanding and judgment; which is ever infuſed and drenched in his affections and cuſtoms. So as there is as much difference between the counſel that a friend giveth, and that a man giveth himſelf, as there is between the counſel of a friend and of a flatterer. For there is no ſuch flatterer as is a man's ſelf; and there is no ſuch remedy againſt flattery of a man's ſelf, as the liberty of a friend. Counſel is of two ſorts; the one concerning manners, the other concerning buſineſs. For the firſt, the beſt preſervative to keep the mind in health, is the faithful admonition of a friend. The calling of a man's ſelf to a ſtrict account, is a medicine ſometimes too piercing and corroſive. Reading good books of morality, is a little flat and dead. Obſerving our faults in others, is ſometimes improper for our caſe: but the beſt receipt, beſt, I ſay, to work, and beſt to take, is the admonition of a friend. It is a ſtrange thing to behold what groſs errors and extreme abſurdities many, eſpecially of the greater ſort, do commit, for want of a friend to tell them of them; to the great damage both of their fame and fortune. For, as St. James ſaith, they are as men *that look ſometimes into a glaſs, and preſently forget their own ſhape and favour:* as for buſineſs, a man may think if he will, that two eyes ſee no more than one; or that a gameſter ſeeth always more than a looker-on; or that a man in anger is as wiſe as he that hath ſaid over the four and twenty letters; or that a muſket may be ſhot off, as well upon the arm, as upon a reſt; and ſuch other fond and high imaginations, to think himſelf all in all. But when all is done, the help of good counſel is that which ſetteth buſineſs ſtraight. And if any man think, that he will take counſel, but it ſhall be by pieces; aſking counſel in one buſineſs of one man, and in another buſineſs of another man; it is well, that is to ſay, better perhaps than if he aſked none at all, but he runneth two dangers: one, that he ſhall not be faithfully counſeled; for it is a rare thing, except it be from a perfect and entire friend, to have counſel given, but ſuch as ſhall be bowed and crooked to ſome ends which he hath that giveth it. The other, that he ſhall have counſel given, hurtful and unſafe, though with good meaning, and mixed partly of miſchief, and partly of remedy: even as if you would call a phyſician that is thought good for the cure of the deceaſe you complain of, but is unacquainted with your body; and therefore may put you in way for a preſent cure, but overthroweth your health in ſome other kind, and ſo cure the diſeaſe and kill the patient. But a friend that is wholly acquainted with a man's eſtate, will beware by furthering any preſent buſineſs how he daſheth upon other inconvenience. And therefore reſt not upon ſcattered counſels; they will rather diſtract and miſlead, than ſettle and direct.

After theſe two noble fruits of friendſhip, peace in the affections, and ſupport of the

the judgment, followeth the laſt fruit, which is like the pomegranate, full of many kernels; I mean aid, and bearing a part in all actions and occaſions. Here the beſt way to repreſent to life the manifold uſe of friendſhip, is to caſt and ſee how many things there are which a man cannot do himſelf; and then it will appear that it was a ſparing ſpeech of the ancients to ſay, That a friend is another himſelf; for that a friend is far more than himſelf. Men have their time, and die many times in deſire of ſome things which they principally take to heart; the beſtowing of a child, the finiſhing of a work, or the like. If a man have a true friend, he may reſt almoſt ſecure, that the care of thoſe things will continue after him. So that a man hath as it were two lives in his deſires. A man hath a body, and that body is confined to a place; but where friendſhip is, all offices of life are as it were granted to him and his deputy: for he may exerciſe them by his friend. How many things are there, which a man cannot, with any face or comelineſs, ſay or do himſelf? A man can ſcarce alledge his own merits with modeſty, much leſs extol them: a man cannot ſometimes brook to ſupplicate or beg; and a number of the like. But all theſe things are graceful in a friend's mouth, which are bluſhing in a man's own. So again, a man's perſon hath many proper relations, which he cannot put off. A man cannot ſpeak to his ſon but as a father; to his wife, but as a huſband; to his enemy, but upon terms: whereas a friend may ſpeak as the caſe requires, and not as it ſorteth with the perſon. But to enumerate theſe things were endleſs; I have given the rule, where a a man cannot fitly play his own part; if he have not a friend, he may quit the ſtage.

XXVIII. *Of* Expence.

RICHES are for ſpending; and ſpending for honour and good actions. Therefore extraordinary expence muſt be limited by the worth of the occaſion; for voluntary undoing may be as well for a man's country, as for the kingdom of heaven. But ordinary expence ought to be limited by a man's eſtate, and governed with ſuch regard as it be within his compaſs; and not ſubject to deceit and abuſe of ſervants; and ordered to the beſt ſhew, that the bills may be leſs than the eſtimation abroad. Certainly if a man will keep but of even hand, his ordinary expences ought to be but to the half of his receipts; and if he think to wax rich, but to the third part. It is no baſeneſs for the greateſt, to deſcend and look into their own eſtate. Some forbear it, not upon negligence alone, but doubting to bring themſelves into melancholy, in reſpect they ſhall find it broken. But wounds cannot be cured without ſearching. He that cannot look into his own eſtate at all, had need both chooſe well thoſe whom he employeth, and change them often: for new are more timorous and leſs ſubtile. He that can look into his eſtate but ſeldom, it behoveth him to turn all to certainties. A man had need, if he be plentiful in ſome kind of expence, to be as ſaving again in ſome other. As if he be plentiful in diet, to be ſaving in apparel: if he be plentiful in the hall, to be ſaving in the ſtable: and the like. For he that is plentiful in expences of all kinds, will hardly be preſerved from decay. In clearing of a man's eſtate, he may as well hurt himſelf in being too ſudden, as in letting it run on too long: for haſty ſelling is commonly as diſadvantageble as intereſt. Beſides, he that clears at once will relapſe; for finding himſelf out of ſtraits, he will revert to his cuſtoms; but he that cleareth by degrees induceth a habit of frugality, and gaineth as well upon his mind as upon his eſtate. Certainly, who hath a ſtate to repair, may not deſpiſe ſmall things: and commonly it is leſs diſhonourable to abridge petty charges,

charges, than to ſtoop to petty gettings. A man ought warily to begin charges, which once begun will continue; but in matters that return not, he may be more magnificent.

XXIX. *Of the* True Greatness *of* Kingdoms *and* Estates.

THE ſpeech of Themiſtocles the Athenian, which was haughty and arrogant in taking ſo much to himſelf, had been a grave and wiſe obſervation and cenſure, applied at large to others. Deſired at a feaſt to touch a lute, he ſaid, He could not fiddle, but yet he could make a ſmall town a great city. Theſe words, holpen a little with a metaphor, may expreſs two differing abilities in thoſe that deal in buſineſs of eſtate. For if a true ſurvey be taken of counſellors and ſtateſmen, there may be found, though rarely, thoſe who can make a ſmall ſtate great, and yet cannot fiddle; as on the other ſide, there will be found a great many that can fiddle very cunningly, but yet are ſo far from being able to make a ſmall ſtate great, as their gift lieth the other way; to bring a great and flouriſhing eſtate to ruin and decay. And certainly thoſe degenerate arts and ſhifts, whereby many counſellors and governors gain both favour with their maſters, and eſtimation with the vulgar, deſerve no better name than fiddling; being things rather pleaſing for the time, and graceful to themſelves only, than tending to the weal and advancement of the ſtate which they ſerve. There are alſo, no doubt, counſellors and governors which may be held ſufficient, *negotiis pares*, able to manage affairs, and to keep them from precipices and manifeſt inconveniencies, which nevertheleſs are far from the ability to raiſe and amplify an eſtate, in power, means, and fortune. But be the workmen what they may be, let us ſpeak of the work; that is, the true greatneſs of kingdoms and eſtates, and the means thereof. An argument fit for great and mighty princes to have in their hand; to the end, that neither by over-meaſuring their forces they loſe themſelves in vain enterprizes; nor on the other ſide, by undervaluing them, they deſcend to fearful and puſillanimous counſels.

The greatneſs of an eſtate in bulk and territory doth fall under meaſure and the greatneſs of finances and revenue doth fall under computation. The population may appear by muſters; and the number and greatneſs of cities and towns by cards and maps. But yet there is not any thing amongſt civil affairs more ſubject to error, than the right valuation and true judgment concerning the power and forces of an eſtate. The kingdom of heaven is compared, not to any great kernel or nut, but to a grain of muſtard-ſeed; which is one of the leaſt grains, but hath in it a property and ſpirit haſtily to get up and ſpread. So are there ſtates, great in territory, and yet not apt to enlarge or command; and ſome that have but a ſmall dimenſion of ſtem, and yet apt to be the foundations of great monarchies.

Walled towns, ſtored arſenals and armouries, goodly races of horſe, chariots of war, elephants, ordnance, artillery, and the like: all this is but a ſheep in a lion's ſkin, except the breed and diſpoſition of the people be ſtout and warlike. Nay number itſelf, in armies, importeth not much, where the people is of weak courage; for, as Virgil ſaith, it never troubles a wolf how many the ſheep be. The army of the Perſians, in the plains of Arbela, was ſuch a vaſt ſea of people, as it did ſomewhat aſtoniſh the commanders in Alexander's army; who came to him therefore, and wiſhed him to ſet upon them by night; but he anſwered, he would not pilfer the victory: and the defeat was eaſy. When Tigranes the Armenian, being encamped upon a hill

hill with four hundred thouſand men, diſcovered the army of the Romans, being not above fourteen thouſand, marching towards him; he made himſelf merry with it, and ſaid, "Yonder men are too many for an embaſſage, and too few for a fight." But before the ſun ſet, he found them enow to give him the chaſe, with infinite ſlaughter. Many are the examples of the great odds between number and courage: ſo that a man may truly make a judgment, that the principal point of greatneſs in any ſtate is to have a race of military men. Neither is money the ſinews of war, as it is trivially ſaid, where the ſinews of mens arms, in baſe and effeminate people, are failing. For Solon ſaid well to Crœſus, when in oſtentation he ſhewed him his gold, "Sir, if any "other come that hath better iron than you, he will be maſter of all this gold." Therefore let any prince or ſtate think ſoberly of his forces, except his militia of natives be of good and valiant ſoldiers. And let princes, on the other ſide, that have ſubjects of martial diſpoſition, know their own ſtrength, unleſs they be otherwiſe wanting unto themſelves. As for mercenary forces, which is the help in this caſe, all examples ſhew, that whatſoever eſtate or prince doth reſt upon them, he may ſpread his feathers for a time, but he will mew them ſoon after.

The bleſſing of Judah and Iſſachar will never meet; that the ſame people or nation ſhould be both the lion's whelp, and the aſs between burdens. Neither will it be, that a people over-laid with taxes ſhould ever become valiant and martial. It is true, that taxes levied by conſent of the eſtate, do abate mens courage leſs; as it hath been ſeen notably in the exciſes of the Low Countries; and, in ſome degree, in the ſubſidies of England. For you muſt note, that we ſpeak now of the heart, and not of the purſe. So that although the ſame tribute and tax, laid by conſent, or by impoſing, be all one to the purſe, yet it works diverſly upon the courage. So that you may conclude, that no people over-charged with tribute is fit for empire.

Let ſtates that aim at greatneſs, take heed how their nobility and gentlemen do multiply too faſt; for that maketh the common ſubject grow to be a peaſant and baſe ſwain, driven out of heart, and in effect but the gentleman's labourer. Even as you may ſee in coppice woods; if you leave your ſtaddles too thick, you ſhall never have clean underwood, but ſhrubs and buſhes. So in countries, if the gentlemen be too many, the commons will be baſe; and you will bring it to that, that not the hundred poll will be fit for an helmet; eſpecially as to the infantry, which is the nerve of an army: and ſo there will be great population, and little ſtrength. This which I ſpeak of, hath been no where better ſeen, than by comparing of England and France; whereof England, though far leſs in territory and population, hath been, nevertheleſs, an overmatch; in regard the middle people of England make good ſoldiers, which the peaſants of France do not. And herein the device of king Henry the ſeventh, whereof I have ſpoken largely in the hiſtory of his life, was profound and admirable; in making farms, and houſes of huſbandry, of a ſtandard; that is, maintained with ſuch a proportion of land unto them, as may breed a ſubject to live in convenient plenty, and no ſervile condition; and to keep the plough in the hands of the owners, and not mere hirelings. And thus indeed you ſhall attain to Virgil's character, which he gives to ancient Italy:

Terra potens armis atque ubere glebae.

Neither is that ſtate, which, for any thing I know, is almoſt peculiar to England, and hardly to be found any where elſe, except it be perhaps in Poland, to be paſſed over; I mean the ſtate of free ſervants, and attendants upon noblemen and gentlemen, which are no ways inferior unto the yeomanry for arms: and therefore out of all queſtion,

queſtion, the ſplendor and magnificence, and great retinues, and hoſpitality of noblemen and gentlemen, received into cuſtom, doth much conduce unto martial greatneſs: whereas, contrariwiſe, the cloſe and reſerved living of noblemen and gentlemen cauſeth a penury of military forces.

By all means it is to be procured, that the trunk of Nebuchadnezzar's tree of monarchy be great enough to bear the branches and the boughs; that is, that the natural ſubjects of the crown or ſtate bear a ſufficient proportion to the ſtranger ſubjects that they govern. Therefore all ſtates, that are liberal of naturalization towards ſtrangers, are fit for empire. For to think that an handful of people can, with the greateſt courage and policy in the world, embrace too large extent of dominion, it may hold for a time, but it will fail ſuddenly. The Spartans were a nice people in point of naturalization; whereby, while they kept their compaſs, they ſtood firm; but when they did ſpread, and their boughs were become too great for their ſtem, they became a windfal upon the ſudden. Never any ſtate was, in this point, ſo open to receive ſtrangers into their body, as were the Romans; therefore it ſorted with them accordingly, for they grew to the greateſt monarchy. Their manner was to grant naturalization, which they called *jus civitatis*, and to grant it in the higheſt degree, that is, not only *jus commercii*, *jus connubii*, *jus hereditatis*; but alſo, *jus ſuffragii*, and *jus honorum*: and this not to ſingular perſons alone, but likewiſe to whole families; yea, to cities, and ſometimes to nations. Add to this, their cuſtom of plantation of colonies, whereby the Roman plant was removed into the ſoil of other nations: and putting both conſtitutions together, you will ſay, that it was not the Romans that ſpread upon the world, but it was the world that ſpread upon the Romans: and that was the ſure way of greatneſs. I have marvelled ſometimes at Spain, how they claſp and contain ſo large dominions, with ſo few natural Spaniards: but ſure the whole compaſs of Spain is a very great body of a tree, far above Rome and Sparta at the firſt. And beſides, though they have not had that uſage, to naturalize liberally, yet they have that which is next to it; that is, to employ, almoſt indifferently, all nations, in their militia of ordinary ſoldiers; yea, and ſometimes in their higheſt commands. Nay, it ſeemeth at this inſtant, they are ſenſible of this want of natives; as by the pragmatical ſanction, now publiſhed, appeareth.

It is certain, that ſedentary and within-door arts, and delicate manufactures, that require rather the finger than the arm, have in their nature a contrariety to a military diſpoſition. And generally all warlike people are a little idle, and love danger better than travail: neither muſt they be too much broken of it, if they ſhall be preſerved in vigour. Therefore it was great advantage in the ancient ſtates of Sparta, Athens, Rome, and others, that they had the uſe of ſlaves, which commonly did rid thoſe manufactures. But that is aboliſhed, in greateſt part, by the chriſtian law. That which cometh neareſt to it is, to leave thoſe arts chiefly to ſtrangers, which for that purpoſe are the more eaſily to be received, and to contain the principal bulk of the vulgar natives within thoſe three kinds; tillers of the ground, free-ſervants, and handicraftſmen of ſtrong and manly arts, as ſmiths, maſons, carpenters, *etc.* not reckoning profeſſed ſoldiers.

But above all, for empire and greatneſs, it importeth moſt, that a nation do profeſs arms as their principal honour, ſtudy, and occupation. For the things which we formerly have ſpoken of, are but habilitations towards arms: and what is habilitation without intention and act? Romulus after his death, as they report or feign, ſent a preſent to the Romans, that above all they ſhould intend arms, and then they ſhould prove

prove the greateſt empire of the world. The fabric of the ſtate of Sparta was wholly, though not wiſely, framed and compoſed to that ſcope and end. The Perſians and Macedonians had it for a flaſh. The Gauls, Germans, Goths, Saxons, Normans, and others, had it for a time. The Turks have it at this day, though in great declination. Of Chriſtian Europe they that have it, are in effect only the Spaniards. But it is ſo plain, that every man profiteth in that he moſt intendeth, that it needeth not to be ſtood upon. It is enough to point at it; that no nation, which doth not directly profeſs arms, may look to have greatneſs fall into their mouths. And on the other ſide, it is a moſt certain oracle of time, that thoſe ſtates that continue long in that profeſſion, as the Romans and Turks principally have done, do wonders: and thoſe that have profeſſed arms but for an age, have notwithſtanding commonly attained that greatneſs in that age, which maintained them long after, when their profeſſion and exerciſe of arms hath grown to decay.

Incident to this point is, for a ſtate to have thoſe laws or cuſtoms, which may reach forth unto them juſt occaſions, as may be pretended, of war. For there is that Juſtice imprinted in the nature of men, that they enter not upon wars, whereof ſo many calamities do enſue, but upon ſome, at the leaſt ſpecious, grounds and quarrels. The Turk hath at hand, for cauſe of war, the propagation of his law or ſect; a quarrel that he may always command. The Romans though they eſteemed the extending the limits of their empire to be great honour to their generals, when it was done; yet they never reſted upon that alone to begin a war. Firſt therefore, let nations that pretend to greatneſs have this, that they be ſenſible of wrongs, either upon borderers, merchants, or politic miniſters; and that they ſit not too long upon a provocation. Secondly, let them be preſt, and ready to give aids and ſuccours to their confederates; as it ever was with the Romans: inſomuch, as if the confederate had leagues defenſive with divers other ſtates, and upon invaſion offered, did implore their aids ſeverally, yet the Romans would ever be the foremoſt, and leave it to none other to have the honour. As for the wars, which were anciently made on the behalf of a kind of party, or tacit conformity of eſtate, I do not ſee how they may be well juſtified; as when the Romans made a war for the liberty of Græcia; or when the Lacedemonians and Athenians made wars, to ſet up or pull down democracies and oligarchies: or when wars were made by foreigners, under the pretence of juſtice or protection, to deliver the ſubjects of others from tyranny and oppreſſion; and the like. Let it ſuffice, that no eſtate expect to be great, that is not awake upon any juſt occaſion of arming.

No body can be healthful without exerciſe, neither natural body nor politic: and certainly, to a kingdom or eſtate, a juſt and honourable war is the true exerciſe. A civil war, indeed, is like the heat of a fever; but a foreign war is like the heat of exerciſe, and ſerveth to keep the body in health. For in a ſlothful peace, both courages will effeminate, and manners corrupt. But howſoever it be for happineſs, without all queſtion, for greatneſs it maketh, to be ſtill, for the moſt part, in arms: and the ſtrength of a veteran army, though it be a chargeable buſineſs, always on foot, is that which commonly giveth the law, or at leaſt the reputation amongſt all neighbour ſtates, as may well be ſeen in Spain; which hath had, in one part or other, a veteran army, almoſt continually, now by the ſpace of ſix-ſcore years.

To be maſter of the ſea, is an abridgment of a monarchy. Cicero writing to Atticus, of Pompey his preparation againſt Cæſar, ſaith, *Conſilium Pompeii plane Themiſtocleum eſt; putat enim, qui mari potitur, eum rerum potiri.* And without doubt Pompey had tired out Cæſar, if upon vain confidence he had not left that

way. We ſee the great effects of battles by ſea. The battle of Actium decided the empire of the world. The battle of Lepanto arreſted the greatneſs of the Turk. There be many examples, where ſea fights have been final to the war; but this is, when princes or ſtates have ſet up their reſt upon the battles. But thus much is certain; that he that commands the ſea is at great liberty, and may take as much and as litt'e of the war as he will. Whereas thoſe that be ſtrongeſt by land are many times, nevertheleſs, in great ſtraits. Surely, at this day, with us of Europe, the vantage of ſtrength at ſea, which is one of the principal dowries of this kingdom of Great Britain, is great: both becauſe moſt of the kingdoms of Europe are not merely inland, but girt with the ſea, moſt part of their compaſs; and becauſe the wealth of both Indies ſeems in great part but an acceſſary to the command of the ſeas.

The wars of latter ages ſeem to be made in the dark, in reſpect of the glory and honour which reflected upon men from the wars in ancient time. There be now, for martial encouragement, ſome degrees and orders of chivalry, which nevertheleſs are conferred promiſcuouſly upon ſoldiers, and no ſoldiers; and ſome remembrance perhaps upon the eſcutcheon, and ſome hoſpitals for maimed ſoldiers, and ſuch like things. But in ancient times, the trophies erected upon the place of the victory; the funeral laudatives and monuments for thoſe that died in the wars; the crowns and garlands perſonal; the ſtile of emperor, which the great kings of the world after borrowed; the triumphs of the generals upon their return; the great donatives and largeſſes upon the diſbanding of the armies, were things able to inflame all mens courages, but above all, that of the triumph, among the Romans, was not pageants or gaudery, but one of the wiſeſt and nobleſt inſtitutions that ever was. For it contained three things; honour to the general; riches to the treaſury out of the ſpoils; and donatives to the army. But that honour, perhaps, were not fit for monarchies; except it be in the perſon of the monarch himſelf, or his ſons; as it came to paſs in the times of the Roman emperors, who did appropriate the actual triumphs to themſelves and their ſons, for ſuch wars as they did atchieve in perſon; and left only, for wars atchieved by ſubjects, ſome triumphal garments and enſigns to the general.

To conclude: no man can, by *care taking*, as the Scripture ſaith, *add a cubit to his ſtature*, in this little model of a man's body: but in the great frame of kingdoms and commonwealths, it is in the power of princes or eſtates, to add amplitude and greatneſs to their kingdoms. For by introducing ſuch ordinances, conſtitutions, and cuſtoms, as we have now touched, they may ſow greatneſs to their poſterity and ſucceſſion. But theſe things are commonly not obſerved, but left to take their chance.

XXX. *Of* Regimen of Health.

THERE is a wiſdom in this beyond the rules of phyſic: a man's own obſervation, what he finds good of, and what he finds hurt of, is the beſt phyſic to preſerve health. But it is a ſafer concluſion to ſay this, "This agreeth not well with me, "therefore I will not continue it;" than this, "I find no offence of this, therefore "I may uſe it." For ſtrength of nature in youth paſſeth over many exceſſes, which are owing a man till his age. Diſcern of the coming on of years, and think not to do the ſame things ſtill; for age will not be defied. Beware of ſudden change in any great point of diet, and if neceſſity enforce it, fit the reſt to it. For it is a ſecret both in nature and ſtate, that it is ſafer to change many things than one. Examine thy cuſtoms of diet, ſleep, exerciſe, apparel, and the like; and try in any thing thou ſhalt judge

judge hurtful, to discontinue it by little and little; but so, as if thou dost find any inconvenience by the change, thou come back to it again; for it is hard to distinguish that which is generally held good and wholsome, from that which is good particularly, and fit for thine own body. To be free-minded and chearfully disposed, at hours of meat, and of sleep, and of exercise, is one of the best precepts of long lasting. As for the passions and studies of the mind, avoid envy, anxious fears, anger, fretting inwards, subtile and knotty inquisitions, joys and exhilarations in excess, sadness not communicated. Entertain hopes, mirth rather than joy, variety of delights, rather than surfeit of them; wonder and admiration, and therefore novelties; studies that fill the mind with splendid and illustrious objects, as histories, fables, and contemplations of nature. If you fly physic in health, altogether, it will be too strange for your body when you shall need it. If you make it too familiar, it will work no extraordinary effect when sickness cometh. I commend rather some diet for certain seasons, than frequent use of physic, except it be grown into a custom. For those diets alter the body more, and trouble it less. Despise no new accident in your body, but ask opinion of it. In sickness, respect health principally; and in health, action. For those that put their bodies to endure in health, may in most sicknesses, which are not very sharp, be cured only with diet and tendering. Celsus could never have spoken it as a physician, had he not been a wise man withal; when he giveth it for one of the great precepts of health and lasting, that a man do vary and interchange contraries; but with an inclination to the more benign extreme. Use fasting and full eating, but rather full eating; watching and sleep, but rather sleep; sitting and exercise, but rather exercise; and the like. So shall nature be cherished and yet taught masteries. Physicians are some of them so pleasing and conformable to the humour of the patient, as they press not the true cure of the disease; and some other are so regular in proceeding according to art for the disease, as they respect not sufficiently the condition of the patient. Take one of a middle temper; or if it may not be found in one man, combine two of either sort; and forget not to call as well the best acquainted with your body, as the best reputed of for his faculty.

XXXI. *Of* Suspicion.

SUSPICIONS amongst thoughts, are like bats amongst birds, they ever fly by twilight. Certainly they are to be repressed, or at the least well guarded: for they cloud the mind, they lose friends, and they check with business, whereby business cannot go on currently and constantly. They dispose kings to tyranny, husbands to jealousy, wise men to irresolution and melancholy. They are defects not in the heart, but in the brain; for they take place in the stoutest natures; as in the example of Henry the seventh of England; there was not a more supicious man, nor a more stout. And in such a composition they do small hurt. For commonly they are not admitted but with examination, whether they be likely or no? But in fearful natures they gain ground too fast. There is nothing makes a man suspect much, more than to know little: and therefore men should remedy suspicion, by procuring to know more, and not to keep their suspicions in smother. What would men have? Do they think those they employ and deal with are saints? Do they not think they will have their own ends, and be truer to themselves than to them? Therefore there is no better way to moderate suspicions, than to account upon such suspicions as true, and yet to bridle them as false: for so far a man ought to make use of suspicions, as to provide, as if

that ſhould be true that he ſuſpects, yet it may do him no hurt. Suſpicions that the mind of itſelf gathers are but buzzes; but ſuſpicions that are artificially nouriſhed, and put into mens heads by the tales and whiſperings of others, have ſtings. Certainly the beſt mean to clear the way in this ſame wood of ſuſpicions, is frankly to communicate them with the party that he ſuſpects; for thereby he ſhall be ſure to know more of the truth of them than he did before; and withal ſhall make that party more circumſpect not to give farther cauſe of ſuſpicion. But this ſhould not be done to men of baſe natures: for they, if they find themſelves once ſuſpected, will never be true. The Italian ſays, *Soſpetto licentia fede*; as if ſuſpicion did give a paſsport to faith; but it ought rather to kindle it to diſcharge itſelf.

XXXII. *Of* Discourse.

SOME in their diſcourſe deſire rather commendation of wit, in being able to hold all arguments, than of judgment in diſcerning what is true; as if it were a praiſe to know what might be ſaid, and not what ſhould be thought. Some have certain common-places and themes, wherein they are good, and want variety: which kind of poverty is for the moſt part tedious, and when it is once perceived, ridiculous. The honourableſt part of talk is to give the occaſion; and again to moderate and paſs to ſomewhat elſe; for then a man leads the dance. It is good in diſcourſe and ſpeech of converſation to vary, and intermingle ſpeech of the preſent occaſion with arguments; tales with reaſons; aſking of queſtions, with telling of opinions; and jeſt with earneſt: for it is a dull thing to tire, and, as we ſay now, to jade any thing too far. As for jeſt, there be certain things which ought to be privileged from it; namely, religion, matters of ſtate, great perſons, any man's preſent buſineſs of importance, and any caſe that deſerveth pity. Yet there be ſome that think their wits have been aſleep, except they dart out ſomewhat that is piquant, and to the quick: that is a vein which ſhould be bridled;

Parce puer ſtimulis, et fortius utere loris.

And generally men ought to find the difference between ſaltneſs and bitterneſs. Certainly he that hath a ſatirical vein, as he maketh others afraid of his wit, ſo he had need be afraid of others memory. He that queſtioneth much ſhall learn much, and content much; but eſpecially if he apply his queſtions to the ſkill of the perſons whom he aſketh: for he ſhall give them occaſion to pleaſe themſelves in ſpeaking, and himſelf ſhall continually gather knowledge. But let his queſtions not be troubleſome, for that is fit for a poſer. And let him be ſure to leave other men their turns to ſpeak. Nay, if there be any that would reign, and take up all the time, let him find means to take them off, and to bring others on; as muſicians uſe to do with thoſe that dance too long galliards. If you diſſemble ſometimes your knowledge of that you are thought to know, you ſhall be thought another time to know what you know not. Speech of a man's ſelf ought to be ſeldom, and well choſen. I knew one was wont to ſay in ſcorn, "He muſt needs be a wiſe man, he "ſpeaks ſo much of himſelf:" and there is but one caſe wherein a man may commend himſelf with good grace, and that is in commending virtue in another; eſpecially if it be ſuch a virtue whereunto himſelf pretendeth. Speech of touch towards others, ſhould be ſparingly uſed: for diſcourſe ought to be as a field, without coming home to any man. I knew two noblemen of the weſt part of England, whereof the one was given to ſcoff, but kept ever royal cheer in his houſe; the other

other would aſk of thoſe that had been at the other's table, "Tell truly, was there "never a flout or dry blow given?" To which the gueſt would anſwer; Such and ſuch a thing paſſed. The lord would ſay, "I thought he would mar a good "dinner." Diſcretion of ſpeech is more than eloquence; and to ſpeak agreeably to him with whom we deal, is more than to ſpeak in good words, or in good order. A good continued ſpeech, without a good ſpeech of interlocution, ſhews ſlowneſs: and a good reply, or ſecond ſpeech, without a good ſettled ſpeech, ſheweth ſhallowneſs and weakneſs. As we ſee in beaſts, that thoſe that are weakeſt in the courſe, are yet nimbleſt in the turn: as it is betwixt the gray-hound and the hare. To uſe too many circumſtances ere one come to the matter, is wearisome; to uſe none at all, is blunt.

XXXIII. *Of* PLANTATIONS.

PLANTATIONS are amongſt ancient, primitive, and heroical works. When the world was young, it begat more children; but now it is old, it begets fewer: for I may juſtly account new plantations to be the children of former kingdoms. I like a plantation in a pure ſoil; that is, where people are not diſplanted to the end to plant in others. For elſe it is rather an extirpation, than a plantation. Planting of countries is like planting of woods; for you muſt make account to loſe almoſt twenty years profit, and expect your recompence in the end. For the principal thing that hath been the deſtruction of moſt plantations, hath been the baſe and haſty drawing of profit in the firſt years. It is true, ſpeedy profit is not to be neglected, as far as may ſtand with the good of the plantation, but no farther. It is a ſhameful and unbleſſed thing, to take the ſcum of people, and wicked condemned men, to be the people with whom you plant; and not only ſo, but it ſpoileth the plantation; for they will ever live like rogues, and not fall to work, but be lazy, and do miſchief, and ſpend victuals, and be quickly weary, and then certify over to their country to the diſcredit of the plantation. The people wherewith you plant, ought to be gardeners, ploughmen, labourers, ſmiths, carpenters, joiners, fiſhermen, fowlers, with ſome few apothecaries, ſurgeons, cooks, and bakers. In a country of plantation, firſt look about what kind of victual the country yields of itſelf to hand; as cheſtnuts, walnuts, pine-apples, olives, dates, plums, cherries, wild honey, and the like, and make uſe of them. Then conſider what victual or eſculent things there are, which grow ſpeedily, and within the year; as parſnips, carrets, turnips, onions, radiſhes, artichokes of Jeruſalem, maiz, and the like. For wheat, barley, and oats, they aſk too much labour: but with peas and beans you may begin; both becauſe they aſk leſs labour, and becauſe they ſerve for meat, as well as for bread. And of rice likewiſe cometh a great increaſe, and it is a kind of meat. Above all, there ought to be brought ſtore of biſket, oatmeal, flour, meal, and the like, in the beginning, till bread may be had. For beaſts or birds, take chiefly ſuch as are leaſt ſubject to diſeaſes, and multiply faſteſt: as ſwine, goats, cocks, hens, turkeys, geeſe, houſe-doves, and the like. The victual in plantations ought to be expended almoſt as in a beſieged town; that is with certain allowance. And let the main part of the ground employed to gardens or corn, be to a common ſtock; and to be laid in, and ſtored up, and then delivered out in proportion; beſides ſome ſpots of ground that any particular perſon will manure for his own private. Conſider likewiſe what commodities the

ſoil

ſoil where the plantation is doth naturally yield, that they may ſome way help to defray the charge of the plantation: ſo it be not, as was ſaid, to the untimely prejudice of the main buſineſs; as it hath fared with tobacco in Virginia. Wood commonly aboundeth but too much; and therefore timber is fit to be one. If there be iron ore, and ſtreams whereupon to ſet the mills; iron is a brave commodity where wood aboundeth. Making of bay-ſalt, if the climate be proper for it ſhould be put in experience. Growing-ſilk likewiſe, if any be, is a likely commodity. Pitch and tar, where ſtore of firs and pines are, will not fail. So drugs and ſweet woods, where they are, cannot but yield great profit. Soap aſhes likewiſe, and other things that may be thought of. But moil not too much under ground; for the hope of mines is very uncertain, and uſeth to make the planters lazy in other things. For government, let it be in the hands of one aſſiſted with ſome counſel: and let them have commiſſion to exerciſe martial laws with ſome limitation. And above all, let men make that profit of being in the wilderneſs, as they have God always and his ſervice, before eyes. Let not the government of the plantation depend upon too many counſellors and undertakers in the country that planteth, but upon a temperate number; and let thoſe be rather noblemen and gentlemen, than merchants; for they look ever to the preſent gain. Let there be freedoms from cuſtom, till the plantation be of ſtrength: and not only freedom from cuſtom, but freedom to carry their commodities where they may make their beſt of them, except there be ſome ſpecial cauſe of caution. Cram not in people, by ſending too faſt, company after company; but rather hearken how they waſte, and ſend ſupplies proportionably; but ſo as the number may live well in the plantation, and not by ſurcharge be in penury. It hath been a great endangering to the health of ſome plantations, that they have built along the ſea and rivers, in mariſh and unwholeſome grounds. Therefore though you begin there to avoid carriage, and other like diſcommodities, yet build ſtill rather upwards from the ſtreams, than along. It concerneth likewiſe the health of the plantation, that they have good ſtore of ſalt with them, that they may uſe it in their victuals when it ſhall be neceſſary. If you plant where ſavages are, do not only entertain them with trifles and gingles; but uſe them juſtly and graciouſly, with ſufficient guard nevertheleſs: and do not win their favour by helping them to invade their enemies, but for their defence it is not amiſs. And ſend oft of them over to the country that plants, that they may ſee a better condition than their own, and commend it when they return. When the plantation grows to ſtrength, then it is time to plant with women, as well as with men; that the plantation may ſpread into generations; and not be ever pieced from without. It is the ſinfulleſt thing in the world, to forſake or deſtitute a plantation once in forwardneſs: for beſides the diſhonour, it is the guiltineſs of blood of many commiſerable perſons.

XXXIV. *Of* Riches.

I Cannot call riches better than the baggage of virtue. The Roman word is better, *impedimenta*. For as the baggage is to an army, ſo are riches to virtue. It cannot be ſpared, nor left behind, but it hindreth the march; yea, and the care of it, ſometimes, loſeth or diſturbeth the victory: of great riches there is no real uſe, except it be in the diſtribution; the reſt is but conceit. So ſaith Solomon; *Where much is, there are many to conſume it; and what hath the owner, but the ſight of it with his*

his eyes? The perſonal fruition in any man, cannot reach to feel great riches: there is a cuſtody of them; or a power of dole and donative of them; or a fame of them; but no ſolid uſe to the owner. Do you not ſee what feigned prices are ſet upon little ſtones and rarities? And what works of oſtentation are undertaken, becauſe there might ſeem to be ſome uſe of great riches? But then you will ſay they may be of uſe, to buy men out of dangers or troubles. As Solomon ſaith, *Riches are as a ſtronghold in the imagination of the rich man.* But this is excellently expreſſed, that it is in imagination, and not always in fact. For certainly great riches have ſold more men than they have bought out. Seek not proud riches, but ſuch as thou mayſt get juſtly, uſe ſoberly, diſtribute chearfully, and leave contentedly. Yet have no abſtract nor friarly contempt of them: but diſtinguiſh, as Cicero ſaith well of Rabirius Poſthumus; *in ſtudio rei amplificandae apparebat, non avaritiae praedam, ſed inſtrumentum bonitati quaeri.* Hearken alſo to Solomon, and beware of haſty gathering of riches: *Qui feſtinat ad divitias, non erit inſons.* The poets feign, that when Plutus, which is riches, is ſent from Jupiter, he limps, and goes ſlowly; but when he is ſent from Pluto, he runs, and is ſwift of foot: meaning that riches gotten by good means and juſt labour pace ſlowly; but when they come by the death of others, as by the courſe of inheritance, teſtaments, and the like, they come tumbling upon a man. But it might be applied likewiſe to Pluto, taking him for the devil. For when riches come from the devil, as by fraud, and oppreſſion, and unjuſt means, they come upon ſpeed. The ways to enrich are many, and moſt of them foul. Parſimony is one of the beſt, and yet is not innocent: for it withholdeth men from works of liberality and charity. The improvement of the ground is the moſt natural obtaining of riches; for it is our great mother's bleſſing, the earth's; but it is ſlow. And yet, where men of great wealth do ſtoop to huſbandry, it multiplieth riches exceedingly. I knew a nobleman in England that had the greateſt audits of any man in my time; a great grazier, a great ſheep-maſter, a great timber-man, a great collier, a great corn-maſter, a great lead-man; and ſo of iron, and a number of the like points of huſbandry: ſo as the earth ſeemed a ſea to him, in reſpect of the perpetual importation. It was truly obſerved by one, that himſelf came very hardly to a little riches, and very eaſily to great riches. For when a man's ſtock is come to that, that he can expect the prime of markets, and overcome thoſe bargains, which for their greatneſs are few mens money, and be partner in the induſtries of younger men, he cannot but increaſe mainly. The gains of ordinary trades and vocations are honeſt, and furthered by two things, chiefly, by diligence, and by a good name for good and fair dealing. But the gains of bargains are of a more doubtful nature, when men ſhould wait upon others neceſſity; broke by ſervants and inſtruments to draw them on; put off others cunningly that would be better chapmen, and the like practices, which are crafty and naught. As for the chopping of bargains, when a man buys, not to hold, but to ſell over again, that commonly grindeth double, both upon the ſeller, and upon the buyer. Sharings do greatly enrich, if the hands be well choſen that are truſted. Uſury is the certaineſt means of gain, though one of the worſt, as that whereby a man doth eat his bread *in ſudore vultus alieni*; and beſides, doth plough upon Sundays. But yet certain though it be, it hath flaws; for that the ſcriveners and brokers do value unſound men, to ſerve their own turn. The fortune in being the firſt in an invention, or in a privilege, doth cauſe ſometimes a wonderful overgrowth in riches; as it was with the firſt ſugarman in the Canaries. Therefore, if a man can play the true logician, to have as well

well judgment as invention, he may do great matters, especially if the times be fit. He that resteth upon gains certain, shall hardly grow to great riches. And he that puts all upon adventures, doth oftentimes break, and come to poverty: it is good therefore to guard adventures with certainties that may uphold losses. Monopolies and co-emption of wares for resale, where they are not restrained, are great means to enrich; especially if the party have intelligence what things are like to come into request, and so store himself beforehand. Riches gotten by service, though it be of the best rise, yet when they are gotten by flattery, feeding humours, and other servile conditions, they may be placed amongst the worst. As for fishing for testaments and executorships, as Tacitus saith of Seneca, *Testamenta et orbos tanquam indagine capi*, it is yet worse; by how much men submit themselves to meaner persons, than in service. Believe not much them that seem to despise riches; for they despise them that despair of them; and none worse when they come to them. Be not peny-wise; riches have wings, and sometimes they fly away of themselves, sometimes they must be set flying to bring in more. Men leave their riches either to their kindred, or to the public: and moderate portions prosper best in both. A great estate left to an heir, is as a lure to all the birds of prey round about, to seize on him, if he be not the better established in years and judgment. Likewise glorious gifts and foundations, are like sacrifices without salt; and but the painted sepulchres of alms, which soon will putrify and corrupt inwardly. Therefore measure not thine advancements by quantity, but frame them by measure; and defer not charities till death: for certainly, if a man weigh it rightly, he that doth so, is rather liberal of another man's than of his own.

XXXV. *Of* Prophecies.

I Mean not to speak of divine prophecies, nor of heathen oracles, nor of natural predictions; but only of prophecies that have been of certain memory, and from hidden causes. Saith the Pythonissa to Saul; *To-morrow thou and thy son shall be with me.* Virgil hath these Verses from Homer:

At domus Aeneae cunctis dominabitur oris,
Et nati natorum, et qui nascentur ab illis. Æneid. iii. 97.

A prophecy, as it seems, of the Roman empire. Seneca the Tragedian hath these verses:

Venient annis
Secula seris, quibus oceanus
Vincula rerum laxet, et ingens
Pateat tellus, Tiphysque novos
Detegat orbes; nec sit terris
Ultima Thule:

A prophecy of the discovery of America. The daughter of Polycrates dreamed, that Jupiter bathed her father, and Apollo anointed him: and it came to pass, that he was crucified in an open place, where the sun made his body run with sweat, and the rain washed it. Philip of Macedon dreamed, he sealed up his wife's belly; whereby he did expound it, that his wife should be barren; but Aristander the soothsayer told him, his wife was with child: because men do not use to seal vessels that are empty. A phantasm that appeared to M. Brutus in his tent, said to him; *Philippis iterum me videbis.* Tiberius said to Galba, *Tu quoque, Galba, degustabis imperium.* In Vespasian's time there went a prophecy in the east, that those that should

ſhould come forth of Judæa, ſhould reign over the world; which though it may be was meant of our Saviour, yet Tacitus expounds it of Veſpaſian. Domitian dreamed the night before he was ſlain, that a golden head was growing out of the nape of his neck: and indeed the ſucceſſion that followed him, for many years, made golden times. Henry the ſixth of England ſaid of Henry the ſeventh, when he was a lad, and gave him water; "This is the lad that ſhall enjoy the crown for which "we ſtrive." When I was in France, I heard from one Dr. Pena, that the queen-mother, who was given to curious arts, cauſed the king her huſband's nativity to be calculated under a falſe name; and the aſtrologer gave a judgment, that he ſhould be killed in a duel; at which the queen laughed, thinking her huſband to be above challenges and duels: but he was ſlain, upon a courſe at tilt, the ſplinters of the ſtaff of Montgomery going in at his beaver. The trivial prophecy which I heard when I was a child, and queen Elizabeth was in the flower of her years, was;

When Hempe is ſponne,
England's donne.

Whereby it was generally conceived, that after the princes had reigned, which had the principal letters of that word Hempe, which were Henry, Edward, Mary, Philip, and Eliſabeth, England ſhould come to utter confuſion: which, thanks be to God, is verified only in the change of the name, for that the king's ſtile is now no more of England, but of Britain. There was alſo another prophecy before the year of eighty eight, which I do not well underſtand:

There ſhall be ſeen upon a day,
Between the baugh and the May,
The black fleet of Norway.
When that is come and gone,
England build houſes of lime and ſtone,
For after wars ſhall you have none.

It was generally conceived to be meant of the Spaniſh fleet that came in eighty eight. For that the King of Spain's ſurname, as they ſay, is Norway. The prediction of Regiomontanus,

Octogeſimus octavus mirabilis annus:

was thought likewiſe accompliſhed, in the ſending of that great fleet, being the greateſt in ſtrength, though not in number, of all that ever ſwam upon the ſea. As for Cleon's dream, I think it was a jeſt: it was, that he was devoured of a long dragon; and it was expounded of a maker of ſauſages that troubled him exceedingly. There are numbers of the like kind; eſpecially if you include dreams, and predictions of aſtrology. But I have ſet down theſe few only of certain credit, for example. My judgment is, that they ought all to be deſpiſed, and ought to ſerve but for winter talk by the fire-ſide. Though when I ſay deſpiſed, I mean it as for belief: for otherwiſe, the ſpreading or publiſhing of them, is in no ſort to be deſpiſed; for they have done much miſchief. And I ſee many ſevere laws made to ſuppreſs them. What hath given them grace, and ſome credit, conſiſteth in three things: firſt, that men mark when they hit, and never mark when they miſs; as they do, generally, alſo of dreams. The ſecond is, that probable conjectures, or obſcure traditions, many times, turn themſelves into prophecies: while the nature of man, which coveteth divination, thinks it no peril to foretel that, which indeed they do but collect; as that of Seneca's verſe. For ſo much was then ſubject to

demonſtration, that the globe of the earth had great parts beyond the Atlantic, which might be probably conceived not to be all ſea: and adding thereto, the tradition in Plato's *Timaeus*, and his *Atlanticus*, it might encourage one to turn it to a prediction. The third and laſt, which is the great one, is, that almoſt all of them, being infinite in number, have been impoſtures, and by idle and crafty brains, merely contrived and feigned after the event paſt.

XXXVI. *Of* Ambition.

AMBITION is like choler, which is an humour that maketh men active, earneſt, full of alacrity, and ſtirring, if it be not ſtopped. But if it be ſtopped, and cannot have its way, it becometh aduſt, and thereby malign and venomous. So ambitious men, if they find the way open for their riſing, and ſtill get forward, they are rather buſy than dangerous; but if they be checked in their deſires, they become ſecretly diſcontent, and look upon men and matters with an evil eye, and are beſt pleaſed when things go backward; which is the worſt property in a ſervant of a prince or ſtate. Therefore it is good for princes, if they uſe ambitious men, to handle it ſo, as they be ſtill progreſſive, and not retrograde; which, becauſe it cannot be without inconvenience, it is good not to uſe ſuch natures at all. For if they riſe not with their ſervice, they will take order to make their ſervice fall with them. But ſince we have ſaid it were good not to uſe men of ambitious natures, except it be upon neceſſity, it is fit we ſpeak, in what caſes they are of neceſſity. Good commanders in the wars muſt be taken, be they never ſo ambitious: for the uſe of their ſervice diſpenſeth with the reſt; and to take a ſoldier without ambition, is to pull off his ſpurs. There is alſo great uſe of ambitious men in being ſcreens to princes, in matters of danger and envy: for no man will take that part, except he be like a ſeeled dove, that mounts and mounts, becauſe he cannot ſee about him. There is uſe alſo of ambitious men in pulling down the greatneſs of any ſubject that over-tops; as Tiberius uſed Macro in the pulling down of Sejanus. Since therefore they muſt be uſed in ſuch caſes, there reſteth to ſpeak how they are to be bridled, that they may be leſs dangerous. There is leſs danger of them, if they be of mean birth, than if they be noble; and if they be rather harſh of nature, than gracious and popular; and if they be rather new raiſed, than grown cunning and fortified in their greatneſs. It is counted by ſome a weakneſs in princes to have favourites; but it is, of all others, the beſt remedy againſt ambitious great ones. For when the way of pleaſuring and diſpleaſuring lieth by the favourite, it is impoſſible any other ſhould be over-great. Another means to curb them, is to balance them by others as proud as they. But then there muſt be ſome middle counſellors to keep things ſteady; for without that ballaſt the ſhip will roll too much. At the leaſt a prince may animate and inure ſome meaner perſons, to be as it were ſcourges to ambitious men. As for the having of them obnoxious to ruin, if they be of fearful natures, it may do well: but if they be ſtout and daring, it may precipitate their deſigns, and prove dangerous. As for the pulling of them down, if the affairs require it, and that it may not be done with ſafety ſuddenly, the only way is, the interchange continually of favours and diſgraces, whereby they may not know what to expect, and be as it were in a wood. Of ambitions, it is leſs harmful the ambition to prevail in great things, than that other to appear in every thing; for that breeds confuſion, and mars buſineſs: but yet it is leſs danger to have an ambitious man

ſtirring,

ſtirring in buſineſs, than great in dependences. He that ſeeketh to be eminent amongſt able men, hath a great taſk; but that is ever good for the public. But he that plots to be the only figure amongſt ciphers, is the decay of a whole age. Honour hath three things in it: the vantage ground to do good; the approach to kings and principal perſons; and the raiſing of a man's own fortunes. He that hath the beſt of theſe intentions, when he aſpireth, is an honeſt man: and that prince that can diſcern of theſe intentions in another that aſpireth, is a wiſe prince. Generally let princes and ſtates chooſe ſuch miniſters as are more ſenſible of duty than of riſing; and ſuch as love buſineſs rather upon conſcience, than upon bravery: and let them diſcern a buſy nature from a willing mind.

XXXVII. *Of* Masks and Triumphs.

THESE things are but toys to come amongſt ſuch ſerious obſervations. But yet ſince princes will have ſuch things, it is better they ſhould be graced with elegancy, than daubed with coſt. Dancing to ſong, is a thing of great ſtate and pleaſure. I underſtand it, that the ſong be in quire, placed aloft, and accompanied with ſome broken muſic: and the ditty fitted to the device. Acting in ſong, eſpecially in dialogues, hath an extreme good grace; I ſay acting, not dancing, for that is a mean and vulgar thing, and the voices of the dialogue ſhould be ſtrong and manly, a baſe, and a tenor; no treble, and the ditty high and tragical; not nice or dainty. Several quires placed one over-againſt another, and taking the voice by catches, anthem-wiſe, give great pleaſure. Turning dances into figure, is a childiſh curioſity. And generally let it be noted, that thoſe things which I here ſet down, are ſuch as do naturally take the ſenſe, and not reſpect petty wonderments. It is true, the alterations of ſcenes, ſo it be quietly and without noiſe, are things of great beauty and pleaſure; for they feed and relieve the eye before it be full of the ſame object. Let the ſcenes abound with light, ſpecially coloured and varied: and let the maſkers, or any other that are to come down from the ſcene, have ſome motions upon the ſcene itſelf before their coming down: for it draws the eye ſtrangely, and makes it with great pleaſure to deſire to ſee that it cannot perfectly diſcern. Let the ſongs be loud and cheerful, and not chirpings or pulings. Let the muſic likewiſe be ſharp and loud, and well placed. The colours that ſhew beſt by candle-light, are white, carnation, and a kind of ſea-water green; and ouches, or ſpangs, as they are of no great coſt, ſo they are of moſt glory. As for rich embroidery, it is loſt and not diſcerned. Let the ſuits of the maſkers be graceful, and ſuch as become the perſon when the vizards are off: not after examples of known attires; turks, ſoldiers, mariners, and the like. Let anti-maſks not be long; they have been commonly of fools, ſatyrs, baboons, wild men, antics, beaſts, ſpirits, witches, ethiopes, pigmies, turquets, nymphs, ruſtics, cupids, ſtatues moving, and the like. As for angels, it is not comical enough to put them in anti-maſks; and any thing that is hideous, as devils, giants, is on the other ſide as unfit: but chiefly, let the muſic of them be recreative, and with ſome ſtrange changes. Some ſweet odours ſuddenly coming forth without any drops falling, are in ſuch a company, as there is ſteam and heat, things of great pleaſure and refreſhment. Double maſks, one of men, another of ladies, addeth ſtate and variety. But all is nothing except the room be kept clear and neat.

For juſts, and tourneys, and barriers, the glories of them are chiefly in the chariots, wherein the challengers make their entry; eſpecially if they be drawn with

ſtrange beaſts; as lions, bears, camels, and the like: or in the devices of their entrance, or in the bravery of their liveries; or in the goodly furniture of their horſes and armour. But enough of theſe toys.

XXXVIII. *Of* NATURE *in* MEN.

NATURE is often hidden, ſometimes overcome, ſeldom extinguiſhed. Force maketh nature more violent in the return; doctrine and diſcourſe maketh nature leſs importune: but cuſtom only doth alter and ſubdue nature. He that ſeeketh victory over his nature, let him not ſet himſelf too great, nor too ſmall taſks; for the firſt will make him dejected by often failings; and the ſecond will make him a ſmall proceeder, though by often prevailings. And at the firſt, let him practiſe with helps, as ſwimmers do with bladders or ruſhes: but after a time let him practiſe with diſadvantages, as dancers do with thick ſhoes. For it breeds great perfection if the practice be harder than the uſe. Where nature is mighty, and therefore the victory hard, the degrees had need be, firſt to ſtay and arreſt nature in time; like to him that would ſay over the four and twenty letters when he was angry: then to go leſs in quantity; as if one ſhould, in forbearing wine, come from drinking healths, to a draught at a meal; and laſtly, to diſcontinue altogether. But if a man have the fortitude and reſolution to enfranchiſe himſelf at once, that is the beſt:

Optimus ille animi vindex, laedentia pectus
Vincula qui rupit, dedoluitque ſemel.

Neither is the ancient rule amiſs, to bend nature as a wand to a contrary extreme, whereby to ſet it right: underſtanding it where the contrary extreme is no vice. Let not a man force a habit upon himſelf with a perpetual continuance, but with ſome intermiſſion. For both the pauſe reinforceth the new onſet; and if a man that is not perfect be ever in practice, he ſhall as well practiſe his errors as his abilities, and induce one habit of both: and there is no means to help this but by ſeaſonable intermiſſions. But let not a man truſt his victory over his nature too far; for nature will lie buried a great time, and yet revive upon the occaſion or temptation. Like as it was with Æſop's damſel, turned from a cat to a woman, who ſat very demurely at the board's end, till a mouſe ran before her. Therefore let a man either avoid the occaſion altogether, or put himſelf often to it, that he may be little moved with it. A man's nature is beſt perceived in privateneſs, for there is no affectation; in paſſion, for that putteth a man out of his precepts; and in a new caſe or experiment, for there cuſtom leaveth him. They are happy men, whoſe natures ſort with their vocations; otherwiſe they may ſay, *Multum incola fuit anima mea:* when they converſe in thoſe things they do not affect. In ſtudies, whatſoever a man commandeth upon himſelf, let him ſet hours for it; but whatſoever is agreeable to his nature, let him take no care for any ſet times: for his thoughts will fly to it of themſelves; ſo as the ſpaces of other buſineſs or ſtudies will ſuffice. A man's nature runs either to herbs or weeds: Therefore let him ſeaſonably water the one, and deſtroy the other.

XXXIX. *Of* CUSTOM *and* EDUCATION.

MENS thoughts are much according to their inclination; their diſcourſe and ſpeeches according to their learning and infuſed opinions; but their deeds are after as they have been accuſtomed. And therefore, as Machiavel well noteth, though in

in an evil-favoured inſtance, there is no truſting to the force of nature, nor to the bravery of words, except it be corroborated by cuſtom. His inſtance is, that for the atchieving of a deſperate conſpiracy, a man ſhould not reſt upon the fierceneſs of any man's nature, or his reſolute undertakings; but take ſuch an one as hath had his hands formerly in blood. But Machiavel knew not of a frier Clement, nor a Ravillac, nor a Jauregny, nor a Baltazar Gerard: yet his rule holdeth ſtill, that nature nor the engagement of words, are not ſo forcible as cuſtom. Only ſuperſtition is now ſo well advanced, that men of the firſt blood are as firm as butchers by occupation: and votary reſolution is made equipollent to cuſtom, even in matter of blood. In other things, the predominancy of cuſtom is every where viſible; inſomuch as a man would wonder to hear men profeſs, proteſt, engage, give great words, and then do juſt as they have done before: as if they were dead images, and engines moved only by the wheels of cuſtom. We ſee alſo the reign or tyranny of cuſtom what it is. The Indians, I mean the ſect of their wiſe men, lay themſelves quietly upon a ſtack of wood, and ſo ſacrifice themſelves by fire. Nay, the wives ſtrive to be burned with the corps of their huſbands. The lads of Sparta, of ancient time, were wont to be ſcourged upon the altar of Diana, without ſo much as wincing. I remember in the beginning of queen Elizabeth's time of England, an Iriſh rebel condemned put up a petition to the deputy, that he might be hanged in a with, and not in an halter, becauſe it had been ſo uſed with former rebels. There be monks in Ruſſia, for penance, that will ſit a whole night in a veſſel of water, till they be engaged with hard ice. Many examples may be put of the force of cuſtom, both upon mind and body. Therefore ſince cuſtom is the principal magiſtrate of man's life, let men by all means endeavour to obtain good cuſtoms. Certainly cuſtom is moſt perfect, when it beginneth in young years: this we call education, which is, in effect, but an early cuſtom. So we ſee in languages, the tongue is more pliant to all expreſſions and ſounds, the joints are more ſupple to all feats of activity and motions, in youth than afterwards. For it is true, that late learners cannot ſo well take the ply, except it be in ſome minds that have not ſuffered themſelves to fix, but have kept themſelves open and prepared to receive continual amendment, which is exceeding rare. But if the force of cuſtom ſimple and ſeparate be great; the force of cuſtom copulate and conjoined, and collegiate, is far greater. For there example teacheth, company comforteth, emulation quickeneth, glory raiſeth: ſo as in ſuch places the force of cuſtom is in its exaltation. Certainly the great multiplication of virtues upon human nature, reſteth upon ſocieties well ordained and diſciplined. For commonwealths and good governments do nouriſh virtue grown, but do not much mend the ſeeds. But the miſery is, that the moſt effectual means are now applied to the ends leaſt to be deſired.

XL. *Of* Fortune.

IT cannot be denied but outward accidents conduce much to fortune: favour, opportunity, death of others, occaſion fitting virtue. But chiefly, the mold of a man's fortune is in his own hands. *Faber quiſque fortunae ſuae*; ſaith the poet. And the moſt frequent of external cauſes is, that the folly of one man is the fortune of another. For no man proſpers ſo ſuddenly as by others errors. *Serpens niſi ſerpentem comederit non fit draco.* Overt and apparent virtues bring forth praiſe; but there be ſecret and hidden virtues that bring forth fortune: certain deliveries of a man's ſelf, which have no name. The Spaniſh name, *deſemboltura*, partly expreſſeth them: when there be not

not ſtonds, nor reſtiveneſs in a man's nature; but that the wheels of his mind keep way with the wheels of his fortune. For ſo Livy, after he had deſcribed Cato Major in theſe words; *in illo viro, tantum robur corporis et animi fuit, ut quocunque loco natus eſſet, fortunam ſibi facturus videretur*; falleth upon that, that he had *verſatile ingenium*. Therefore if a man look ſharply and attentively, he ſhall ſee fortune: for though ſhe be blind, yet ſhe is not inviſible. The way of fortune is like the milky way in the ſky; which is a meeting or knot of a number of ſmall ſtars, not ſeen aſunder, but giving light together. So are there a number of little and ſcarce diſcerned virtues, or rather faculties and cuſtoms, that make men fortunate. The Italians note ſome of them, ſuch as a man would little think. When they ſpeak of one that cannot do amiſs, they will throw in into his other conditions, that he hath *Poco di matto*. And certainly there be not two more fortunate properties, than to have a little of the fool, and not too much of the honeſt. Therefore extreme lovers of their country, or maſters, were never fortunate, neither can they be. For when a man placeth his thoughts without himſelf, he goeth not his own way. An haſty fortune maketh an enterprizer and remover; the French hath it better, *entreprenant*, or *remuant*, but the exerciſed fortune maketh the able man. Fortune is to be honoured and reſpected, and it be but for her daughters, Confidence and Reputation. For thoſe two felicity breedeth: the firſt within a man's ſelf; the latter, in others towards him. All wiſe men, to decline the envy of their own virtues, uſe to aſcribe them to providence and fortune; for ſo they may the better aſſume them: and beſides, it is greatneſs in a man to be the care of the higher powers. So Cæſar ſaid to the pilot in the tempeſt, *Cæſarem portas, et fortunam ejus*. So Sylla choſe the name of *felix*, and not of *magnus*: and it hath been noted, that thoſe that aſcribe openly too much to their own wiſdom and policy, end unfortunate. It is written, that Timotheus the Athenian, after he had, in the account he gave to the ſtate of his government, often interlaced this ſpeech, "And in this "fortune had no part; never proſpered in any thing he undertook afterwards. Certainly there be, whoſe fortunes are like Homer's verſes, that have a ſlide and eaſineſs more than the verſes of other poets: as Plutarch ſaith of Timoleon's fortune, in reſpect of that of Ageſilaus or Epaminondas. And that this ſhould be, no doubt it is much in a man's ſelf.

XLI. *Of* Us-ury.

MANY have made witty invectives againſt uſury. They ſay, That it is pity the devil ſhould have God's part, which is the tithe. That the uſurer is the greateſt ſabbath-breaker, becauſe his plough goeth every ſunday. That the uſurer is the drone that Virgil ſpeaketh of:

Ignavum fucos pecus à praeſepibus arcent.

That the uſurer breaketh the firſt law that was made for mankind after the fall; which was, *In ſudore vultus tui comedes panem tuum*; not, *In ſudore vultus alieni*. That uſurers ſhould have orange-tawney bonnets, becauſe they do judaize. That it is againſt nature, for money to beget money: and the like. I ſay this only, that uſury is a *conceſſum propter duritiem cordis*: for ſince there muſt be borrowing and lending, and men are ſo hard of heart as they will not lend freely, uſury muſt be permitted. Some others have made ſuſpicious and cunning propoſitions of banks, diſcovery of mens eſtates, and other inventions. But few have ſpoken of uſury uſefully. It is good to ſet before us the incommodities and commodities of uſury; that the good

may

may be either weighed out, or culled out; and warily to provide, that while we make forth to that which is better, we meet not with that which is worſe.

The diſcommodities of uſury are: firſt, that it makes fewer merchants. For were it not for this lazy trade of uſury, money would not lie ſtill but would in great part be employed upon merchandizing; which is the *vena porta* of wealth in a ſtate. The ſecond, that it makes poor merchants. For as a farmer cannot huſband his ground ſo well, if he ſit at a great rent; ſo the merchant cannot drive his trade ſo well, if he ſit at great uſury. The third is incident to the other two; and that is, the decay of cuſtoms of kings or ſtates, which ebb or flow with merchandizing. The fourth, that it bringeth the treaſure of a realm or ſtate into a few hands. For the uſurer being at certainties, and others at uncertainties, at the end of the game moſt of the money will be in the box; and ever a ſtate flouriſheth when wealth is more equally ſpread. The fifth, that it beats down the price of land: for the employment of money is chiefly either merchandizing or purchaſing; and uſury way-lays both. The ſixth, that it doth dull and damp all induſtries, improvements, and new inventions, wherein money ſhould be ſtirring, if it were not for this ſlug. The laſt, that it is the canker and ruin of many mens eſtates, which in proceſs of time breeds a public poverty.

On the other ſide, the commodities of uſury are: firſt, that howſoever uſury in ſome reſpect hindereth merchandizing, yet in ſome other it advanceth it; for it is certain that the greateſt part of trade is driven by young merchants, upon borrowing at intereſt; ſo as if the uſurer either call in or keep back his money, there will enſue preſently a great ſtand of trade. The ſecond is, that were it not for this eaſy borrowing upon intereſt, mens neceſſities would draw upon them a moſt ſudden undoing; in that they would be forced to ſell their means, be it lands or goods, far under foot; and ſo whereas uſury doth but gnaw upon them, bad markets would ſwallow them quite up. As for mortgaging or pawning, it will little mend the matter; for either men will not take pawns without uſe; or if they do, they will look preciſely for the forfeiture. I remember a cruel moneyed man in the country, that would ſay; "The "devil take this uſury, it keeps us from forfeitures of mortgages and bonds." The third and laſt is, that it is a vanity to conceive, that there would be ordinary borrowing without profit; and it is impoſſible to conceive the number of inconveniencies that will enſue, if borrowing be cramped. Therefore to ſpeak of the aboliſhing of uſury is idle. All ſtates have ever had it in one kind or rate or other. So as that opinion muſt be ſent to Utopia.

To ſpeak now of the reformation and reglement of uſury: how the diſcommodities of it may be beſt avoided, and the commodities retained: it appears by the balance of commodities and diſcommodities of uſury, two things are to be reconciled. The one, that the tooth of uſury be grinded that it bite not too much: the other, that there be left open a means to invite monied men to lend to the merchants, for the continuing and quickning of trade. This cannot be done, except you introduce two ſeveral ſorts of uſury, a leſs and a greater. For if you reduce uſury to one low rate, it will eaſe the common borrower, but the merchant will be to ſeek for money. And it is to be noted, that the trade of merchandize being the moſt lucrative, may bear uſury at a good rate; other contracts not ſo.

To ſerve both intentions, the way ſhould be briefly thus. That there be two rates of uſury; the one free and general for all; the other under licence only to certain perſons, and in certain places of merchandizing. Firſt therefore let uſury in general be:

be reduced to five in the hundred; and let that rate be proclaimed to be free and current; and let the ſtate ſhut itſelf out to take any penalty for the ſame. This will preſerve borrowing from any general ſtop or dryneſs. This will eaſe infinite borrowers in the country. This will in good part raiſe the price of land, becauſe land purchaſed at ſixteen years purchaſe, will yield ſix in the hundred and ſomewhat more, whereas this rate of intereſt yields but five. This by like reaſon will encourage and edge induſtrious and profitable improvements; becauſe many will rather venture in that kind, than take five in the hundred, eſpecially having been uſed to greater profit. Secondly, let there be certain perſons licenſed to lend to known merchants, upon uſury at a higher rate: and let it be with the cautions following. Let the rate be, even with the merchant himſelf, ſomewhat more eaſy than that he uſed formerly to pay: for by that means all borrowers ſhall have ſome eaſe by this reformation, be he merchant or whoſoever. Let it be no bank or common ſtock, but every man be maſter of his own money. Not that I altogether miſlike banks, but they will hardly be brooked in regard of certain ſuſpicions. Let the ſtate be anſwered ſome ſmall matter for the licence, and the reſt left to the lender: for if the abatement be but ſmall, it will no whit diſcourage the lender. For he, for example, that took before ten or nine in the hundred, will ſooner deſcend to eight in the hundred, than give over his trade of uſury; and go from certain gains, to gains of hazard. Let theſe licenſed lenders be in number indefinite, but reſtrained to certain principal cities and towns of merchandizing: for then they will be hardly able to colour other mens moneys in the country; ſo as the licence of nine will not ſuck away the current rate of five: for no man will ſend his moneys far off, nor put them into unknown hands.

If it be objected, that this doth in a ſort authoriſe uſury, which before was in ſome places but permiſſive: the anſwer is, that it is better to mitigate uſury by declaration, than to ſuffer it to rage by connivance.

XLII. *Of* YOUTH *and* AGE.

A Man that is young in years, may be old in hours, if he have loſt no time. But that happeneth rarely. Generally youth is like the firſt cogitations, not ſo wiſe as the ſecond. For there is a youth in thoughts, as well as in ages. And yet the invention of young men is more lively than that of old; and imaginations ſtream into their minds better, and as it were more divinely. Natures that have much heat, and great and violent deſires and perturbations, are not ripe for action, till they have paſſed the meridian of their years: as it was with Julius Cæſar, and Septimius Severus. Of the latter of whom it is ſaid, *Juventutem egit erroribus, imo furoribus, plenam.* And yet he was the ableſt emperor almoſt of all the liſt. But repoſed natures may do well in youth: as it is ſeen in Auguſtus Cæſar, Coſmus duke of Florence, Gaſton de Foix, and others. On the other ſide, heat and vivacity in age is an excellent compoſition for buſineſs. Young men are fitter to invent than to judge; fitter for execution than for counſel; and fitter for new projects, than for ſettled buſineſs. For the experience of age, in things that fall within the compaſs of it, directeth them; but in new things abuſeth them. The errors of young men are the ruin of buſineſs; but the errors of aged men amount but to this; that more might have been done, or ſooner. Young men, in the conduct and management of actions embrace more than they can hold; ſtir more than they can quiet; fly to the end, without conſideration of the means and degrees; purſue ſome few principles, which they have chanced upon, abſurdly; care not

not to innovate, which draws unknown inconveniences; uſe extreme remedies at firſt; and, that which doubleth all errors, will not acknowledge or retract them; like an unready horſe, that will neither ſtop nor turn. Men of age object too much, conſult too long, adventure too little, repent too ſoon, and ſeldom drive buſineſs home to the full period; but content themſelves with a mediocrity of ſucceſs. Certainly it is good to compound employments of both; for that will be good for the preſent, becauſe the virtues of either age may correct the defects of both: and good for ſucceſſion, that young men may be learners, while men in age are actors: and laſtly, good for external accidents, becauſe authority followeth old men, and favour and popularity youth. But for the moral part, perhaps youth will have the preeminence, as age hath for the politic. A certain Rabbin upon the text, *Your young men ſhall ſee viſions, and your old men ſhall dream dreams*; inferreth, that young men are admitted nearer to God than old; becauſe viſion is a clearer revelation than a dream. And certainly, the more a man drinketh of the world, the more it intoxicateth; and age doth profit rather in the powers of underſtanding, than in the virtues of the will and affections. There be ſome have an over-early ripeneſs in their years, which fadeth betimes: theſe are firſt, ſuch as have brittle wits, the edge whereof is ſoon turned; ſuch as was Hermogenes the rhetorician, whoſe books are exceeding ſubtile; who afterwards waxed ſtupid. A ſecond ſort, is of thoſe that have ſome natural diſpoſitions which have better grace in youth than in age: ſuch as is a fluent and luxuriant ſpeech; which becomes youth well, but not age. So Tully ſaith of Hortenſius; *idem manebat, neque idem decebat.* The third is, of ſuch as take too high a ſtrain at the firſt; and are magnanimous, more than tract of years can uphold. As was Scipio Africanus, of whom Livy ſaith in effect; *ultima primis cedebant.*

XLIII. *Of* Beauty.

VIRTUE is like a rich ſtone, beſt plain ſet: and ſurely virtue is beſt in a body that is comely, though not of delicate features; and that hath rather dignity of preſence, than beauty of aſpect. Neither is it almoſt ſeen, that very beautiful perſons are otherwiſe of great virtue. As if nature were rather buſy not to err, than in labour to produce excellency. And therefore they prove accompliſhed, but not of great ſpirit; and ſtudy rather behaviour than virtue. But this holds not always; for Auguſtus Cæſar, Titus Veſpaſianus, Philip le Belle of France, Edward the fourth of England, Alcibiades of Athens, Iſmael the ſophi of Perſia, were all high and great ſpirits; and yet the moſt beautiful men of their times. In beauty, that of favour is more than that of colour; and that of decent and gracious motion more than that of favour. That is the beſt part of beauty, which a picture cannot expreſs; no nor the firſt ſight of the life. There is no excellent beauty, that hath not ſome ſtrangeneſs in the proportion. A man cannot tell, whether Apelles or Albert Durer were the more triſler; whereof the one would make a perſonage by geometrical proportions: the other, by taking the beſt parts out of divers faces, to make one excellent. Such perſonages, I think, would pleaſe no body but the painter that made them. Not but I think a painter may make a better face than ever was; but he muſt do it by a kind of felicity, as a muſician that maketh an excellent air in muſic, and not by rule. A man ſhall ſee faces, that if you examine them part by part, you ſhall never find a good; and yet altogether do well. If it be true, that the principal part of beauty is in decent motion, certainly,

it is no marvel, though perſons in years ſeem many times more amiable; *pulchrorum autumnus pulcher:* for no youth can be comely but by pardon, and conſidering the youth, as to make up the comelineſs. Beauty is as ſummer-fruits, which are eaſy to corrupt, and cannot laſt: and for the moſt part it makes a diſſolute youth, and an age a little out of countenance: but yet certainly again, if it light well, it maketh virtues ſhine, and vices bluſh.

XLIV. *Of* Deformity.

DEFORMED perſons are commonly even with nature; for as nature hath done ill by them, ſo do they by nature; being for the moſt part, as the Scripture ſaith, *void of natural affection:* and ſo they have their revenge of nature. Certainly there is a conſent between the body and the mind, and where nature erreth in the one, ſhe ventureth in the other. *Ubi peccat in uno, periclitatur in altero.* But becauſe there is in man an election touching the frame of his mind, and a neceſſity in the frame of his body, the ſtars of natural inclination are ſometimes obſcured by the ſun of diſcipline and virtue: therefore it is good to conſider of deformity, not as a ſign which is more deceivable, but as a cauſe which ſeldom faileth of the effect. Whoſoever hath any thing fixed in his perſon that doth induce contempt, hath alſo a perpetual ſpur in himſelf, to reſcue and deliver himſelf from ſcorn; therefore all deformed perſons are extreme bold. Firſt, as in their own defence, as being expoſed to ſcorn; but in proceſs of time by a general habit. Alſo it ſtirreth in them induſtry, and eſpecially of this kind, to watch and obſerve the weakneſs of others, that they may have ſomewhat to repay. Again, in their ſuperiors it quencheth jealouſy towards them, as perſons that they think they may at pleaſure deſpiſe: and it layeth their competitors and emulators aſleep; as never believing they ſhould be in poſſibility of advancement, till they ſee them in poſſeſſion. So that, upon the matter, in a great wit deformity is an advantage to riſing. Kings in ancient times, and at this preſent, in ſome countries, were wont to put great truſt in eunuchs, becauſe they that are envious towards all, are more obnoxious and officious towards one. But yet their truſt towards them hath rather been as to good ſpials, and good whiſperers, than good magiſtrates and officers. And much like is the reaſon of deformed perſons. Still the ground is, they will, if they be of ſpirit, ſeek to free themſelves from ſcorn; which muſt be either by virtue or malice. And therefore let it not be marvelled, if ſometimes they prove excellent perſons; as was Ageſilaus, Zanger the ſon of Solyman, Æſop, Gaſca preſident of Peru; and Socrates may go likewiſe amongſt them, with others.

XLV. *Of* Building.

HOUSES are built to live in, and not to look on; therefore let uſe be preferred before uniformity, except where both may be had. Leave the goodly fabrics of houſes for beauty only, to the inchanted palaces of the poets: who build them with ſmall coſt. He that builds a fair houſe upon an ill ſeat, committeth himſelf to priſon. Neither do I reckon it an ill ſeat only, where the air is unwholeſome, but likewiſe where the air is unequal; as you ſhall ſee many fine ſeats, ſet upon a knap of ground, environed with higher hills round about it, whereby the heat of the ſun is pent in, and the wind gathereth as in troughs; ſo as you ſhall have, and that

that ſuddenly, as great diverſity of heat and cold, as if you dwelt in ſeveral places. Neither is it ill air only that maketh an ill ſeat; but ill ways, ill markets; and, if you will conſult with Momus, ill neighbours. I ſpeak not of many more; want of water, want of wood, ſhade, and ſhelter; want of fruitfulneſs, and mixture of grounds of ſeveral natures; want of proſpect; want of level grounds; want of places at ſome near diſtance for ſports of hunting, hawking, and races; too near the ſea, too remote; having the commodity of navigable rivers, or the diſcommodity of their overflowing; too far off from great cities, which may hinder buſineſs; or too near them, which lurcheth all proviſions, and maketh every thing dear; where a man hath a great living laid together, and where he is ſcanted: all which, as it is impoſſible perhaps to find together, ſo it is good to know them, and think of them, that a man may take as many as he can: and if he have ſeveral dwellings, that he ſort them ſo, that what he wanteth in the one, he may find in the other. Lucullus anſwered Pompey well, who, when he ſaw his ſtately galleries and rooms, ſo large and lightſome in one of his houſes, ſaid, "Surely an excellent "place for ſummer, but how do you do in winter?" Lucullus anſwered, "Why, "do you not think me as wiſe as ſome fowls are, that ever change their abode towards "the winter?"

To paſs from the ſeat to the houſe itſelf, we will do as Cicero doth in the orator's art, who writes books *de oratore*, and a book he intitles *Orator*: whereof the former delivers the precepts of the art, and the latter the perfection. We will therefore deſcribe a princely palace, making a brief model thereof. For it is ſtrange to ſee, now in Europe, ſuch huge buildings as the Vatican, and Eſcurial, and ſome others be, and yet ſcarce a very fair room in them.

Firſt therefore, I ſay, you cannot have a perfect palace, except you have two ſeveral ſides; a ſide for the banquet, as is ſpoken of in the book of Eſther; and a ſide for the houſhold: the one for feaſt and triumphs, the other for dwelling. I underſtand both theſe ſides to be not only returns, but parts of the front; and to be uniform without, though ſeverally partitioned within; and to be on both ſides of a great and ſtately tower, in the midſt of the front; that as it were joineth them together on either hand. I would have on the ſide of the banquet, in front, one only goodly room above ſtairs, of ſome forty foot high; and under it a room for a dreſſing or preparing place, at times of triumphs. On the other ſide, which is the houſhold ſide, I wiſh it divided at the firſt into a hall and a chapel, with a partition between, both of good ſtate and bigneſs; and thoſe not to go all the length, but to have at the farther end a winter and a ſummer parlour, both fair: and under theſe rooms a fair and large cellar ſunk under ground; and likewiſe ſome privy kitchens, with butteries and pantries, and the like. As for the tower, I would have it two ſtories, of eighteen foot high apiece, above the two wings; and a goodly leads upon the top, railed, with ſtatues interpoſed; and the ſame tower to be divided into rooms, as ſhall be thought fit. The ſtairs likewiſe to the upper rooms, let them be upon a fair open newel, and finely railed in, with images of wood, caſt into a braſs colour; and a very fair landing-place at the top. But this to be, if you do not appoint any of the lower rooms, for a dining-place of ſervants; for otherwiſe you ſhall have the ſervants dinner after your own: for the ſteam of it will come up as in a tunnel. And ſo much for the front. Only I underſtand the height of the firſt ſtairs to be ſixteen foot, which is the height of the lower room.

Beyond this front is there to be a fair court, but three ſides of it of a far lower building than the front. And in all the four corners of that court fair ſtair-caſes caſt into turrets on the outſide, and not within the row of buildings themſelves: but thoſe towers are not to be of the height of the front, but rather proportionable to the lower building. Let the court not be paved, for that ſtriketh up a great heat in ſummer, and much cold in winter: but only ſome ſide alleys, with a croſs, and the quarters to graze, being kept ſhorn, but not too near ſhorn. The row of return on the banquet ſide, let it be all ſtately galleries; in which galleries let there be three, or five, fine cupolas, in the length of it, placed at equal diſtance; and fine coloured windows of ſeveral works. On the houſhold ſide, chambers of preſence, and ordinary entertainments, with ſome bed-chambers; and let all three ſides be a double houſe, without thorough lights on the ſides, that you may have rooms from the ſun, both for forenoon and afternoon. Caſt it alſo, that you may have rooms both for ſummer and winter; ſhady for ſummer, and warm for winter. You ſhall have ſometimes fair houſes ſo full of glaſs, that one cannot tell where to become to be out of the ſun or cold. For imbowed windows, I hold them of good uſe; in cities indeed, upright do better, in reſpect of the uniformity towards the ſtreet, for they be pretty retiring places for conference; and beſides, they keep both the wind and ſun off; for that which would ſtrike almoſt through the room, doth ſcarce paſs the window. But let them be but few, four in the court, on the ſides only.

Beyond this court, let there be an inward court of the ſame ſquare and height, which is to be invironed with the garden on all ſides: and in the inſide, cloiſtered on all ſides, upon decent and beautiful arches, as high as the firſt ſtory: on the under ſtory, towards the garden, let it be turned to a grotto, or place of ſhade or eſtivation: and only have opening and windows towards the garden, and be level upon the floor, no whit ſunk under ground, to avoid all dampiſhneſs. And let there be a fountain, or ſome fair work of ſtatues, in the midſt of this court; and to be paved as the other court was. Theſe buildings to be for privy lodgings on both ſides, and the end for privy galleries: whereof you muſt foreſee, that one of them be for an infirmary, if the prince or any ſpecial perſon ſhould be ſick, with chambers, bed-chamber, *antecamera* and *recamera*, joining to it. This upon the ſecond ſtory. Upon the ground-ſtory, a fair gallery, open, upon pillars; and upon the third ſtory likewiſe, an open gallery upon pillars, to take the proſpect and freſhneſs of the garden. At both corners of the farther ſide, by way of return, let there be two delicate or rich cabinets, daintily paved, richly hanged, glazed with cryſtalline glaſs, and a rich cupola in the midſt; and all other elegancy that may be thought upon. In the upper gallery too, I wiſh that there may be, if the place will yield it, ſome fountains running in divers places from the wall, with ſome fine avoidances. And thus much for the model of the palace; ſave that you muſt have, before you come to the front, three courts: a green court plain, with a wall about it: a ſecond court of the ſame, but more garniſhed, with little turrets, or rather embelliſhments upon the wall; and a third court, to make a ſquare with the front, but not to be built, nor yet incloſed with a naked wall, but incloſed with terraſſes leaded aloft, and fairly garniſhed on the three ſides; and cloiſtered on the inſide with pillars, and not with arches below. As for offices, let them ſtand at diſtance, with ſome low galleries to paſs from them to the palace itſelf.

XLVI. *Of* GARDENS.

GOD almighty firſt planted a garden: and indeed it is the pureſt of human pleaſures. It is the greateſt refreſhment to the ſpirits of man; without which, buildings and palaces are but groſs handy-works: and a man ſhall ever ſee, that when ages grow to civility and elegancy, men come to build ſtately, ſooner than to garden finely; as if gardening were the greater perfection. I do hold it in the royal ordering of gardens, there ought to be gardens for all the months in the year: in which ſeverally, things of beauty may be then in ſeaſon. For December and January, and the latter part of November, you muſt take ſuch things as are green all winter; holly; ivy; bays; juniper; cypreſs-trees; yew; pine-apple trees; fir-trees; roſemary; lavender; periwinkle, the white, the purple, and the blue; germander; flags; orange-trees; lemon-trees, and myrtles, if they be ſtoved; and ſweet marjoram warm ſet. There followeth, for the latter part of January and February, the *mezereon* tree, which then bloſſoms; *crocus vernus*, both the yellow and the gray; primroſes; anemonies; the early tulip; *hyacinthus orientalis*; *chamairis*; *fritellaria*. For March there come violets, eſpecially the ſingle blue, which are the earlieſt; the yellow daffadil; the daiſy; the almond-tree in bloſſom; the peach-tree in bloſſom; the cornelian tree in bloſſom; ſweet briar. In April follow the double white violet; the wall-flower; the ſtock-gilliflower; the cowſlip, flower-de-luces, and lilies of all natures; roſemary-flowers; the tulip; the double piony; the pale daffadil; the French honeyſuckle; the cherry-tree in bloſſom; the damaſcene and plum-trees in bloſſom; the white thorn in leaf; the lilach-tree. In May and June come pinks of all ſorts; eſpecially the bluſh-pink, roſes of all kinds, except the muſk, which comes later: honeyſuckles; ſtrawberries; bugloſs; columbine; the French marygold; *flos Africanus*; cherry-tree in fruit; ribes; figs in fruit; raſps; vine flowers; lavender in flowers; the ſweet ſatyrian, with the white flower; *herba muſcaria*; *lilium convallium*; the apple-tree in bloſſom. In July come gilliflowers of all varieties; muſk-roſes; the lime-tree in bloſſom; early pears, and plums in fruit, gennitings, codlins. In Auguſt come plums of all ſorts in fruit; pears; apricots; barberries; filberds; muſkmelons; monks-hoods, of all colours. In September come grapes; apples; poppies of all colours; peaches; *melo cotones*; nectarines; cornelians; wardens; quinces. In October, and the beginning of November, come ſervices; medlars; bullaces; roſes cut or removed to come late; hollyoaks, and ſuch like. Theſe particulars are for the climate of London: but my meaning is perceived, that you may have *ver perpetuum*, as the place affords.

And becauſe the breath of flowers is far ſweeter in the air, where it comes and goes, like the warbling of muſic, than in the hand, therefore nothing is more fit for that delight than to know what be the flowers and plants that do beſt perfume the air. Roſes damaſk and red, are faſt flowers of their ſmells; ſo that you may walk by a whole row of them, and find nothing of their ſweetneſs: yea, though it be in a morning's dew. Bays likewiſe yield no ſmell, as they grow; roſemary little; nor ſweet marjoram. That which above all others yields the ſweeteſt ſmell in the air, is the violet; eſpecially the white double violet, which comes twice a year; about the middle of April, and about Bartholomew-tide. Next to that is the muſk-roſe: then the ſtrawberry-leaves dying, with a moſt excellent cordial ſmell: then the flower of the vines; it is a little duſt, like the duſt of a bent, which grows upon

upon the cluſter, in the firſt coming forth: then ſweet-brier: then wall-flowers, which are very delightful, to be ſet under a parlour, or lower chamber window: then pinks and gilliflowers, eſpecially the matted pink, and clove gilliflower: then the flowers of the lime-tree: then the honey-ſuckles, ſo they be ſomewhat afar off. Of bean-flowers I ſpeak not, becauſe they are field flowers: but thoſe which perfume the air moſt delightfully, not paſſed by as the reſt, but being troden upon and cruſhed, are three: that is, burnet, wild thyme, and water mints. Therefore you are to ſet whole alleys of them, to have the pleaſure when you walk or tread.

For gardens, ſpeaking of thoſe which are indeed prince-like, as we have done of buildings, the contents ought not well to be under thirty acres of ground, and to be divided into three parts: a green in the entrance; a heath or deſert in the going forth; and the main garden in the midſt; beſides alleys on both ſides. And I like well, that four acres of ground be aſſigned to the green, ſix to the heath, four and four to either ſide, and twelve to the main garden. The green hath two pleaſures; the one, becauſe nothing is more pleaſant to the eye, than green graſs kept finely ſhorn; the other, becauſe it will give you a fair alley in the midſt; by which you may go in front upon a ſtately hedge, which is to incloſe the garden. But becauſe the alley will be long, and in great heat of the year or day, you ought not to buy the ſhade in the garden by going in the ſun through the green; therefore you are, of either ſide the green, to plant a covert alley, upon carpenters work, about twelve foot in height, by which you may go in ſhade into the garden. As for the making of knots or figures, with divers coloured earths, that they may lie under the windows of the houſe, on that ſide which the garden ſtands, they be but toys; you may ſee as good ſights, many times, in tarts. The garden is beſt to be ſquare, encompaſſed on all the four ſides with a ſtately arched hedge: the arches to be upon pillars of carpenters work, of ſome ten foot high, and ſix foot broad; and the ſpaces between, of the ſame dimenſion with the breadth of the arch. Over the arches let there be an entire hedge, of ſome four foot high, framed alſo upon carpenters work; and upon the upper hedge, over every arch, a little turret, with a belly enough to receive a cage of birds: and over every ſpace, between the arches, ſome other little figure, with broad plates of round coloured glaſs, gilt, for the ſun to play upon. But this hedge I intend to be raiſed upon a bank, not ſteep, but gently ſlope, of ſome ſix foot, ſet all with flowers. Alſo I underſtand, that this ſquare of the garden ſhould not be the whole breadth of the ground, but to leave on either ſide ground enough for diverſity of ſide alleys; unto which the two covert alleys of the green may deliver you: but there muſt be no alleys with hedges at either end of this great incloſure; not at the hither end, for letting your proſpect upon the fair hedge from the green; nor at the farther end, for letting your proſpect from the hedge, through the arches, upon the heath.

For the ordering of the ground within the great hedge. I leave it to variety of device; adviſing nevertheleſs, that whatſoever form you caſt it into, firſt it be not too buſy, or full of work: wherein I, for my part, do not like images cut out in juniper or other garden ſtuff; they be for children. Little low hedges round, like welts, with ſome pretty pyramids, I like well; and in ſome places, fair columns upon frames of carpenter's work. I would alſo have the alleys ſpacious and fair. You may have cloſer alleys upon the ſide grounds, but none in the main garden. I wiſh alſo, in the very middle, a fair mount, with three aſcents and alleys, enough for four to walk a-breaſt; which I would have to be perfect circles, without any bulwarks or embоſments; and the whole mount to be thirty foot high; and ſome fine banqueting houſe, with ſome chimneys neatly caſt, and without too much glaſs.

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For fountains, they are a great beauty and refreſhment; but pools marr all, and make the garden unwholeſome, and full of flies and frogs. Fountains I intend to be of two natures: the one that ſprinkleth or ſpouteth water; the other a fair receipt of water, of ſome thirty or forty foot ſquare, but without fiſh, or ſlime, or mud. For the firſt, the ornaments of images gilt, or of marble, which are in uſe, do well: but the main matter is ſo to convey the water, as it never ſtay either in the bowls, or in the ciſtern; that the water be never by reſt diſcoloured, green or red, or the like; or gather any moſſineſs or putrefaction. Beſides that, it is to be cleanſed every day by the hand. Alſo ſome ſteps up to it, and ſome fine pavement about it doth well. As for the other kind of fountain, which we may call a bathing pool, it may admit much curioſity and beauty, wherewith we will not trouble ourſelves; as that the bottom be finely paved, and with images; the ſides likewiſe; and withal embelliſhed with coloured glaſs, and ſuch things of luſtre; encompaſſed alſo with fine rails of low ſtatues. But the main point is the ſame which we mentioned in the former kind of fountain; which is, that the water be in perpetual motion, fed by a water higher than the pool, and delivered into it by fair ſpouts, and then diſcharged away under ground by ſome equality of bores, that it ſtay little. And for fine devices of arching water without ſpilling, and making it riſe in ſeveral forms, of feathers, drinking-glaſſes, canopies, and the like, they be pretty things to look on, but nothing to health and ſweetneſs.

For the heath, which was the third part of our plot, I wiſh it to be framed as much as may be to a natural wildneſs. Trees I would have none in it, but ſome thickets made only of ſweet-brier and honey-ſuckle, and ſome wild vine amongſt; and the ground ſet with violets, ſtraw-berries, and primroſes. For theſe are ſweet and proſper in the ſhade. And theſe to be in the heath here and there, not in any order. I like alſo little heaps, in the nature of mole-hills, ſuch as are in wild heaths, to be ſet, ſome with wild thyme, ſome with pinks, ſome with germander, that gives a good flower to the eye, ſome with periwinkle, ſome with violets, ſome with ſtraw-berries, ſome with cowſlips, ſome with daiſies, ſome with red roſes, ſome with *lilium convallium*, ſome with ſweet-williams red, ſome with bears foot, and the like low flowers, being withal ſweet and ſightly. Part of which heaps to be with ſtandards of little buſhes, prickt upon their top, and part without. The ſtandards to be roſes, juniper, holly, berberries, but here and there, becauſe of the ſmell of their bloſſom, red currans, gooſeberries, roſemary, bays, ſweet-briar, and ſuch like. But theſe ſtandards to be kept with cutting, that they grow not out of courſe.

For the ſide grounds, you are to fill them with variety of alleys, private, to give a full ſhade, ſome of them, whereſoever the ſun be. You are to frame ſome of them likewiſe for ſhelter, that when the wind blows ſharp, you may walk as in a gallery. And thoſe alleys muſt be likewiſe hedged at both ends, to keep out the wind; and theſe cloſer alleys muſt be ever finely gravelled, and no graſs, becauſe of growing wet. In many of theſe alleys likewiſe, you are to ſet fruit-trees of all ſorts; as well upon the walls as in ranges. And this ſhould be generally obſerved, that the borders wherein you plant your fruit-trees, be fair and large, and low, and not ſteep; and ſet with fine flowers, but thin and ſparingly, leſt they deceive the trees. At the end of both the ſide grounds, I would have a mount of ſome pretty height, leaving the wall of the incloſure breaſt high, to look abroad into the fields.

For the main garden, I do not deny but there ſhould be ſome fair alleys, ranged on both ſides, with fruit trees, and ſome pretty tufts of fruit-trees, and arbours with ſeats,

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ſet in ſome decent order; but theſe to be by no means ſet too thick, but to leave the main garden ſo as it be not cloſe, but the air open and free. For as for ſhade, I would have you reſt upon the alleys of the ſide grounds, there to walk, if you be diſpoſed, in the heat of the year or day; but to make account, that the main garden is for the more temperate parts of the year; and in the heat of ſummer, for the morning and the evening, or overcaſt days.

For aviaries, I like them not, except they be of that largeneſs, as they may be turfed, and have living plants and buſhes ſet in them; that the birds may have more ſcope, and natural neſtling, and that no foulneſs appear in the floor of the aviary.

So I have made a platform of a princely garden, partly by precept, partly by drawing; not a model, but ſome general lines of it; and in this I have ſpared for no coſt. But it is nothing for great princes, that for the moſt part, taking advice with workmen, with no leſs coſt ſet their things together; and ſometimes add ſtatues, and ſuch things, for ſtate and magnificence, but nothing to the true pleaſure of a garden.

XLVII. *Of* NEGOTIATING.

IT is generally better to deal by ſpeech, than by letter; and by the mediation of a third, than by a man's ſelf. Letters are good, when a man would draw an anſwer by letter back again; or when it may ſerve for a man's juſtification, afterwards to produce his own letter; or where it may be danger to be interrupted, or heard by pieces. To deal in perſon is good, when a man's face breedeth regard, as commonly with inferiors; or in tender caſes, where a man's eye upon the countenance of him with whom he ſpeaketh, may give him a direction how far to go: and generally where a man will reſerve to himſelf liberty, either to diſavow or to expound. In choice of inſtruments, it is better to chooſe men of a plainer ſort, that are like to do that that is committed to them, and to report back again faithfully the ſucceſs; than thoſe that are cunning to contrive out of other mens buſineſs ſomewhat to grace themſelves, and will help the matter in report, for ſatisfaction ſake. Uſe alſo ſuch perſons as affect the buſineſs wherein they are employed, for that quickeneth much; and ſuch as are fit for the matter; as bold men for expoſtulation, fair-ſpoken men for perſuaſion, crafty men for inquiry and obſervation, froward and abſurd men for buſineſs that doth not well bear out itſelf. Uſe alſo ſuch as have been lucky, and prevailed before in things wherein you have employed them; for that breeds confidence, and they will ſtrive to maintain their preſcription. It is better to ſound a perſon with whom one deals, afar off, than to fall upon the point at firſt; except you mean to ſurpriſe him by ſome ſhort queſtion. It is better dealing with men in appetite, than with thoſe that are where they would be. If a man deal with another upon conditions, the ſtart or firſt performance is all; which a man cannot reaſonably demand, except either the nature of the thing be ſuch which muſt go before; or elſe a man can perſuade the other party, that he ſhall ſtill need him in ſome other thing; or elſe that he be counted the honeſter man. All practice is to diſcover, or to work. Men diſcover themſelves in truſt, in paſſion, at unawares, and of neceſſity, when they would have ſomewhat done, and cannot find an apt pretext. If you would work any man, you muſt either know his nature and faſhions, and ſo lead him; or his ends, and ſo perſuade him; or his weakneſs and diſadvantages, and ſo awe him; or thoſe that have intereſt in him, and ſo govern him. In dealing with cunning perſons, we muſt ever conſider their ends to interpret their ſpeeches; and it is good to ſay little

to

to them, and that which they leaſt look for. In all negotiations of difficulty, a man may not look to ſow and reap at once; but muſt prepare buſineſs, and ſo ripen it by degrees.

XLVIII. *Of* Followers *and* Friends.

COSTLY followers are not to be liked; leſt while a man maketh his train longer, he make his wings ſhorter. I reckon to be coſtly, not them alone which charge the purſe, but which are wearifom and importune in ſuits. Ordinary followers ought to challenge no higher conditions than countenance, recommendation, and protection from wrongs. Factious followers are worſe to be liked, which follow not upon affection to him with whom they range themſelves, but upon diſcontentment conceived againſt ſome other: whereupon commonly enſueth that ill intelligence that we many times ſee between great perſonages. Likewiſe glorious followers, who make themſelves as trumpets of the commendation of thoſe they follow, are full of inconvenience; for they taint buſineſs through want of ſecrecy; and they export honour from a man, and make him a return in envy. There is a kind of followers likewiſe, which are dangerous, being indeed eſpials; which inquire the ſecrets of the houſe, and bear tales of them to others. Yet ſuch men many times are in great favour; for they are officious, and commonly exchange tales. The following by certain eſtates of men anſwerable to that which a great perſon himſelf profeſſeth, as of ſoldiers to him that hath been employed in the wars, and the like, hath ever been a thing civil, and well taken even in monarchies; ſo it be without too much pomp or popularity. But the moſt honourable kind of following, is to be followed as one that apprehendeth to advance virtue and deſert in all ſorts of perſons. And yet where there is no eminent odds in ſufficiency, it is better to take with the more paſſable than with the more able. And beſides, to ſpeak truth, in baſe times active men are of more uſe than virtuous. It is true, that in government, it is good to uſe men of one rank equally: for to countenance ſome extraordinarily, is to make them inſolent, and the reſt diſcontent; becauſe they may claim a due. But contrariwiſe in favour, to uſe men with much difference and election is good; for it maketh the perſons preferred more thankful, and the reſt more officious; becauſe all is of favour. It is good diſcretion not to make too much of any man at the firſt; becauſe one cannot hold out that proportion. To be governed, as we call it, by one, is not ſafe; for it ſhews ſoftneſs, and gives a freedom to ſcandal and diſreputation; for thoſe that would not cenſure, or ſpeak ill of a man immediately, will talk more boldly of thoſe that are ſo great with them, and thereby wound their honour. Yet to be diſtracted with many, is worſe; for it makes men to be of the laſt impreſſion, and full of change. To take advice of ſome few friends is ever honourable; for lookers-on many times ſee more than gameſters; and the vale beſt diſcovereth the hill. There is little friendſhip in the world, and leaſt of all between equals, which was wont to be magnified. That that is, is between ſuperior and inferior, whoſe fortunes may comprehend the one the other.

XLIX. *Of* Suitors.

MANY ill matters and projects are undertaken; and private ſuits do putrify the public good. Many good matters are undertaken with bad minds; I

mean not only corrupt minds, but crafty minds, that intend not performance. Some embrace ſuits, which never mean to deal effectually in them; but if they ſee there may be life in the matter by ſome other mean, they will be content to win a thank, or take a ſecond reward, or at leaſt to make uſe in the mean time of the ſuitor's hopes. Some take hold of ſuits, only for an occaſion to croſs ſome other, or to make an information, whereof they could not otherwiſe have apt pretext; without care what become of the ſuit when that turn is ſerved: or generally, to make other mens buſineſs a kind of entertainment to bring in their own. Nay, ſome undertake ſuits, with a full purpoſe to let them fall; to the end to gratify the adverſe party or competitor. Surely there is in ſome ſort a right in every ſuit; either a right of equity, if it be a ſuit of controverſy; or a right of deſert, if it be a ſuit of petition. If affection lead a man to favour the wrong ſide in juſtice, let him rather uſe his countenance to compound the matter than to carry it. If affection lead a man to favour the leſs worthy in deſert, let him do it without depraving or diſabling the better deſerver. In ſuits which a man doth not well underſtand, it is good to refer them to ſome friend of truſt and judgment, that may report whether he may deal in them with honour; but let him chooſe well his referendaries, for elſe he may be led by the noſe. Suitors are ſo diſtaſted with delays and abuſes, that plain dealing in denying to deal in ſuits at firſt, and reporting the ſucceſs barely, and in challenging no more thanks than one hath deſerved, is grown not only honourable, but alſo gracious. In ſuits of favour, the firſt coming ought to take little place; ſo far forth conſideration may be had of his truſt, that, if intelligence of the matter could not otherwiſe have been had but by him, advantage be not taken of the note, but the party left to his other means, and in ſome ſort recompenſed for his diſcovery. To be ignorant of the value of a ſuit, is ſimplicity; as well as to be ignorant of the right thereof, is want of conſcience. Secrecy in ſuits is a great mean of obtaining; for voicing them to be in forwardneſs, may diſcourage ſome kind of ſuitors; but doth quicken and awake others. But timing of the ſuit is the principal: timing, I ſay, not only in reſpect of the perſon that ſhould grant it, but in reſpect of thoſe which are like to croſs it. Let a man, in the choice of his mean, rather chooſe the fitteſt mean than the greateſt mean: and rather them that deal in certain things than thoſe that are general. The reparation of a denial is ſometimes equal to the firſt grant; if a man ſhew himſelf neither dejected nor diſcontented. *Iniquum petas, ut aequum feras*; is a good rule, where a man hath ſtrength of favour: but otherwiſe a man were better riſe in his ſuit; for he that would have ventured at firſt to have loſt the ſuitor, will not in the concluſion loſe both the ſuitor and his own former favour. Nothing is thought ſo eaſy a requeſt to a great perſon, as his letter; and yet, if it be not in a good cauſe, it is ſo much out of his reputation. There are no worſe inſtruments than theſe general contrivers of ſuits; for they are but a kind of poiſon and infection to public proceedings.

L. *Of* Studies.

STUDIES ſerve for delight, for ornament, and for ability. Their chief uſe for delight, is in privateneſs and retiring; for ornament, is in diſcourſe; and for ability, is in the judgment and diſpoſition of buſineſs. For expert men can execute, and perhaps judge of particulars, one by one; but the general counſels, and

and the plots and marſhalling of affairs, come beſt from thoſe that are learned. To ſpend too much time in ſtudies, is ſloth; to uſe them too much for ornament, is affectation; to make judgment wholly by their rules, is the humour of a ſcholar. They perfect nature, and are perfected by experience: for natural abilities are like natural plants, that need pruning by ſtudy; and ſtudies themſelves do give forth directions too much at large, except they be bounded in by experience. Crafty men contemn ſtudies; ſimple men admire them; and wiſe men uſe them: for they teach not their own uſe; but that is a wiſdom without them, and above them, won by obſervation. Read not to contradict and confute; nor to believe and take for granted; nor to find talk and diſcourſe; but to weigh and conſider. Some books are to be taſted, others to be ſwallowed, and ſome few to be chewed and digeſted: that is, ſome books are to be read only in parts; others to be read, but not curiouſly; and ſome few to be read wholly, and with diligence and attention. Some books alſo may be read by deputy, and extracts made of them by others; but that would be only in the leſs important arguments, and the meaner ſort of books: elſe diſtilled books are like common diſtilled waters, flaſhy things. Reading maketh a full man; conference a ready man; and writing an exact man. And therefore if a man write little, he had need have a great memory; if he confer little, he had need have a preſent wit; and if he read little, he had need have much cunning, to ſeem to know that he doth not. Hiſtories make men wiſe; poets, witty; the mathematics, ſubtile; natural philoſophy, deep; moral, grave; logic and rhetoric, able to contend: *Abeunt ſtudia in mores.* Nay, there is no ſtond or impediment in the wit, but may be wrought out by fit ſtudies; like as diſeaſes of the body may have appropriated exerciſes: bowling is good for the ſtone and reins; ſhooting for the lungs and breaſt; gentle walking for the ſtomach; riding for the head; and the like. So if a man's wit be wandering, let him ſtudy the mathematics; for in demonſtrations, if his wit be called away never ſo little, he muſt begin again: if his wit be not apt to diſtinguiſh or find differences, let him ſtudy the ſchoolmen; for they are *cymini ſectores:* if he be not apt to beat over matters, and to call up one thing to prove and illuſtrate another, let him ſtudy the lawyers caſes: ſo every defect of the mind may have a ſpecial receipt.

LI. *Of* FACTION.

MANY have an opinion not wiſe; that for a prince to govern his eſtate, or for a great perſon to govern his proceedings, according to the reſpect of factions, is a principal part of policy; whereas, contrariwiſe, the chiefeſt wiſdom is, either in ordering thoſe things which are general, and wherein men of ſeveral factions do nevertheleſs agree, or in dealing with correſpondence to particular perſons, one by one. But I ſay not, that the conſideration of factions is to be neglected. Mean men, in their riſing, muſt adhere; but great men, that have ſtrength in themſelves, were better to maintain themſelves indifferent and neutral. Yet even in beginners, to adhere ſo moderately, as he be a man of the one faction, which is moſt paſſable with the other, commonly giveth beſt way. The lower and weaker faction is the firmer in conjunction: and it is often ſeen, that a few that are ſtiff do tire out a greater number that are more moderate. When one of the factions is extinguiſhed, the remaining ſubdivideth: as the faction between Lucullus and the reſt of the nobles of the ſenate, which they called *optimates*,

held out a while againſt the faction of Pompey and Cæſar: but when the ſenate's authority was pulled down, Cæſar and Pompey ſoon after brake. The faction or party of Antonius and Octavianus Cæſar, againſt Brutus and Caſſius, held out likewiſe for a time: but when Brutus and Caſſius were overthrown, then ſoon after Antonius and Octavianus brake and ſubdivided. Theſe examples are of wars, but the ſame holdeth in private factions. And therefore thoſe that are ſeconds in factions, do many times, when the faction ſubdivideth, prove principals: but many times alſo they prove cyphers and caſheered; for many a man's ſtrength is in oppoſition; and when that faileth he groweth out of uſe. It is commonly ſeen, that men once placed, take in with the contrary faction to that by which they enter; thinking belike that they have the firſt ſure, and now are ready for a new purchaſe. The traitor in faction lightly goeth away with it; for when matters have ſtuck long in balancing, the winning of ſome one man caſteth them, and he getteth all the thanks. The even carriage between two factions, proceedeth not always of moderation, but of a trueneſs to a man's ſelf, with end to make uſe of both. Certainly in Italy they hold it a little ſuſpect in popes, when they have often in their mouth *Padre commune:* and take it to be a ſign of one that meaneth to refer all to the greatneſs of his own houſe. Kings had need beware how they ſide themſelves, and make themſelves as of a faction or party; for leagues within the ſtate are ever pernicious to monarchies; for they raiſe an obligation paramount to obligation of ſovereignty, and make the king *tanquam unus ex nobis*; as was to be ſeen in the league of France. When factions are carried too high, and too violently, it is a ſign of weakneſs in princes, and much to the prejudice both of their authority and buſineſs. The motions of factions under kings ought to be like the motions, as the aſtronomers ſpeak, of the inferior orbs; which may have their proper motions, but yet ſtill are quietly carried by the higher motion of *primum mobile*.

LII. *Of* Ceremonies *and* Respects.

HE that is only real, had need have exceeding great parts of virtue: as the ſtone had need to be rich, that is ſet without foil: but if a man mark it well, it is in praiſe and commendation of men, as it is in gettings and gains. For the proverb is true, that light gains make heavy purſes; for light gains come thick, whereas great come but now and then. So it is true, that ſmall matters win great commendation, becauſe they are continually in uſe, and in note; whereas the occaſion of any great virtue cometh but on feſtivals: therefore it doth much add to a man's reputation, and is, as queen Iſabella ſaid, like perpetual letters commendatory, to have good forms. To attain them, it almoſt ſufficeth not to deſpiſe them: for ſo ſhall a man obſerve them in others; and let him truſt himſelf with the reſt. For if he labour too much to expreſs them, he ſhall loſe their grace; which is to be natural and unaffected. Some mens behaviour is like a verſe, wherein every ſyllable is meaſured: how can a man comprehend great matters, that breaketh his mind too much to ſmall obſervations? Not to uſe ceremonies at all, is to teach others not to uſe them again, and ſo diminiſheth reſpect to himſelf; eſpecially they be not to be omitted to ſtrangers and formal natures: but the dwelling upon them and exalting them above the moon, is not only tedious, but doth diminiſh the faith and credit of him that ſpeaks. And certainly there

is a kind of conveying of effectual and imprinting paſſages, amongſt compliments, which is of ſingular uſe, if a man can hit upon it. Amongſt a man's peers, a man ſhall be ſure of familiarity; and therefore it is good a little to keep ſtate. Amongſt a man's inferiors, one ſhall be ſure of reverence; and therefore it is good a little to be familiar. He that is too much in any thing, ſo that he giveth another occaſion of ſatiety, maketh himſelf cheap. To apply one's ſelf to others is good; ſo it be with demonſtration that a man doth it upon regard, and not upon facility. It is a good precept, generally in ſeconding another, yet to add ſomewhat of one's own; as if you will grant his opinion, let it be with ſome diſtinction; if you will follow his motion, let it be with condition; if you allow his counſel, let it be with alledging farther reaſon. Men had need beware how they be too perfect in compliments; for be they never ſo ſufficient otherwiſe, their enviers will be ſure to give them that attribute, to the diſadvantage of their greater virtues. It is loſs alſo in buſineſs, to be too full of reſpects, or to be too curious in obſerving times and opportunities: Solomon ſaith, *He that conſidereth the wind, ſhall not ſow; and he that looketh to the clouds, ſhall not reap.* A wiſe man will make more opportunities than he finds. Mens behaviour ſhould be like their apparel; not too ſtrait or point device, but free for exerciſe or motion.

LIII. *Of* PRAISE.

PRAISE is the reflexion of virtue: but it is as the glaſs or body which giveth the reflexion. If it be from the common people, it is commonly falſe and nought; and rather followeth vain perſons than virtuous; for the common people underſtand not many excellent virtues: the loweſt virtues draw praiſe from them; the middle virtues work in them aſtoniſhment or admiration; but of the higheſt virtues they have no ſenſe or perceiving at all: but ſhews, and *ſpecies virtutibus ſimiles*, ſerve beſt with them. Certainly fame is like a river, that beareth up things light and ſwoln, and drowns things weighty and ſolid: but if perſons of quality and judgment concur, then it is, as the Scripture ſaith, *Nomen bonum inſtar unguenti fragrantis.* It filleth all round about, and will not eaſily away: for the odours of ointments are more durable than thoſe of flowers. There be ſo many falſe points of praiſe, that a man may juſtly hold it a ſuſpect. Some praiſes proceed merely of flattery; and if he be an ordinary flatterer, he will have certain common attributes, which may ſerve every man; if he be a cunning flatterer, he will follow the arch-flatterer, which is a man's ſelf; and wherein a man thinketh beſt of himſelf, therein the flatterer will uphold him moſt: but if he be an impudent flatterer, look, wherein a man is conſcious to himſelf that he is moſt defective, and is moſt out of countenance in himſelf, that will the flatterer intitle him to perforce, *ſpreta conſcientia.* Some praiſes come of good wiſhes and reſpects, which is a form due in civility to kings and great perſons; *laudando praecipere*; when by telling men what they are, they repreſent to them what they ſhould be. Some men are praiſed maliciouſly to their hurt, thereby to ſtir envy and jealouſy towards them; *peſſimum genus inimicorum laudantium*; inſomuch as it was a proverb amongſt the Grecians, that he that was praiſed to his hurt, ſhould have a puſh riſe upon his noſe: as we ſay, that a bliſter will riſe upon one's tongue that tells a lie. Certainly moderate praiſe, uſed with opportunity and not vulgar, is that which doth the good. Solomon ſaith, *He that praiſeth his friend aloud, riſing early, it ſhall be to him no better than a curſe.* Too much

much magnifying of man or matter, doth irritate contradiction, and procure envy and ſcorn. To praiſe a man's ſelf cannot be decent, except it be in rare caſes: but to praiſe a man's office or profeſſion, he may do it with good grace, and with a kind of magnanimity. The cardinals of Rome, which are theologues, and friers, and ſchoolmen, have a phraſe of notable contempt and ſcorn, towards civil buſineſs; for they call all temporal buſineſs, of wars, embaſſages, judicature and other employments, *ſhirrerie*, which is under-ſheriffries, as if they were but matters for under-ſheriffs and catchpoles; though many times thoſe under-ſheriffries do more good than their high ſpeculations. St. Paul, when he boaſts of himſelf, he doth oft interlace, *I ſpeak like a fool*; but ſpeaking of his calling, he ſaith, *magnificabo apoſtolatum meum.*

LIV. *Of* Vain-Glory.

IT was prettily deviſed of Æſop: The fly ſat upon the axle-tree of the chariot-wheel, and ſaid, What a duſt do I raiſe? So are there ſome vain perſons, that whatſoever goeth alone, or moveth upon greater means, if they have never ſo little hand in it, they think it is they that carry it. They that are glorious, muſt needs be factious; for all bravery ſtands upon compariſons. They muſt needs be violent, to make good their own vaunts: neither can they be ſecret, and therefore not effectual; but according to the French proverb, *Beaucoup de bruit, peu de fruit:* Much bruit, little fruit. Yet certainly there is uſe of this quality in civil affairs: where there is an opinion, and frame to be created, either of virtue or greatneſs, theſe men are good trumpeters. Again, as Titus Livius noteth, in the caſe of Antiochus and the Ætolians, there are ſometimes great effects of croſs lies; as if a man that negotiates between two princes, to draw them to join in a war againſt the third, doth extol the forces of either of them, above meaſure, the one to the other: and ſometimes, he that deals between man and man, raiſeth his own credit with both, by pretending greater intereſt than he hath in either. And in theſe and the like kinds, it often falls out, that ſomewhat is produced of nothing; for lies are ſufficient to breed opinion, and opinion brings on ſubſtance. In military commanders and ſoldiers vain-glory is an eſſential point; for as iron ſharpens iron, ſo by glory one courage ſharpeneth another: in caſes of great enterpriſe, upon charge and adventure, a compoſition of glorious natures doth put life into buſineſs; and thoſe that are of ſolid and ſober natures, have more of the ballaſt than of the ſail. In fame of learning, the flight will be ſlow, without ſome feathers of oſtentation: *Qui de contemnenda gloria libros ſcribunt, nomen ſuum inſcribunt.* Socrates, Ariſtotle, Galen, were men full of oſtentation. Certainly vain-glory helpeth to perpetuate a man's memory; and virtue was never ſo beholden to human nature, as it received its due at the ſecond hand. Neither had the fame of Cicero, Seneca, Plinius Secundus, born her age ſo well, if it had not been joined with ſome vanity in themſelves: like unto varniſh, that makes cielings not only ſhine but laſt. But all this while, when I ſpeak of vain-glory, I mean not of that property that Tacitus doth attribute to Mucianus; *omnium, quae dixerat, feceratque, arte quadam oſtentator:* for that proceeds not of vanity, but of natural magnanimity and diſcretion: and in ſome perſons, is not only comely but gracious. For excuſations, ceſſions, modeſty itſelf well governed, are but arts of oſtentation. And amongſt thoſe arts there is none better, than that which Plinius Secundus ſpeaketh of; which is to be liberal of praiſe and commendation to others, in that wherein a man's ſelf hath any perfection. For ſaith Pliny very

very wittily: "in commending another, you do yourſelf right; for he that you "commend is either ſuperior to you, in that you commend, or inferior. If he be "inferior, if he be to be commended, you much more. If he be ſuperior, if he "be not to be commended, you much leſs." Glorious men are the ſcorn of wiſe men; the admiration of fools; the idols of paraſites; and the ſlaves of their own vaunts.

LV. *Of* Honour *and* Reputation.

THE winning of honour is but the revealing of a man's virtue and worth without diſadvantage. For ſome in their actions do woo and affect honour and reputation; which ſort of men are commonly much talked of, but inwardly little admired. And ſome, contrariwiſe, darken their virtue in the ſhew of it; ſo as they be undervalued in opinion. If a man perform that which hath not been attempted before, or attempted and given over; or hath been atchieved, but not with ſo good circumſtance; he ſhall purchaſe more honour than by effecting a matter of greater difficulty or virtue, wherein he is but a follower. If a man ſo temper his actions, as in ſome one of them he doth content every faction or combination of people, the muſic will be the fuller. A man is an ill huſband of his honour that entereth into any action, the failing wherein may diſgrace him more than the carrying of it through can honour him. Honour that is gained and broken upon another, hath the quickeſt reflexion, like diamonds cut with faſcets. And therefore let a man contend to excel any competitors of his in honour, in out-ſhooting them, if he can, in their own bow. Diſcreet followers and ſervants help much to reputation: *omnis fama à domeſticis emanat.* Envy, which is the canker of honour, is beſt extinguiſhed by declaring a man's ſelf, in his ends rather to ſeek merit, than fame; and by attributing a man's ſucceſſes rather to divine providence and felicity, than to his own virtue or policy. The true marſhalling of the degrees of ſovereign honour, are theſe. In the firſt place are *conditores imperiorum*; founders of ſtates and commonwealths; ſuch as were Romulus, Cyrus, Cæſar, Ottoman, Iſmael. In the ſecond place are *legiſlatores*, lawgivers, which are alſo called ſecond founders, or *perpetui principes*, becauſe they govern by their ordinances, after they are gone: ſuch were Lycurgus, Solon, Juſtinian, Edgar, Alphonſus of Caſtile the wiſe, that made the *Siete partidas*. In the third place are *liberatores*, or *ſalvatores*; ſuch as compound the long miſeries of civil wars, or deliver their countries from ſervitude of ſtrangers or tyrants; as Auguſtus Cæſar, Veſpaſianus, Aurelianus, Theodoricus, king Henry the ſeventh of England, king Henry the fourth of France. In the fourth place are *propagatores*, or *propugnatores imperii*, ſuch as in honourable wars enlarge their territories, or make noble defence againſt invaders. And in the laſt place, are *patres patriae*, which reign juſtly, and make the times good wherein they live. Both which laſt kinds need no examples, they are in ſuch number. Degrees of honour in ſubjects are; firſt, *participes curarum*, thoſe upon whom princes do diſcharge the greateſt weight of their affairs; their right hands, as we call them. The next are *duces belli*, great leaders; ſuch as are princes lieutenants, and do them notable ſervices in the wars. The third are *gratioſi*, favourites; ſuch as exceed not this ſcantling, to be ſolace to the ſovereign, and harmleſs to the people: and the fourth, *negotiis pares*; ſuch as have great places under princes, and execute their places with ſufficiency. There is an honour likewiſe, which may be ranked amongſt the greateſt, which happeneth

peneth rarely: that is, of ſuch as ſacrifice themſelves to death or danger for the good of their country; as was M. Regulus, and the two Decii.

LVI. *Of* JUDICATURE.

JUDGES ought to remember, that their office is *jus dicere*, and not *jus dare*; to interpret law, and not to make law, or give law. Elſe will it be like the authority claimed by the church of Rome; which, under pretext of expoſition of Scripture, doth not ſtick to add and alter; and to pronounce that which they do not find; and by ſhew of antiquity to introduce novelty. Judges ought to be more learned than witty; more reverend than plauſible; and more adviſed than confident. Above all things, integrity is their portion and proper virtue. *Curſed*, ſaith the law, *is he that removeth the land-mark*. The miſlayer of a mere-ſtone is to blame: but it is the unjuſt judge that is the capital remover of land-marks, when he defineth amiſs of lands and property. One foul ſentence doth more hurt than many foul examples. For theſe do but corrupt the ſtream: the other corrupteth the fountain. So ſaith Solomon; *Fons turbatus, et vena corrupta, eſt juſtus cadens in cauſa ſua coram adverſario*. The office of judges may have reference unto the parties that ſue; unto the advocates that plead; unto the clerks and miniſters of juſtice underneath them; and to the ſovereign or ſtate above them.

Firſt, for the cauſes or parties that ſue. *There be*, ſaith the Scripture, *that turn judgment into wormwood*; and ſurely there be alſo that turn it into vinegar: for injuſtice maketh it bitter, and delays make it ſour. The principal duty of a judge is to ſuppreſs force and fraud; whereof force is the more pernicious when it is open; and fraud when it is cloſe and diſguiſed. Add thereto contentious ſuits, which ought to be ſpewed out as the ſurfeit of courts. A judge ought to prepare his way to a juſt ſentence, as God uſeth to prepare his way, by raiſing valleys and taking down hills: ſo when there appeareth on either ſide an high hand, violent proſecution, cunning advantages taken, combination, power, great counſel, then is the virtue of a judge ſeen, to make inequality equal; that he may plant his judgment as upon an even ground. *Qui fortiter emungit, elicit ſanguinem*; and where the wine-preſs is hard wrought, it yields a harſh wine that taſtes of the grape-ſtone. Judges muſt beware of hard conſtructions and ſtrained inferences; for there is no worſe torture than the torture of laws: eſpecially in caſe of laws penal they ought to have care, that that which was meant for terror be not turned into rigour; and that they bring not upon the people that ſhower whereof the Scripture ſpeaketh, *pluet ſuper eos laqueos*: for penal laws preſſed, are a ſhower of ſnares upon the people. Therefore let penal laws, if they have been ſleepers of long, or if they be grown unfit for the preſent time, be by wiſe judges confined in the execution; *Judicis officium eſt, ut res, ita tempora rerum, etc.* In cauſes of life and death, judges ought, as far as the law permitteth, in juſtice to remember mercy; and to caſt a ſevere eye upon the example, but a merciful eye upon the perſon.

Secondly, for the advocates and counſel that plead: patience and gravity of hearing is an eſſential part of juſtice; and an over-ſpeaking judge is no well-tuned cymbal. It is no grace to a judge, firſt to find that which he might have heard in due time from the bar; or to ſhew quickneſs of conceit in cutting off evidence or counſel too ſhort; or to prevent information by queſtions, though pertinent. The parts of a judge in hearing

hearing are four: to direct the evidence; to moderate length, repetition, or impertinency of speech; to recapitulate, select, and collate, the material points of that which hath been said; and to give the rule or sentence. Whatsoever is above these, is too much; and proceedeth either of glory and willingness to speak, or of impatience to hear, or of shortness of memory, or of want of a stayed and equal attention. It is a strange thing to see, that the boldness of advocates should prevail with judges; whereas they should imitate God, in whose seat they sit: who *represseth the presumptuous*, and *giveth grace to the modest*. But it is more strange, that judges should have noted favourites; which cannot but cause multiplication of fees and suspicion of by-ways. There is due from the judge to the advocate some commendation and gracing where causes are well handled, and fairly pleaded; especially towards the side which obtaineth not; for that upholds in the client the reputation of his counsel, and beats down in him the conceit of his cause. There is likewise due to the public a civil reprehension of advocates, where there appeareth cunning counsel, gross neglect, slight information, indiscreet pressing, or an over-bold defence. And let not the counsel at the bar chop with the judge, nor wind himself into the handling of the cause anew, after the judge hath declared his sentence: but on the other side, let not the judge meet the cause half way; nor give occasion to the party to say, his counsel or proofs were not heard.

Thirdly, for that that concerns clerks and ministers. The place of justice is an hallowed place; and therefore not only the bench, but the footpace, and precincts, and purprise thereof, ought to be preserved without scandal and corruption. For certainly *grapes*, as the Scripture saith, *will not be gathered of thorns or thistles*: neither can justice yield her fruit with sweetness, amongst the briers and brambles of catching and polling clerks and ministers. The attendance of courts is subject to four bad instruments. First, certain persons that are sowers of suits; which make the court swell, and the country pine. The second sort is of those that engage courts in quarrels of jurisdiction, and are not truly *amici curiae*, but *parasiti curiae*, in puffing a court up beyond her bounds, for their own scraps and advantage. The third sort is of those that may be accounted the left hands of courts; persons that are full of nimble and sinister tricks and shifts, whereby they pervert the plain and direct courses of courts, and bring justice into oblique lines and labyrinths. And the fourth is, the poller and exacter of fees; which justifies the common resemblance of the courts of justice to the bush, whereunto while the sheep flies for defence in weather, he is sure to lose part of his fleece. On the other side, an ancient clerk, skilful in precedents, wary in proceeding, and understanding in the business of the court, is an excellent finger of a court, and doth many times point the way to the judge himself.

Fourthly, for that which may concern the sovereign and estate. Judges ought above all to remember the conclusion of the Roman twelve tables; *salus populi suprema lex*; and to know that laws, except they be in order to that end, are but things captious, and oracles not well inspired. Therefore it is an happy thing in a state, when kings and states do often consult with judges; and again, when judges do often consult with the king and state; the one, when there is matter of law intervenient in business of state; the other, when there is some consideration of state intervenient in matter of law. For many times the things deduced to judgment may be *meum* and *tuum*, when the reason and consequence thereof may trench to point of estate: I call matter of estate, not only the parts of sovereignty, but whatsoever introduceth any great alteration, or dangerous precedent; or concerneth manifestly any great portion of people. And let no man weakly conceive, that just laws and true policy have any

antipathy; for they are like the ſpirits and ſinews, that one moves with the other. Let judges alſo remember, that Solomon's throne was ſupported by lions on both ſides; let them be lions, but yet lions under the throne; being circumſpect that they do not check or oppoſe any points of ſovereignty. Let not judges alſo be ſo ignorant of their own right, as to think there is not left to them, as a principal part of their office, a wiſe uſe and application of laws. For they may remember what the apoſtle ſaith of a greater law than theirs; *Nos ſcimus quia lex bona eſt, modo quis ea utatur legitime.*

LVII. *Of* Anger.

TO ſeek to extinguiſh anger utterly, is but a bravery of the Stoics. We have better oracles: *Be angry, but ſin not. Let not the ſun go down upon your anger.* Anger muſt be limited and confined, both in race and in time. We will firſt ſpeak, how the natural inclination and habit, *to be angry*, may be attempered and calmed. Secondly, how the particular motions of anger may be repreſſed, or at leaſt refrained from doing miſchief. Thirdly, how to raiſe anger, or appeaſe anger, in another.

For the firſt, there is no other way but to meditate and ruminate well upon the effects of anger, how it troubles man's life. And the beſt time to do this, is to look back upon anger when the fit is thoroughly over. Seneca ſaith well; That anger is like ruin, which breaks itſelf upon that it falls. The Scripture exhorteth us, *to poſſeſs our ſouls in patience.* Whoſoever is out of patience, is out of poſſeſſion of his ſoul. Men muſt not turn bees;

animaſque in vulnere ponunt.

Anger is certainly a kind of baſeneſs; as it appears well in the weakneſs of thoſe ſubjects in whom it reigns; children, women, old folks, ſick folks. Only men muſt beware, that they carry their anger rather with ſcorn, than with fear; ſo that they may ſeem rather to be above the injury, than below it. Which is a thing eaſily done, if a man will give law to himſelf in it.

For the ſecond point, the cauſes and motives of anger are chiefly three. Firſt, to be too ſenſible of hurt; for no man is angry that feels not himſelf hurt: and therefore tender and delicate perſons muſt needs be oft angry; they have ſo many things to trouble them, which more robuſt natures have little ſenſe of. The next is the apprehenſion and conſtruction of the injury offered to be, in the circumſtances thereof, full of contempt. For contempt is that which putteth an edge upon anger, as much or more than the hurt itſelf. And therefore when men are ingenious in picking out circumſtances of contempt, they do kindle their anger much. Laſtly, opinion of the touch of a man's reputation doth multiply and ſharpen anger. Wherein the remedy is, that a man ſhould have, as Conſalvo was wont to ſay, *telam honoris craſſiorem.* But in all refrainings of anger, it is the beſt remedy to win time; and to make a man's ſelf believe, that the opportunity of his revenge is not yet come: but that he foreſees a time for it, and ſo to ſtill himſelf in the mean time, and reſerve it.

To contain anger from miſchief, though it take hold of a man, there be two things whereof you muſt have ſpecial caution. The one of extreme bitterneſs of words, eſpecially if they be aculeate and proper: for *communia maledicta* are nothing ſo much: and again, that in anger a man reveal no ſecrets; for that makes them not fit for ſociety. The other, that you do not peremptorily break off, in any buſineſs, in a fit of anger: but howſoever you ſhew bitterneſs, do not act any thing that is not revocable.

For

For raiſing and appeaſing anger in another; it is done chiefly by chooſing of times. When men are frowardeſt and worſt diſpoſed, to incenſe them. Again, by gathering, as was touched before, all that you can find out to aggravate the contempt: and the two remedies are by the contraries. The former, to take good times, when firſt to relate to a man an angry buſineſs: for the firſt impreſſion is much. And the other is, to ſever, as much as may be, the conſtruction of the injury, from the point of contempt: imputing it to miſunderſtanding, fear, paſſion, or what you will.

LVIII. *Of* Vicissitude of Things.

SOLOMON ſaith, *There is no new thing upon the earth:* ſo that as Plato had an imagination, that all knowledge was but remembrance; ſo Solomon giveth his ſentence, *that all novelty is but oblivion.* Whereby you may ſee, that the river of Lethe runneth as well above ground as below. There is an abſtruſe aſtrologer, that ſaith, if it were not for two things that are conſtant, the one is, that the fixed ſtars ever ſtand at like diſtance one from another, and never come nearer together, nor go farther aſunder: the other, that the diurnal motion perpetually keepeth time, no individual would laſt one moment. Certain it is, that the matter is in a perpetual flux, and never at a ſtay. The great windingſheets that bury all things in oblivion, are two: deluges, and earthquakes. As for conflagrations, and great droughts, they do not merely diſpeople and deſtroy. Phaeton's car went but a day. And the three years drought, in the time of Elias, was but particular, and left people alive. As for the great burnings by lightnings, which are often in the Weſt-Indies, they are but narrow. But in the other two deſtructions, by deluge and earthquake, it is farther to be noted, that the remnant of people which hap to be reſerved, are commonly ignorant and mountainous people, that can give no account of the time paſt: ſo that the oblivion is all one, as if none had been left. If you conſider well of the people of the Weſt-Indies, it is very probable that they are a newer or a younger people than the people of the old world: and it is much more likely, that the deſtruction that hath heretofore been there, was not by earthquakes, as the Ægyptian prieſt told Solon, concerning the iſland of Atlantis, that it was ſwallowed by an earthquake, but rather, that it was deſolated by a particular deluge; for earthquakes are ſeldom in thoſe parts: but, on the other ſide, they have ſuch pouring rivers, as the rivers of Aſia, and Africa, and Europe, are but brooks to them. Their Andes likewiſe, or mountains, are far higher than thoſe with us; whereby it ſeems, that the remnants of generation of men were in ſuch a particular deluge ſaved. As for the obſervation that Machiavel hath, that the jealouſy of ſects doth much extinguiſh the memory of things; traducing Gregory the Great, that he did what in him lay to extinguiſh all heathen antiquities; I do not find that thoſe zeals do any great effects, nor laſt long; as it appeared in the ſucceſſion of Sabinian, who did revive the former antiquities.

The viciſſitude or mutations in the ſuperior globe are no fit matter for this preſent argument. It may be, Plato's great year, if the world ſhould laſt ſo long, would have ſome effect, not in renewing the ſtate of like individuals, for that is the fume of thoſe, that conceive the celeſtial bodies have more accurate influences upon theſe things below than indeed they have, but in groſs. Comets, out of queſtion, have likewiſe power and effect over the groſs and maſs of things: but they are rather gazed upon, and waited upon in their journey, than wiſely obſerved in their effects; eſpecially in their reſpective effects: that is, what kind of comet, for magnitude, colour, verſion of the beams, placing in the region of heaven, or laſting, produceth what kind of effects.

There is a toy, which I have heard, and I would not have it given over, but waited upon a little. They ſay it is obſerved in the Low Countries, I know not in what part, that every five and thirty years, the ſame kind and ſute of years and weathers comes about again: as great froſt, great wet, great droughts, warm winters, ſummers with little heat, and the like; and they call it the prime. It is a thing I do the rather mention, becauſe, computing backwards, I have found ſome concurrence.

But to leave theſe points of nature, and to come to men. The greateſt viciſſitude of things amongſt men is the viciſſitude of ſects and religions: for thoſe orbs rule in mens minds moſt. The true religion is built upon the rock: the reſt are toſſed upon the waves of time. To ſpeak therefore of the cauſes of new ſects, and to give ſome counſel concerning them, as far as the weakneſs of human judgment can give ſtay to ſo great revolutions.

When the religion formerly received is rent by diſcords; and when the holineſs of the profeſſors of religion is decayed and full of ſcandal; and withal the times be ſtupid, ignorant, and barbarous, you may doubt the ſpringing up of a new ſect; if then alſo there ſhould ariſe any extravagant and ſtrange ſpirit to make himſelf author thereof: all which points held when Mahomet publiſhed his law. If a new ſect have not two properties, fear it not; for it will not ſpread. The one is the ſupplanting, or the oppoſing of authority eſtabliſhed: for nothing is more popular than that. The other is the giving licence to pleaſures and a voluptuous life. For as for ſpeculative hereſies, ſuch as were in ancient times the Arians, and now the Arminians, though they work mightily upon mens wits, yet they do not produce any great alterations in ſtates; except it be by the help of civil occaſions. There be three manner of plantations of new ſects: by the power of ſigns and miracles; by the eloquence and wiſdom of ſpeech and perſuaſion; and by the ſword. For martyrdoms, I reckon them amongſt miracles; becauſe they ſeem to exceed the ſtrength of human nature: and I may do the like of ſuperlative and admirable holineſs of life. Surely there is no better way to ſtop the riſing of new ſects and ſchiſms, than to reform abuſes; to compound the ſmaller differences; to proceed mildly, and not with ſanguinary perſecutions; and rather to take off the principal authors, by winning and advancing them, than to enrage them by violence and bitterneſs.

The changes and viciſſitudes in wars are many: but chiefly in three things; in the ſeats or ſtages of the war; in the weapons; and in the manner of the conduct. Wars, in ancient time, ſeemed more to move from eaſt to weſt: for the Perſians, Aſſyrians, Arabians, Tartars, which were the invaders, were all eaſtern people. It is true, the Gauls were weſtern; but we read but of two incurſions of theirs; the one to Gallo-Græcia, the other to Rome. But eaſt and weſt have no certain points of heaven; and no more have the wars, either from the eaſt or weſt, any certainty of obſervation. But north and ſouth are fixed: and it hath ſeldom or never been ſeen, that the far ſouthern people have invaded the northern, but contrariwiſe; whereby it is manifeſt, that the northern tract of the world is in nature the more martial region: be it in reſpect of the ſtars of that hemiſphere, or of the great continents that are upon the north; whereas the ſouth part, for ought that is known, is almoſt all ſea; or which is moſt apparent, of the cold of the northern parts; which is that which, without aid of diſcipline, doth make the bodies hardeſt, and the courages warmeſt.

Upon the breaking and ſhivering of a great ſtate and empire, you may be ſure to have wars. For great empires, while they ſtand, do enervate and deſtroy the forces of the natives which they have ſubdued, reſting upon their own protecting forces: and

and then when they fail alſo, all goes to ruin, and they become a prey. So was it in the decay of the Roman empire, and likewiſe in the empire of Almaigne, after Charles the Great, every bird taking a feather; and were not unlike to befal to Spain, if it ſhould break. The great acceſſions and unions of kingdoms do likewiſe ſtir up wars. For when a ſtate grows to an over-power, it is like a great flood, that will be ſure to overflow. As it hath been ſeen in the ſtates of Rome, Turkey, Spain, and others. Look, when the world hath feweſt barbarous people, but ſuch as commonly will not marry or generate, except they know means to live, as it is almoſt every where at this day, except Tartary, there is no danger of inundations of people: but when there be great ſhoals of people, which go on to populate, without foreſeeing means of life and ſuſtentation, it is of neceſſity that once in an age or two they diſcharge a portion of their people upon other nations; which the ancient northern people were wont to do by lot; caſting lots what part ſhould ſtay at home, and what ſhould ſeek their fortunes. When a warlike ſtate grows ſoft and effeminate, they may be ſure of a war. For commonly ſuch ſtates are grown rich in the time of their degenerating; and ſo the prey inviteth, and their decay in valour encourageth a war.

As for the weapons, it hardly falleth under rule and obſervation: yet we ſee, even they have returns and viciſſitudes. For certain it is, that ordnance was known in the city of the Oxidraces in India; and was that which the Macedonians called thunder and lightening, and magic. And it is well known, that the uſe of ordnance hath been in China above two thouſand years. The conditions of weapons, and their improvement are, firſt, the fetching afar off; for that outruns the danger; as it is ſeen in ordnance and muſkets. Secondly, the ſtrength of the percuſſion; wherein likewiſe ordnance do exceed all arietations and ancient inventions. The third is, the commodious uſe of them; as that they may ſerve in all weathers; that the carriage may be light and manageable; and the like.

For the conduct of the war: at the firſt, men reſted extremely upon number: they did put the wars likewiſe upon main force and valour, pointing days for pitched fields, and ſo trying it out, upon an even match: and they were more ignorant in ranging and arraying their battles. After, they grew to reſt upon number rather competent than vaſt; they grew to advantages of place, cunning diverſions, and the like: and they grew more ſkilful in the ordering of their battles.

In the youth of a ſtate, arms do flouriſh; in the middle age of a ſtate, learning; and then both of them together for a time: in the declining age of a ſtate, mechanical arts and merchandize. Learning hath its infancy, when it is but beginning and almoſt childiſh: then its youth, when it is luxuriant and juvenile: then its ſtrength of years, when it is ſolid and reduced: and laſtly, its old age, when it waxeth dry and exhauſted. But it is not good to look too long upon theſe turning wheels of viciſſitude, leſt we become giddy. As for the philology of them, that is but a circle of tales, and therefore not fit for this writing.

Of a KING.

1. A King is a mortal god on earth, unto whom the living God hath lent his own name as a great honour; but withal told him, he ſhould die like a man, leſt he ſhould be proud and flatter himſelf, that God hath with his name imparted unto him his nature alſo.

2. Of all kind of men, God is the leaſt beholden unto them; for he doth moſt for them, and they do ordinarily leaſt for him.

3. A

3. A king that would not feel his crown too heavy for him, must wear it every day; but if he think it too light, he knoweth not of what metal it is made.

4. He must make religion the rule of government, and not to balance the scale; for he that casteth in religion only to make the scales even, his own weight is contained in those characters, *Mene, mene, tekel, upharsin, He is found too light, his kingdom shall be taken from him.*

5. And that king that holds not religion the best reason of state, is void of all piety and justice, the supporters of a king.

6. He must be able to give counsel himself, but not rely thereupon; for though happy events justify their counsels, yet it is better that the evil event of good advice be rather imputed to a subject than a sovereign.

7. He is the fountain of honour, which should not run with a waste pipe, lest the courtiers sell the water, and then, as papists say of their holy wells, it loses the virtue.

8. He is the life of the law, not only as he is *lex loquens* himself, but because he animateth the dead letter, making it active towards all his subjects *praemio et poena.*

9. A wise king must do less in altering his laws than he may; for new government is ever dangerous. It being true in the body politic, as in the corporal, that *omnis subita immutatio est periculosa*; and though it be for the better, yet it is not without a fearful apprehension; for he that changeth the fundamental laws of a kingdom, thinketh there is no good title to a crown, but by conquest.

10. A king that setteth to sale seats of justice, oppresseth the people; for he teacheth his judges to sell justice; and *pretio parata pretio venditur justitia.*

11. Bounty and magnificence are virtues very regal, but a prodigal king is nearer a tyrant than a parsimonious; for store at home draweth not his contemplations abroad; but want supplieth itself of what is next, and many times the next way: a king herein must be wise, and know what he may justly do.

12. That king which is not feared, is not loved; and he that is well seen in his craft, must as well study to be feared as loved; yet not loved for fear, but feared for love.

13. Therefore, as he must always resemble him whose great name he beareth, and that as in manifesting the sweet influence of his mercy on the severe stroke of his justice sometimes, so in this not to suffer a man of death to live; for besides that the land doth mourn, the restraint of justice towards sin doth more retard the affection of love, than the extent of mercy doth inflame it; and sure where love is [ill] bestowed, fear is quite lost.

14. His greatest enemies are his flatterers; for though they ever speak on his side, yet their words still make against him.

15. The love which a king oweth to a weal public, should not be restrained to any one particular; yet that his more special favour do reflect upon some worthy ones, is somewhat necessary, because there are few of that capacity.

16. He must have a special care of five things, if he would not have his crown to be but to him *infelix felicitas.*

First, that *simulata sanctitas* be not in the church; for that is *duplex iniquitas.*

Secondly, that *inutilis aequitas* sit not in the chancery; for that is *inepta misericordia.*

Thirdly, that *utilis iniquitas* keep not the exchequer; for that is *crudele latrocinium.*

Fourthly, that *fidelis temeritas* be not his general; for that will bring but *feram poenitentiam.*

Fifthly,

Fifthly, that *infidelis prudentia* be not his ſecretary; for that is *anguis ſub viridi herba.*

To conclude; as he is of the greateſt power, ſo he is ſubject to the greateſt cares, made the ſervant of his people, or elſe he were without a calling at all.

He then that honoureth him not is next an atheiſt, wanting the fear of God in his heart.

A fragment of an Eſſay on FAME.

THE poets make Fame a monſter. They deſcribe her in part finely and elegantly; and in part gravely and ſententiouſly. They ſay: Look, how many feathers ſhe hath, ſo many eyes ſhe hath underneath; ſo many tongues; ſo many voices; ſhe pricks up ſo many ears.

This is a flouriſh, there follow excellent parables; as, that ſhe gathereth ſtrength in going; that ſhe goeth upon the ground, and yet hideth her head in the clouds: that in the day-time ſhe ſitteth in a watch-tower, and flieth moſt by night: that ſhe mingleth things done, with things not done: and that ſhe is a terror to great cities. But that which paſſeth all the reſt is, they do recount that the Earth, mother of the giants, that made war againſt Jupiter, and were by him deſtroyed, thereupon in an anger brought forth Fame; for certain it is, that rebels, figured by the giants, and ſeditious fames and libels, are but brothers and ſiſters; maſculine and feminine. But now if a man can tame this monſter, and bring her to feed at the hand, and govern her, and with her fly other ravening fowl, and kill them, it is ſomewhat worth. But we are infected with the ſtile of the poets. To ſpeak now in a ſad and a ſerious manner; there is not in all the politics a place leſs handled, and more worthy to be handled, than this of fame. We will therefore ſpeak of theſe points: what are falſe fames; and what are true fames; and how they may be beſt diſcerned; how fames may be ſown and raiſed; how they may be ſpread and multiplied; and how they may be checked and laid dead. And other things concerning the nature of fame. Fame is of that force, as there is ſcarcely any great action wherein it hath not a great part, eſpecially in the war. Mucianus undid Vitellius by a fame that he ſcattered, that Vitellius had in purpoſe to remove the legions of Syria into Germany, and the legions of Germany into Syria; whereupon the legions of Syria were infinitely inflamed. Julius Cæſar took Pompey unprovided, and laid aſleep his induſtry and preparations, by a fame that he cunningly gave out, how Cæſar's own ſoldiers loved him not; and being wearied with the wars, and laden with the ſpoils of Gaul, would forſake him as ſoon as he came into Italy. Livia ſettled all things for the ſucceſſion of her ſon Tiberius, by continual giving out that her huſband Auguſtus was upon recovery and amendment. And it is an uſual thing with the baſhaws, to conceal the death of the Great Turk from the janizaries and men of war, to ſave the ſacking of Conſtantinople and other towns, as their manner is. Themiſtocles made Xerxes, king of Perſia, poſt apace out of Grecia, by giving out that the Grecians had a purpoſe to break his bridge of ſhips which he had made athwart the Helleſpont. There be a thouſand ſuch like examples, and the more they are, the leſs they need to be repeated, becauſe a man meeteth with them every where: therefore let all wiſe governors have as great a watch and care over fames, as they have of the actions and deſigns themſelves.

The reſt was not finiſhed.

A

COLLECTION

OF

APOPHTHEGMS

NEW and OLD.

His LORDSHIP's PREFACE.

JULIUS Cæsar did write a collection of apophthegms as appears in an epistle of Cicero; so did Macrobius, a consular man. I need say no more for the worth of a writing of that nature. It is pity Cæsar's book is lost: for I imagine they were collected with judgment and choice; whereas that of Plutarch and Stobæus, and much more the modern ones, draw much of the dregs. Certainly they are of excellent use. They are mucrones verborum, *pointed speeches.* The words of the wise are as goads, *saith Solomon. Cicero prettily calleth them* salinas, *salt-pits, that you may extract salt out of, and sprinkle it where you will. They serve to be interlaced in continued speech. They serve to be recited upon occasion of themselves. They serve if you take out the kernel of them, and make them your own. I have, for my recreation amongst more serious studies, collected some few of them (a): therein fanning the old; not omitting any, because they are vulgar, for many vulgar ones are excellent good, nor for the meanness of the person, but because they are dull and flat; and adding many new, that otherwise would have died.*

(a) This collection his lordship made out of his memory, without turning any book. *Rawley.*

A COLLECTION OF APOPHTHEGMS New and Old.

1. QUEEN Elizabeth, the morrow of her coronation, it being the cuſtom to releaſe priſoners at the inauguration of a prince, went to the chapel; and in the great chamber, one of her courtiers, who was well known to her, either out of his own motion, or by the inſtigation of a wiſer man, preſented her with a petition; and before a number of courtiers, beſought her with a loud voice, "That now this "good time, there might be four or five principal priſoners more releaſed: thoſe "were the four evangeliſts and the apoſtle St. Paul, who had been long ſhut up in "an unknown tongue, as it were in priſon; ſo as they could not converſe with the "common people." The Queen anſwered very gravely, "That it was beſt firſt "to inquire of them, Whether they would be releaſed or no."

2. Queen Ann Bullen, at the time when ſhe was led to be beheaded in the Tower, called one of the king's privy-chamber to her, and ſaid unto him, "Com-"mend me to the king, and tell him, that he hath been ever conſtant in his courſe "of advancing me; from a private gentlewoman he made me a marchioneſs; and "from a marchioneſs a queen; and now, that he hath left no higher degree of "earthly honour, he intends to crown my innocency with the glory of mar-"tyrdom."

3. His majeſty James the firſt, king of Great Britain, having made unto his parliament an excellent and large declaration, concluded thus; "I have now given "you a clear mirrour of my mind; uſe it therefore like a mirrour, and take heed "how you let it fall, or how you ſoil it with your breath."

4. A great officer in France was in danger to have loſt his place; but his wife, by her ſuit and means making, made his peace; whereupon a pleaſant fellow ſaid, "That he had been cruſhed, but that he ſaved himſelf upon his horns."

5. His majeſty ſaid to his parliament at another time, finding there were ſome cauſeleſs jealouſies ſown amongſt them; "That the king and his people, whereof "the parliament is the repreſentative body, were as huſband and wife; and there-"fore that of all other things jealouſy was between them moſt pernicious."

6. His majeſty, when he thought his council might note in him ſome variety in buſineſſes, though indeed he remained conſtant, would ſay, "That the ſun many "times ſhineth watery; but it is not the ſun which cauſeth it, but ſome cloud "riſing betwixt us and the ſun: and when that is ſcattered, the ſun is as it was, "and comes to his former brightneſs."

7. His

7. His majeſty, in his anſwer to the book of the cardinal of Evereux, who had in a grave argument of divinity ſprinkled many witty ornaments of poeſy and humanity, ſaith; "That theſe flowers were like blue, and yellow, and red flowers in "the corn, which make a pleaſant ſhew to thoſe that look on, but they hurt "the corn."

8. Sir Edward Coke being vehement againſt the two provincial councils of Wales, and the north, ſaid to the king; "There was nothing there but a kind "of confuſion and hotch-potch of juſtice: one while they were a ſtar-chamber; "another while a kings-bench; another, a common pleas; another, a commiſſion "of oyer and terminer." His majeſty anſwered; "Why, Sir Edward Coke, they "be like houſes in progreſs, where I have not, nor can have, ſuch diſtinct rooms "of ſtate, as I have here at Whitehall, or at Hampton-court."

9. The commiſſioners of the treaſury moved the king for the relief of his eſtate, to diſafforeſt ſome foreſts of his, explaining themſelves of ſuch foreſts as lay out of the way, not near any of the king's houſes, nor in the courſe of his progreſs; whereof he ſhould never have uſe nor pleaſure. "Why, ſaith the "king, do you think that Solomon had uſe and pleaſure of all his three hundred "concubines!"

10. His majeſty, when the committees of both houſes of parliament preſented unto him the inſtrument of union of England and Scotland, was merry with them; and amongſt other pleaſant ſpeeches, ſhewed unto them the laird of Lawreſton a Scotchman, who was the talleſt and greateſt man that was to be ſeen, and ſaid; "Well, now we are all one, yet none of you will ſay, but here is one Scotchman "greater than any Engliſhman;" which was an ambiguous ſpeech; but it was thought he meant it of himſelf.

11. His majeſty would ſay to the lords of his council when they ſat upon any great matter, and came from council in to him, "Well, you have ſat, but what "have you hatched?"

12. When the arch-duke did raiſe his ſiege from the Grave, the then ſecretary came to queen Elizabeth. The queen, having firſt intelligence thereof, ſaid to the ſecretary, "Wote you what? The arch-duke is riſen from the Grave." He anſwered; "What, without the trumpet of the arch-angel?" The queen replied, "Yes; without the ſound of trumpet."

13. Queen Elizabeth was importuned much by my lord of Eſſex, to ſupply divers great offices that had been long void; the queen anſwered nothing to the matter; but roſe up on the ſudden, and ſaid; "I am ſure my office will not be long "void." And yet at that time there was much ſpeech of troubles, and diviſions about the crown, to be after her deceaſe; but they all vaniſhed; and king James came in, in a profound peace.

14. The council did make remonſtrance unto queen Elizabeth of the continual conſpiracies againſt her life; and namely, that a man was lately taken, who ſtood ready in a very dangerous and ſuſpicious manner to do the deed: and they ſhewed her the weapon, wherewith he thought to have acted it. And therefore they adviſed her, that ſhe ſhould go leſs abroad to take the air, weakly attended, as ſhe uſed. But the queen anſwered; "That ſhe had rather be dead, than put "in cuſtody."

15. The lady Paget, that was very private with queen Elizabeth, declared herſelf much againſt the match with Monſieur. After monſieur's death, the queen

took extreme grief, at leaſt as ſhe made ſhew, and kept in within her bed-chamber and one ante-chamber for three weeks ſpace, in token of mourning: at laſt ſhe came forth into the privy-chamber, and admitted her ladies to have acceſs unto her; and amongſt the reſt, my lady Paget preſented herſelf, and came to her with a ſmiling countenance. The queen bent her brows, and ſeemed to be highly diſpleaſed, and ſaid to her; "Madam, you are not ignorant of my extreme grief, and do you come "to me with a countenance of joy?" My lady Paget anſwered; "Alas, if it "pleaſe your majeſty, it is impoſſible for me to be abſent from you three weeks, "but that when I ſee you, I muſt look chearfully." "No, no, ſaid the queen, "not forgetting her former averſeneſs to the match, you have ſome other conceit in "it, tell me plainly." My lady anſwered, "I muſt obey you; it is this. I was "thinking how happy your majeſty was, you married not Monſieur; for ſeeing you "take ſuch thought for his death, being but your friend; if he had been your huſ-"band, ſure it would have coſt you your life."

16. Henry the fourth of France his queen was young with child; count Soiſſons, that had his expectation upon the crown, when it was twice or thrice thought that the queen was with child before, ſaid to ſome of his friends, "That it was but with "a pillow." This had ſome ways come to the king's ear; who kept it till ſuch time as the queen waxed great: then he called the count of Soiſſons to him, and ſaid, laying his hand upon the queen's belly; "Come couſin, is this a pillow?" The count of Soiſſons anſwered; "Yes, ſir, it is a pillow for all France to ſleep "upon."

17. King Henry the fourth of France was ſo punctual of his word, after it was once paſſed, that they called him "The king of the faith."

18. The ſaid king Henry the fourth was moved by his parliament to a war againſt the proteſtants: he anſwered, "Yes, I mean it; I will make every one "of you captains; you ſhall have companies aſſigned you." The parliament obſerving whereunto his ſpeech tended, gave over, and deſerted his motion.

19. Queen Elizabeth was wont to ſay, upon the commiſſion of ſales, "That "the commiſſioners uſed her like ſtrawberry-wives, that laid two or three great "ſtrawberries at the mouth of their pot, and all the reſt were little ones; ſo they "made her two or three good prizes of the firſt particulars, but fell ſtraight-"ways."

20. Queen Elizabeth uſed to ſay of her inſtructions to great officers, "That "they were like to garments, ſtrait at the firſt putting on, but did by and by wear "looſe enough."

21. A great officer at court, when my lord of Eſſex was firſt in trouble; and that he, and thoſe that dealt for him, would talk much of my lord's friends, and of his enemies, anſwered to one of them; "I will tell you, I know but one friend "and one enemy my lord hath, and that one friend is the queen, and that one "enemy is himſelf."

22. The book for depoſing king Richard the ſecond, and the coming in of Henry the fourth, ſuppoſed to be written by doctor Hayward, who was committed to the Tower for it, had much incenſed queen Elizabeth; and ſhe aſked Mr. Bacon, being then of her counſel learned, "Whether there were any treaſon contained in it?" Who intending to do him a pleaſure, and to take off the queen's bitterneſs with a merry conceit, anſwered; "No, madam, for treaſon I cannot deliver opinion that "there is any, but very much felony." The queen apprehending it gladly, aſked, "How?

" How? and wherein?" Mr. Bacon anſwered, " Becauſe he had ſtolen many of " his ſentences and conceits out of Cornelius Tacitus."

23. Queen Elizabeth being to reſolve upon a great officer, and being by ſome, that canvaſſed for others, put in ſome doubt of that perſon whom ſhe meant to advance, called for Mr. Bacon; and told him, " She was like one with a lanthorn " ſeeking a man;" and ſeemed unſatisfied in the choice ſhe had of a man for that place. Mr. Bacon anſwered her, " That he had heard that in old time there " was uſually painted on the church walls the day of doom, and God ſitting in " judgment, and Saint Michael by him, with a pair of balances; and the ſoul, " and the good deeds in the one balance; and the faults and the evil deeds in " the other: and the ſoul's balance went up far too light. Then was our lady " painted with a great pair of beads, who caſt them into the light balance, and " brought down the ſcale: ſo, he ſaid, place and authority, which were in her " majeſty's hands to give, were like our lady's beads, which though men, " through any imperfections, were too light before, yet when they were caſt in, " made weight competent."

24. Queen Elizabeth was dilatory enough in ſuits, of her own nature; and the lord treaſurer Burleigh being a wiſe man, and willing therein to feed her humour, would ſay to her; " Madam, you do well to let ſuitors ſtay; for I " ſhall tell you, *bis dat*, *qui cito dat*; if you grant them ſpeedily, they will come " again the ſooner."

25. Sir Nicholas Bacon, who was keeper of the great ſeal of England, when queen Elizabeth in her progreſs came to his houſe at Gorhambury, and ſaid to him; " My lord, what a little houſe have you gotten?" anſwered her; " Madam, " my houſe is well, but it is you that have made me too great for my houſe."

26. There was a conference in parliament, between the lords houſe and the houſe of commons, about a bill of accountants, which came down from the lords to the commons; which bill prayed, That the lands of accountants, whereof they were ſeized when they entered upon their office, might be liable to their arrears to the queen. But the commons deſired, That the bill might not look back to accountants that were already, but extend only to accountants hereafter. But the lord treaſurer ſaid; " Why, I pray you, if you had loſt your purſe " by the way, would you look forwards, or would you look back? The queen " hath loſt her purſe."

27. The lord keeper, Sir Nicholas Bacon, was aſked his opinion by my lord of Leiceſter, concerning two perſons whom the queen ſeemed to think well of: " By " my troth, my lord, ſaid he, the one is a grave counſellor; the other is a proper " young man; and ſo he will be as long as he lives."

28. My lord of Leiceſter, favourite to queen Elizabeth, was making a large chace about Cornbury park; meaning to incloſe it with poſts and rails; and one day was caſting up his charge what it would come to. Mr. Goldingham, a free-ſpoken man, ſtood by, and ſaid to my lord; " Methinks your lordſhip goeth not the cheap- " eſt way to work." " Why, Goldingham," ſaid my lord. " Marry, my lord, ſaid " Goldingham, count you but upon the poſts, for the country will find you railing."

29. The lord keeper, Sir Nicholas Bacon, was aſked his opinion by queen Elizabeth of one of theſe monopoly licences? And he anſwered; " Madam, will you " have me ſpeak the truth? *Licentiâ omnes deteriores ſumus*: We are all the worſe " for licences."

30. My

30. My lord of Eſſex, at the ſuccour of Roan, made twenty four knights, which at that time was a great number. Divers of thoſe gentlemen were of weak and ſmall means; which when queen Elizabeth heard, ſhe ſaid; "My lord might have "done well to have built his alms-houſe, before he made his knights."

31. The deputies of the reformed religion, after the maſſacre which was at Paris upon St. Bartholomew's day, treated with the king and queen-mother, and ſome other of the council, for a peace. Both ſides were agreed upon the articles. The queſtion was, upon the ſecurity for the performance. After ſome particulars propounded and rejected, the queen-mother ſaid, "Why, is not the word of a king "ſufficient ſecurity?" One of the deputies anſwered; "No, by St. Bartholomew, "madam."

32. There was a French gentleman ſpeaking with an Engliſh of the law Salique; That women were excluded from inheriting the crown of France. The Engliſh ſaid; "Yes, but that was meant of the women themſelves, not of ſuch "males as claimed by women." The French gentleman ſaid, "Where did you "find that gloſs?" The Engliſh anſwered, "I'll tell you, Sir; look on the back-"ſide of the record of the law Salique, and there you ſhall find it indorſed:" implying, there was no ſuch thing as the law Salique, but that it is a mere fiction.

33. A frier of France, being in an earneſt diſpute about the law Salique, would needs prove it by Scripture; citing that verſe of the goſpel; *Lilia agri non laborant, neque nent*; the lilies of the field do neither labour nor ſpin; applying it thus; That the flower-de-luces of France cannot deſcend, neither to the diſtaff, nor to the ſpade; that is, not to a woman, nor to a peaſant.

34. When peace was renewed with the French in England, divers of the great counſellors were preſented from the French with jewels: the lord Henry Howard, being then earl of Northampton and a counſellor, was omitted. Whereupon the king ſaid to him, "My lord, how happens it that you have not a jewel as well as "the reſt?" My lord anſwered, according to the fable in Æſop; *Non ſum Gallus, itaque non reperi gemmam.*

35. The ſame earl of Northampton, then lord privy ſeal, was aſked by king James openly at the table, where commonly he entertained the king with diſcourſe; the king aſked him upon the ſudden; "My lord, have you not a deſire to ſee Rome?" My lord privy ſeal anſwered; "Yes indeed, Sir." The king ſaid, "And why?" My lord anſwered; "Becauſe, if it pleaſe your majeſty, it was the ſeat of the great-"eſt monarchy, and the ſeminary of the braveſt men in the world, whilſt it was "heathen: and then, ſecondly, becauſe afterwards it was the ſee of ſo many holy "biſhops in the primitive church, moſt of them martyrs." The king would not give it over, but ſaid; "And for nothing elſe?" My lord anſwered; "Yes, if it "pleaſe your Majeſty, for two things more: the one, to ſee him, who, they ſay, hath "ſo great a power to forgive other men their ſins, to confeſs his own ſins upon his "knees before a chaplain or prieſt: and the other to hear Antichriſt ſay his creed."

36. Sir Nicholas Bacon being appointed a judge for the northern circuit, and having brought his trials that came before him to ſuch a paſs, as the paſſing of ſentence on malefactors, he was by one of the malefactors mightily importuned for to ſave his life; which, when nothing that he had ſaid did avail, he at length deſired his mercy on account of kindred. "Prithee," ſaid my lord judge, "how came that "in?" "Why, if it pleaſe you, my lord, your name is Bacon, and mine is Hog, "and in all ages Hog and Bacon have been ſo near kindred, that they are not to "be

" be ſeparated." " Ay, but," replied judge Bacon, " you and I cannot be kindred, " except you be hanged; for Hog is not Bacon until it be well hanged."

37. Two ſcholars and a countryman travelling upon the road, one night lodged all in one inn, and ſupped together, where the ſcholars thought to have put a trick upon the countryman, which was thus: the ſcholars appointed for ſupper two pigeons, and a fat capon, which being ready was brought up, and they having ſat down, the one ſcholar took up one pigeon, the other ſcholar took the other pigeon, thinking thereby that the countryman ſhould have ſat ſtill, until that they were ready for the carving of the capon; which he perceiving, took the capon and laid it on his trencher, and thus ſaid, " Daintily contrived, every man a bird."

38. Jack Roberts was deſired by his taylor, when the reckoning grew ſomewhat high, to have a bill of his hand. Roberts ſaid, " I am content, but you muſt let " no man know it." When the taylor brought him the bill, he tore it as in choler, and ſaid to him, " You uſe me not well; you promiſed me that no man ſhould " know it, and here you have put in, *Be it known to all men by theſe preſents.*"

39. Sir Walter Raleigh was wont to ſay of the ladies of queen Elizabeth's privy-chamber and bed-chamber, " that they were like witches, they could " do hurt, but they could do no good."

40. There was a miniſter deprived for inconformity, who ſaid to ſome of his friends, " that if they deprived him, it ſhould coſt an hundred mens lives." The party underſtood it, as if being a turbulent fellow, he would have moved ſedition, and complained of him; whereupon being convented and appoſed upon that ſpeech, he ſaid his meaning was, " that if he loſt his benefice, he " would practiſe phyſic, and then he thought he ſhould kill an hundred men " in time."

41. Secretary Bourn's ſon kept a gentleman's wife in Shropſhire, who lived from her huſband with him: when he was weary of her, he cauſed her huſband to be dealt with to take her home, and offered him five hundred pounds for reparation; the gentleman went to Sir H. Sidney, to take his advice upon this offer, telling him, " that his wife promiſed now a new life; and, to tell him truth, " five hundred pounds would come well with him; and beſides, that ſometimes " he wanted a woman in his bed." " By my troth," ſaid Sir Henry Sidney, " take her home, and take the money; then whereas other cuckolds wear their " horns plain, you may wear yours gilt."

42. When Rabelais, the great jeſter of France, lay on his death-bed, and they gave him the extreme unction, a familiar friend came to him afterwards, and aſked him how he did? Rabelais anſwered, " Even going my journey, they " have greaſed my boots already."

43. Mr. Bromley ſolicitor, giving in evidence for a deed, which was impeached to be fraudulent, was urged by the counſel on the other ſide with this preſumption, That in two former ſuits when title was made, that deed was paſſed over in ſilence, and ſome other conveyance ſtood upon. Mr. juſtice Catiline taking in with that ſide, aſked the ſolicitor, " I pray thee, Mr. Solicitor, let me " aſk you a familiar queſtion; I have two geldings in my ſtable; I have divers " times buſineſs of importance, and ſtill I ſend forth one of my geldings, and " not the other; would you not think I ſet him aſide for a jade?" " No, my lord, " ſaid Bromley, I would think you ſpared him for your own ſaddle."

44. Thales,

44. Thales, as he looked upon the ſtars, fell towards water; whereupon it was after ſaid, "that if he had looked into the water he might have ſeen the ſtars, "but looking up to the ſtars he could not ſee the water."

45. A man and his wife in bed together, ſhe towards morning pretended herſelf to be ill at eaſe, deſiring to lie on her huſband's ſide; ſo the good man, to pleaſe her, came over her, making ſome ſhort ſtay in his paſſage over; where ſhe had not long lain, but deſired to lie in her old place again: quoth he, "How can it "be effected?" She anſwered, "Come over me again." "I had rather," ſaid he, "go a mile and a half about."

46. A thief being arraigned at the bar for ſtealing a mare, in his pleading urged many things in his own behalf, and at laſt nothing availing, he told the bench, the mare rather ſtole him, than he the mare; which in brief he thus related: That paſſing over ſeveral grounds about his lawful occaſions, he was purſued cloſe by a fierce maſtiff dog, and ſo was forced to ſave himſelf by leaping over a hedge, which being of an agile body he effected; and in leaping, a mare ſtanding on the other ſide of the hedge, leaped upon her back, who running furiouſly away with him, he could not by any means ſtop her, until he came to the next town, in which town the owner of the mare lived, and there was he taken, and here arraigned.

47. Maſter Maſon of Trinity college, ſent his pupil to another of the fellows, to borrow a book of him, who told him, "I am loth to lend my books out of "my chamber, but if it pleaſe thy tutor to come and read upon it in my cham-"ber, he ſhall as long as he will." It was winter, and ſome days after the ſame fellow ſent to Mr. Maſon to borrow his bellows; but Mr. Maſon ſaid to his pupil, "I am loth to lend my bellows out of my chamber, but if thy tutor "would come and blow the fire in my chamber, he ſhall as long as he will."

48. A notorious rogue being brought to the bar, and knowing his caſe to be deſperate, inſtead of pleading, he took to himſelf the liberty of jeſting, and thus ſaid, "I charge you in the king's name, to ſeize and take away that man, mean-"ing the judge in the red gown, for I go in danger of my life becauſe of him."

49. In Flanders, by accident a Flemiſh tiler fell from the top of a houſe upon a Spaniard, and killed him, though he eſcaped himſelf; the next of the blood proſecuted his death with great violence, and when he was offered pecuniary recompence, nothing would ſerve him but *lex talionis*: whereupon the judge ſaid to him, "that if he did urge that ſentence, it muſt be, that he ſhould go up to "the top of the houſe, and then fall down upon the tiler."

50. A rough-hewn ſeaman, being brought before a wiſe juſt-aſs for ſome miſdemeanour, was by him ſent away to priſon, and being ſomewhat refractory after he heard his doom, inſomuch as he would not ſtir a foot from the place where he ſtood, ſaying, "it were better to ſtand where he was, than go to a worſe place:" the juſtice thereupon, to ſhew the ſtrength of his learning, took him by the ſhoulder, and ſaid, "Thou ſhalt go *nogus vogus*," inſtead of *nolens volens*.

51. Francis the firſt of France, uſed for his pleaſure ſometimes to go diſguiſed: ſo walking one day in the company of the cardinal of Bourbon near Paris, he met with a peaſant with a new pair of ſhoes upon his arm: ſo he called unto him, and ſaid; "By our lady, theſe be good ſhoes, what did they coſt thee?" The peaſant ſaid, "Gueſs." The king ſaid, "I think ſome five ſols." Saith the peaſant, "You have lyed; but a *carlois*." "What, villain," ſaid the cardinal of Bourbon,

Bourbon, " thou art dead, it is the king." The peaſant replied; " The devil " take him of you and me, that knew ſo much."

52. There was a young man in Rome, that was very like Auguſtus Cæſar; Auguſtus took knowledge of him, and ſent for the man, and aſked him, " Was " your mother ever at Rome?" He anſwered; " No, ſir, but my father was."

53. A phyſician adviſed his patient that had ſore eyes, that he ſhould abſtain from wine; but the patient ſaid, " I think rather, Sir, from wine and water; " for I have often marked it in blue eyes, and I have ſeen water come forth, but " never wine."

54. A debauched ſeaman being brought before a juſtice of the peace upon the account of ſwearing, was by the juſtice commanded to depoſite his fine in that behalf provided, which was two ſhillings; he thereupon plucking out of his pocket a half crown, aſked the juſtice what was the rate he was to pay for curſing; the juſtice told him, ſix-pence: quoth he, " Then a pox take you all for a com- " pany of knaves and fools, and there's half a crown for you, I will never ſtand " changing of money."

55. Auguſtus Cæſar was invited to ſupper by one of his old friends, that had converſed with him in his leſs fortunes, and had but ordinary entertainment; where- upon at his going away, he ſaid, " I did not know that you and I were ſo familiar."

56. Agathocles, after he had taken Syracuſe, the men whereof, during the ſiege, had in a bravery ſpoken of him all the villany that might be, ſold the Syracuſans for ſlaves, and ſaid; " Now if you uſe ſuch words of me, I will tell your maſters " of you."

57. Dionyſius the elder, when he ſaw his ſon in many things very inordinate, ſaid to him, " Did you ever know me do ſuch things?" His ſon anſwered, " No, " but you had not a tyrant to your father." The father replied, " No, nor you, " if you take theſe courſes, will have a tyrant to your ſon."

58. Calliſthenes the philoſopher, that followed Alexander's court, and hated the king, being aſked by one, how one ſhould become the famouſeſt man in the world, anſwered, " By taking away him that is."

59. Ageſilaus, when one told him there was one did excellently counterfeit a nightingale, and would have had him hear him, ſaid; " Why I have heard the " nightingale herſelf."

60. A great nobleman, upon the complaint of a ſervant of his, laid a citizen by the heels, thinking to bend him to his ſervant's deſire; but the fellow being ſtubborn, the ſervant came to his lord, and told him, " Your lordſhip, I know, " hath gone as far as well you may, but it works not; for yonder fellow is more " perverſe than before." Said my lord, " Let's forget him a while, and then he " will remember himſelf."

61. One came to a cardinal in Rome, and told him, that he had brought his lordſhip a dainty white palfrey, but he fell lame by the way. Saith the cardinal to him, " I'll tell thee what thou ſhalt do; go to ſuch a cardinal, and ſuch a " cardinal," naming him half a dozen cardinals, " and tell them as much; and " ſo whereas by thy horſe, if he had been ſound, thou couldeſt have pleaſed but " one, with thy lame horſe thou mayeſt pleaſe half a dozen."

62. A witty rogue coming into a lace-ſhop, ſaid, he had occaſion for ſome lace; choice whereof being ſhewed him, he at laſt pitched upon one pattern, and aſked them, how much they would have for ſo much as would reach from ear to ear,

for ſo much he had occaſion for. They told him, for ſo much: ſo ſome few words paſſing between them, he at laſt agreed, and told down his money for it, and began to meaſure on his own head, thus ſaying; "One ear is here, and the other "is nailed to the pillory in Briſtol, and I fear you have not ſo much of this lace "by you at preſent as will perfect my bargain: therefore this piece of lace ſhall "ſuffice at preſent in part of payment, and provide the reſt with all expedition."

63. Iphicrates the Athenian, in a treaty that he had with the Lacedæmonians for peace, in which queſtion was about ſecurity for obſerving the ſame, ſaid; "The Athenians would not accept of any ſecurity, except the Lacedæmonians "did yield up unto them thoſe things, whereby it might be manifeſt, that they "could not hurt them if they would."

64. Euripides would ſay of perſons that were beautiful, and yet in ſome years, "In faireſt bodies not only the ſpring is pleaſant, but alſo the autumn."

65. There was a captain ſent to an exploit by his general with forces that were not likely to atchieve the enterprize; the captain ſaid to him, "Sir, appoint "but half ſo many. Why, "ſaith the general? The captain anſwered; Becauſe "it is better fewer die than more."

66. There was a harbinger who had lodged a gentleman in a very ill room, who expoſtulated with him ſomewhat rudely; but the harbinger careleſly ſaid; "you will take pleaſure in it when you are out of it."

67. There is a Spaniſh adage, "Love without end hath no end;" meaning, that if it were begun not upon particular ends it would laſt.

68. A woman being ſuſpected by her huſband for diſhoneſty, and being by him at laſt preſſed very hard about it, made him quick anſwer with many proteſtations, "that ſhe knew no more of what he ſaid than the man in the moon." Now the captain of the ſhip called the Moon, was the very man ſhe ſo much loved.

69. Demoſthenes when he fled from the battle, and that it was reproached to him, ſaid, "that he that flies might fight again."

70. Gonſalvo would ſay, "The honour of a ſoldier ought to be of a ſtrong "web;" meaning, that it ſhould not be ſo fine and curious, that every little diſgrace ſhould catch and ſtick in it.

71. An apprentice of London being brought before the chamberlain by his maſter for the ſin of incontinency, even with his own miſtreſs, the chamberlain thereupon gave him many chriſtian exhortations; and at laſt he mentioned and preſſed the chaſtity of Joſeph, when his miſtreſs tempted him with the like crime of incontinency. "Ay, Sir," ſaid the apprentice; "but if Joſeph's miſtreſs had been "as handſome as mine is, he could not have forborn."

72. Bias gave in precept, "Love as if you ſhould hereafter hate; and hate as "if you ſhould hereafter love."

73. Cineas was an excellent orator and ſtateſman, and principal friend and counſellor to Pyrrhus; and falling in inward talk with him, and diſcerning the king's endleſs ambition; Pyrrhus opened himſelf unto him, that he intended firſt a war upon Italy, and hoped to atchieve it: Cineas aſked him, "Sir, what will you do "then? Then, ſaith he, we will attempt Sicily." Cineas ſaid, "Well, Sir, what "then?" Said Pyrrhus, "If the Gods favour us, we may conquer Africa and "Carthage." "What then, Sir," ſaith Cineas? "Nay then," ſaith Pyrrhus, "we "may take our reſt, and ſacrifice and feaſt every day, and make merry with our "friends." "Alas, Sir," ſaid Cineas, "may we not do ſo now without all this ado?"

74. Lamia

74. Lamia the courtezan had all power with Demetrius king of Macedon, and by her inſtigations he did many unjuſt and cruel acts; whereupon Lyſimachus ſaid, "that it was the firſt time that ever he knew a whore play in a tragedy."

75. One of the Romans ſaid to his friend, "What think you of one who was "taken in the act and manner of adultery?" The other anſwered, "Marry, I "think he was ſlow at diſpatch."

76. Epaminondas, when his great friend and collegue in war was ſuitor to him to pardon an offender, denied him; afterwards, when a concubine of his made the ſame ſuit, he granted it to her; which when Pelopidas ſeemed to take unkindly, he ſaid; "Such ſuits are to be granted to whores, but not to perſonages of worth."

77. Thales being aſked when a man ſhould marry, ſaid; "Young men not yet, "old men not at all."

78. A company of ſcholars going together to catch conies, carried one ſcholar with them, which had not much more wit than he was born with; and to him they gave in charge, that if he ſaw any, he ſhould be ſilent, for fear of ſcaring of them. But he no ſooner eſpied a company of rabbits, before the reſt, but he cried aloud, *Ecce multi cuniculi*, which in Engliſh ſignifies, "Behold many conies;" which he had no ſooner ſaid, but the conies ran to their burrows: and he being checked by them for it, anſwered, "Who the devil would have thought that the rabbits "underſtood Latin?"

79. A Welchman being at a ſeſſions-houſe, and ſeeing the priſoners hold up hands at the bar, related to ſome of his acquaintance there, "that the judges "were good fortune-tellers; for if they did but look upon their hands, they could "certainly tell whether they ſhould live or die."

80. Solon compared the people unto the ſea, and orators and counſellors to the winds; for that the ſea would be calm and quiet, if the winds did not trouble it.

81. Socrates was pronounced by the oracle of Delphos to be the wiſeſt man of Greece, which he would put from himſelf ironically, ſaying, "there would be "nothing in him to verify the oracle, except this; that he was not wiſe, and knew "it; and others were not wiſe, and knew it not."

82. Socrates, when there was ſhewed him the book of Heraclitus the obſcure, and was aſked his opinion of it, anſwered; "Thoſe things which I underſtood "were excellent, I imagine ſo were thoſe I underſtood not; but they require a "diver of Delos."

83. Bion aſked an envious man that was very ſad, "what harm had befallen unto "him, or what good had befallen unto another man."

84. Stilpo the philoſopher, when the people flocked about him, and that one ſaid to him, "The people come wondering about you as if it were to ſee ſome ſtrange "beaſt?" "No, faith he, it is to ſee a man which Diogenes fought with his lant-"horn at noon-day."

85. A man being very jealous of his wife, inſomuch that which way ſoever ſhe went, he would be prying at her heels; and ſhe being ſo grieved thereat, in plain terms told him, "that if he did not for the future leave off his proceedings in that "nature, ſhe would graft ſuch a pair of horns upon his head, that ſhould hinder "him from coming out of any door in the houſe."

86. A citizen of London paſſing the ſtreets very haſtily, came at laſt where ſome ſtop was made by carts; and ſome gentlemen talking together, who knew him, where being in ſome paſſion that he could not ſuddenly paſs, one of them in this

wiſe ſpoke unto him; "that others had paſſed by, and there was room enough, "only they could not tell whether their horns were ſo wide as his."

87. A tinker paſſing Cheapſide with his uſual tone, "Have you any work for "a tinker?" an apprentice ſtanding at a door oppoſite to a pillory there ſet up, called the tinker, with an intent to put a jeſt upon him, and told him, "that he ſhould "do very well if he would ſtop thoſe two holes in the pillory;" to which the tinker anſwered, "that if he would but put in his head and ears a while in that "pillory, he would beſtow both braſs and nails upon him to hold him in, and "give him his labour into the bargain."

88. A young maid having married an old man, was obſerved on the day of marriage to be ſomewhat moody, as if ſhe had eaten a diſh of chums, which one of her bridemen obſerving, bid her be cheary; and told her moreover, "that an old "horſe would hold out as long, and as well as a young one, in travel." To which ſhe anſwered, ſtroking down her belly with her hand, "But not in this road, Sir."

89. There was in Oxford a cowardly fellow that was a very good archer; he was abuſed groſly by another, and moaned himſelf to Sir Walter Raleigh, then a ſcholar, and aſked his advice, what he ſhould do to repair the wrong had been offered him; Raleigh anſwered, "Why, challenge him at a match of ſhooting."

90. Whitehead a grave divine, was much eſteemed by queen Elizabeth, but not preferred, becauſe he was againſt the government of biſhops; he was of a blunt ſtoical nature: he came one day to the queen, and the queen happened to ſay to him, "I like thee the better, Whitehead, becauſe thou liveſt unmarried." He anſwered, "In troth, madam, I like you the worſe for the ſame cauſe."

91. Doctor Laud ſaid, "that ſome hypocrites, and ſeeming mortified men, "that held down their heads like bulruſhes, were like the little images that they "place in the very bowing of the vaults of churches, that look as if they held "up the church, but are but puppets."

92. A nobleman of this nation, famouſly known for his mad tricks, on a time having taken phyſic, which he perceiving that it began well to work, called up his man to go for a chirurgeon preſently, and to bring his inſtruments with him. The chirurgeon comes in all ſpeed; to whom my lord related, that he found himſelf much addicted to women, and therefore it was his will, that the cauſe of it might be taken away, and therefore commanded him forthwith to prepare his inſtruments ready for to geld him: ſo the chirurgeon forthwith prepares accordingly, and my lord told him that he would not ſee it done, and therefore that he ſhould do his work the back way: ſo, both parties being contented, my lord makes ready, and holds up his a---; and when he perceives the chirurgeon very near him, he lets fly full in his face; which made the chirurgeon ſtep back, but coming preſently on again; "Hold, hold, ſaith my lord, I will better "conſider of it, for I ſee the retentive faculty is very weak at the approach of "ſuch keen inſtruments."

93. There was a curſed page that his maſter whipt naked, and when he had been whipt, would not put on his cloaths: and when his maſter bad him, ſaid, "Take them you, for they are the hangman's fees."

94. There was a lady of the weſt country, that gave great entertainment at her houſe to moſt of the gallant gentlemen thereabouts, and amongſt others Sir Walter Raleigh was one. This lady, though otherwiſe a ſtately dame, was a notable good houſewife; and in the morning betimes ſhe called to one of her maids that looked

looked to the ſwine, and aſked, "Are the pigs ſerved?" Sir Walter Raleigh's chamber was faſt by the lady's, ſo as he heard her: a little before dinner, the lady came down in great ſtate into the great chamber, which was full of gentlemen; and as ſoon as Sir Walter Raleigh ſet eye upon her, "Madam," ſaith he, "are the pigs ſerved?" The lady anſwered, "You know beſt whether you have had your breakfaſt."

95. There were fiſhermen drawing the river at Chelſea; Mr. Bacon came thither by chance in the afternoon, and offered to buy their draught: they were willing. He aſked them what they would take? They aſked Thirty ſhillings. Mr. Bacon offered them ten. They refuſed it. Why then, ſaith Mr. Bacon, I will be only a looker on. They drew, and catched nothing. Saith Mr. Bacon, Are not you mad fellows now, that might have had an angel in your purſe, to have made merry withal, and to have warmed you thoroughly, and now you muſt go home with nothing. Ay but, ſaith the fiſhermen, we had hope then to make a better gain of it. Saith Mr. Bacon, "Well, my maſter, then I will tell you, hope is a good breakfaſt, but it is "a bad ſupper."

96. A lady walking with Mr. Bacon in Gray's Inn walks, aſked him, Whoſe that piece of ground lying next under the walls was? He anſwered, "Theirs." Then ſhe aſked him, If thoſe fields beyond the walks were theirs too? He anſwered, "Yes, "Madam, thoſe are ours, as you are ours, to look on, and no more."

97. His lordſhip, when he was newly made lord Keeper, was in Gray's Inn walks with Sir Walter Raleigh; one came and told him, that the earl of Exeter was above. He continued upon occaſion ſtill walking a good while. At laſt when he came up, my lord of Exeter met him, and ſaid; "My lord, I have made a great venture, to come up ſo high ſtairs, being a gouty man." His lordſhip anſwered; "Pardon me, "my lord, I have made the greateſt venture of all; for I have ventured upon "your patience."

98. When Sir Francis Bacon was made the king's attorney, Sir Edward Coke was put up from being lord Chief Juſtice of the common pleas, to be lord Chief Juſtice of the king's bench; which is a place of greater honour, but of leſs profit; and withal was made privy counſellor. After a few days, the lord Coke meeting with the king's attorney, ſaid unto him; Mr. Attorney, this is all your doing: It is you that have made this ſtir. Mr. Attorney anſwered; "Ah! my lord, your lordſhip all this "while hath grown in breadth; you muſt needs now grow in height, or elſe you "would be a monſter."

99. One day queen Elizabeth told Mr. Bacon, that my lord of Eſſex, after great proteſtation of penitence and affection, fell in the end but upon the ſuit of renewing of his farm of ſweet wines. He anſwered; "I read that in nature, there be two kinds "of motions or appetites in ſympathy; the one as of iron to the adamant, for per-"fection; the other as of the vine to the ſtake, for ſuſtentation; that her majeſty "was the one, and his ſuit the other."

100. Mr. Bacon, after he had been vehement in parliament againſt depopulation and incloſures; and that ſoon after the queen told in that ſhe had referred the hearing of Mr. Mill's cauſe to certain counſellors and judges; and aſked him how he liked of it? anſwered; "Oh, madam! my mind is known; I am againſt all in-"cloſures, and eſpecially againſt incloſed juſtice."

101. When Sir Nicholas Bacon the lord Keeper lived, every room in Gorhambury was ſerved with a pipe of water from the ponds, diſtant about a mile off. In the life-time of Mr. Anthony Bacon, the water ceaſed. After whoſe death, his lordſhip coming to the inheritance, could not recover the water without infinite charge: when he

was

was lord chancellor, he built verulam houſe, cloſe by the pond-yard, for a place of privacy when he was called upon to diſpatch any urgent buſineſs. And being aſked, why he built that houſe there; his lordſhip anſwered, "that ſince he could not carry "the water to his houſe, he would carry his houſe to the water."

102. When my lord preſident of the council came firſt to be lord treaſurer, he complained to my lord chancellor of the troubleſomneſs of the place, for that the exchequer was ſo empty; the lord chancellor anſwered; "My lord, be of good cheer, for "now you ſhall ſee the bottom of your buſineſs at the firſt."

103. When his lordſhip was newly advanced to the great ſeal, Gondomar came to viſit him. My lord ſaid; that he was to thank God and the king for that honour; but yet, ſo he might be rid of the burden, he could very willingly forbear the honour: and that he formerly had a deſire, and the ſame continued with him ſtill, to lead a private life. Gondomar anſwered, that he would tell him a tale of an old rat, that would needs leave the world, and acquainted the young rats that he would retire into his hole, and ſpend his days ſolitarily; and would enjoy no more comfort: and commanded them upon his high diſpleaſure, not to offer to come in unto him. They forbore two or three days; at laſt, one that was more hardy than the reſt, incited ſome of his fellows to go in with him, and he would venture to ſee how his father did: for he might be dead. They went in, and found the old rat ſitting in the midſt of a rich Parmeſan cheeſe. So he applied the fable after his witty manner.

104. Rabelais tells a tale of one that was very fortunate in compounding differences. His ſon undertook the ſaid courſe, but could never compound any. Whereupon he came to his father, and aſked him; what art he had to reconcile differences? He anſwered; "he had no other but this; to watch when the two parties were much "wearied, and their hearts were too great to ſeek reconcilement at one another's "hands; then to be a means betwixt them, and upon no other terms." After which the ſon went home, and proſpered in the ſame undertakings.

105. Alonſo Cartilio was informed by his ſteward of the greatneſs of his expence, being ſuch as he could not hold out therewith. The biſhop aſked him, wherein it chiefly aroſe? His ſteward told him, in the multitude of his ſervants. The biſhop bad him make him a note of thoſe that were neceſſary, and thoſe that might be ſpared. Which he did. And the biſhop taking occaſion to read it before moſt of his ſervants, ſaid to his ſteward; "Well, let theſe remain becauſe I have need of them; "and theſe other alſo becauſe they have need of me."

106. Mr. Marbury the preacher would ſay, "that God was fain to do with wicked "men, as men do with friſking jades in a paſture, that cannot take them up, till they "get them at a gate. So wicked men will not be taken up till the hour of death."

107. Pope Sixtus the fifth, who was a very poor man's ſon, and his father's houſe ill thatched, ſo that the ſun came in, in many places, would ſport with his ignobility, and ſay; "that he was *nato di caſa illuſtre*, ſon of an illuſtrious houſe."

108. When the king of Spain conquered Portugal, he gave ſpecial charge to his lieutenant, that the ſoldiers ſhould not ſpoil, leſt he ſhould alienate the hearts of the people: the army alſo ſuffered much ſcarcity of victual. Whereupon the Spaniſh ſoldiers would afterwards ſay; "that they had won the king a kingdom on earth, "as the kingdom of heaven uſed to be won; by faſting and abſtaining from that "which is another man's."

109. They feigned a tale of Sixtus Quintus, whom they called Size-ace, that after his death he went to hell, and the porter of hell ſaid to him; "You have ſome

"reaſon

" reaſon to offer yourſelf to this place, becauſe you were a wicked man; but yet, " becauſe you were a pope, I have order not to receive you: you have a place of " your own, purgatory, you may go thither." So he went away, and ſought about a great while for purgatory, and could find no ſuch place. Upon that he took heart, and went to heaven and knocked; and St. Peter aſked, " Who was there?" He ſaid, " Sixtus pope." Whereunto St. Peter ſaid, " Why do you knock? you " have the keys." Sixtus anſwered, " It is true, but it is ſo long ſince they were " given, as I doubt the wards of the lock be altered."

110. Charles king of Sweden, a great enemy of the Jeſuits, when he took any of their colleges, he would hang the old Jeſuits, and put the young to his mines, ſaying; " that ſince they wrought ſo hard above ground, he would try how they " could work under ground."

111. In chancery, at one time when the counſel of the parties ſet forth the boundaries of the land in queſtion, by the plot; and the counſel of one part ſaid, " We lie on this ſide, my lord;" and the counſel of the other part ſaid, " And we lie on this ſide:" the lord chancellor Hatton ſtood up and ſaid; " If you lie on both " ſides, whom will you have me to believe?"

112. Sir Edward Coke was wont to ſay, when a great man came to dinner to him, and gave him no knowledge of his coming; " Sir, ſince you ſent me no word of " your coming, you muſt dine with me; but if I had known of it in due time, I " would have dined with you."

113. Pope Julius the third, when he was made pope, gave his hat unto a youth, a favourite of his, with great ſcandal. Whereupon, at one time, a cardinal that might be free with him, ſaid modeſtly to him; " What did your holineſs ſee in that " young man, to make him cardinal?" Julius anſwered, " What did you ſee in me to " make me pope."

114. The ſame Julius, upon like occaſion of ſpeech, Why he ſhould bear ſo great affection to the ſame young man? would ſay; " that he found by aſtrology, that " it was the youth's deſtiny to be a great prelate; which was impoſſible except " himſelf were pope. And therefore that he did raiſe him, as the driver on of his " own fortune."

115. Sir Thomas More had only daughters at the firſt, and his wife did ever pray for a boy. At laſt ſhe had a boy; which being come to man's eſtate, proved but ſimple. Sir Thomas ſaid to his wife, " Thou prayedſt ſo long for a boy, that he " will be a boy as long as he lives."

116. Sir Fulk Grevil, afterwards lord Brook, in parliament, when the houſe of commons, in a great buſineſs, ſtood much upon precedents, ſaid unto them; " Why " do you ſtand ſo much upon precedents? The times hereafter will be good or bad. " If good, precedents will do no harm; if bad, power will make a way where it " finds none."

117. Sir Thomas More, on the day that he was beheaded, had a barber ſent to him, becauſe his hair was long; which was thought would make him more commiſerated with the people. The barber came to him, and aſked him, " Whether he " would be pleaſed to be trimmed?" " In good faith, honeſt fellow, ſaith Sir Thomas, " the king and I have a ſuit for my head; and till the title be cleared, I will do no " coſt upon it."

118. Stephen

118. Stephen Gardiner biſhop of Wincheſter, a great champion of the popiſh religion, was wont to ſay of the proteſtants who ground upon the Scripture; "that "they were like poſts, that bring truth in their letters, and lies in their mouths."

119. The former Sir Thomas More had ſent him by a ſuitor in chancery two ſilver flagons. When they were preſented by the gentleman's ſervant, he ſaid to one of his men, "Have him to the cellar, and let him have of my beſt wine:" and, turning to the ſervant, ſaid; "Tell thy maſter, if he like it, let him not "ſpare it."

120. Michael Angelo the famous painter, painting in the pope's chapel the portraiture of hell and damned ſouls, made one of the damned ſouls ſo like a cardinal that was his enemy, as every body at firſt ſight knew it. Whereupon the cardinal complained to pope Clement, humbly praying it might be defaced. The pope ſaid to him; "Why, you know very well, I have power to deliver a ſoul out of purga-"tory, but not out of hell."

121. There was an agent here for the Dutch, called Carroon; and when he uſed to move the queen for farther ſuccours and more men, my lord Henry Howard would ſay; "that he agreed well with the name of Charon, ferryman of hell; for "he came ſtill for more men, to increaſe *regnum umbrarum*."

122. They were wont to call referring to the maſters in chancery, committing. My lord keeper Egerton, when he was maſter of the rolls, was wont to aſk, "what "the cauſe had done that it ſhould be committed."

123. They feigned a tale, principally againſt doctors reports in the chancery, that Sir Nicolas Bacon, when he came to heaven gate, was oppoſed, touching an unjuſt decree which had been made in the chancery. Sir Nicolas deſired to ſee the order, whereupon the decree was drawn up; and finding it to begin *Veneris, etc.* "Why, "ſaith he, I was then ſitting in the ſtar-chamber; this concerns the maſter of the "rolls, let him anſwer it." Soon after came the maſter of the rolls, Cordal, who died indeed a ſmall time after Sir Nicolas Bacon; and he was likewiſe ſtayed upon it: and looking into the order, he found, that upon the reading of a certificate of Doctor Gibſon, it was ordered that his report ſhould be decreed. And ſo he put it upon Dr. Gibſon, and there it ſtuck.

124. Sir Nicolas Bacon, when a certain nimble-witted counſellor at the bar, who was forward to ſpeak, did interrupt him often, ſaid unto him; "There is a great "difference betwixt you and me: a pain to me to ſpeak, and a pain to you to hold "your peace."

125. The ſame Sir Nicolas Bacon, upon bills exhibited to diſcover where lands lay, upon proof that they had a certain quantity of land, but could not ſet it forth, was wont to ſay; "And if you cannot find your land in the country, how will you "have me find it in the chancery?"

126. Mr. Howland, in conference with a young ſtudent, arguing a caſe, happened to ſay, "I would aſk you but this queſtion." The ſtudent preſently interrupted him, to give him an anſwer. Whereunto Mr. Howland gravely ſaid; "Nay, though "I aſk you a queſtion, yet I did not mean you ſhould anſwer me, I mean to anſwer "myſelf."

127. Pope Adrian the ſixth was talking with the duke of Seſa, "that Paſquil gave "great ſcandal, and that he would have him thrown into the river:" but Seſa anſwered; "Do it not, holy father, for then he will turn frog; and whereas now he "chants but by day, he will then chant both by day and night."

128. There

128. There was a gentleman in Italy that wrote to a great friend of his, whom the pope had newly advanced to be cardinal; that he was very glad of his advancement for the cardinal's own ſake; but he was ſorry that he himſelf had loſt a good friend.

129. There was a king of Hungary took a biſhop in battle, and kept him priſoner: whereupon the pope writ a monitory to him, for that he had broken the privilege of holy church, and taken his ſon. The king ſent an embaſſage to him, and ſent withal the armour wherein the biſhop was taken, and this only in writing; *Vide num haec ſit veſtis filii tui:* "Know now whether this be thy "ſon's coat."

130. Sir Amyas Pawlet, when he ſaw too much haſte made in any matter, was wont to ſay; "Stay a while, that we may make an end the ſooner."

131. A maſter of the requeſts to queen Elizabeth had divers times moved for audience, and been put off. At laſt he came to the queen in a progreſs, and had on a new pair of boots. The queen, who loved not the ſmell of new leather, ſaid to him; "Fy, ſloven, thy new boots ſtink." "Madam," ſaid he, "it is not my new "boots that ſtink; but it is the ſtale bills that I have kept ſo long."

132. At an act of the commencement, the anſwerer gave for this queſtion, that an ariſtocracy was better than a monarchy. The replier, who was a diſſolute man, did tax him that being a private bred man, he would give a queſtion of ſtate. The anſwerer ſaid, that the replier did much wrong the privilege of ſcholars, who would be much ſtraitned if they ſhould give queſtions of nothing but ſuch things wherein they are practiſed: and added, "We have heard yourſelf diſpute of virtue, which "no man will ſay you put much in practice."

133. Queen Iſabella of Spain uſed to ſay, "Whoſoever hath a good preſence, "and a good faſhion, carries continual letters of recommendation."

134. Alonſo of Arragon was wont to ſay in commendation of age, "that age ap-"peared to be beſt in four things: old wood beſt to burn; old wine to drink; old "friends to truſt; and old authors to read."

135. It was ſaid of Auguſtus, and afterward the like was ſaid of Septimius Severus; both which did infinite miſchief in their beginnings, and infinite good toward their ends; "that they ſhould either have never been born or never died."

136. Conſtantine the Great, in a kind of envy, himſelf being a great builder, as Trajan likewiſe was, would call Trajan *Parietaria*, wall-flower, becauſe his name was upon ſo many walls.

137. Alonſo of Arragon was wont to ſay of himſelf, "that he was a great necro-"mancer, for that he uſed to aſk counſel of the dead;" meaning of books.

138. Ethelwold, biſhop of Wincheſter, in a famine, ſold all the rich veſſels and ornaments of the church, to relieve the poor with bread; and ſaid, "there was no "reaſon that the dead temples of God ſhould be ſumptuouſly furniſhed, and the "living temples ſuffer penury."

139. Many men, eſpecially ſuch as affect gravity, have a manner after other mens ſpeech to ſhake their heads. A great officer of this land would ſay, "it was as men "ſhake a bottle, to ſee if there were any wit in their heads or no?"

140. After a great fight, there came to the camp of Conſalvo the great captain, a gentleman, proudly horſed and armed. Diego de Mendoza aſked the great captain, who is this? Who anſwered; "It is ſaint Ermin, who never appears but after "the ſtorm."

141. There was one that died greatly in debt: when it was reported in ſome company, where divers of his creditors caſually were, that he was dead, one began to ſay; "Well, if he be gone, then he hath carried five hundred ducats of mine with "him into the other world:" and another ſaid, "And two hundred of mine: and "a third ſpake of great ſums of his." Whereupon one that was amongſt them ſaid; "I perceive now, that though a man cannot carry any of his own with him into "the next world, yet he may carry away that which is another man's."

142. Francis Carvajal, that was the great captain of the rebels of Peru, had often given the chaſe to Diego Centeno, a principal commander of the emperor's party: he was afterwards taken by the emperor's lieutenant Gaſca, and committed to the cuſtody of Diego Centeno, who uſed him with all poſſible courteſy; inſomuch as Carvajal aſked him; "I pray, ſir, who are you that uſe me with this courteſy?" Centeno ſaid, "Do not you know Diego Centeno?" Carvajal anſwered, "Truly, "ſir, I have been ſo uſed to ſee your back, as I knew not your face."

143. There was a merchant died that was very far in debt, his goods and houſhold-ſtuff were ſet forth to ſale. A ſtranger would needs buy a pillow there, ſaying; "This pillow ſure is good to ſleep upon, ſince he could ſleep that owed ſo "many debts."

144. A lover met his lady in a cloſe chair, ſhe thinking to have gone unknown, he came and ſpake to her: ſhe aſked him, "How did you know me?" He ſaid, "Becauſe "my wounds bleed afreſh;" alluding to the common tradition, that the wounds of a body ſlain will bleed afreſh upon the approach of the murderer.

145. A gentleman brought muſic to his lady's window. She hated him, and had warned him often away: and when he would not deſiſt, ſhe threw ſtones at him: whereupon a gentleman ſaid unto him that was in his company; "What greater "honour can you have to your muſic, than that ſtones come about you, as they did "to Orpheus?"

146. Coranus the Spaniard, at a table at dinner, fell into an extolling his own father, ſaying; "if he could have wiſhed of God, he could not have choſen amongſt "men a better father." Sir Henry Savil ſaid, "What not Abraham?" Now Coranus was doubted to deſcend of a race of Jews.

147. Breſquet, jeſter to Francis the firſt of France, did keep a calendar of fools, wherewith he did uſe to make the king ſport; telling him ever the reaſon, why he put any one into his calendar. When Charles the fifth, emperor, upon confidence of the noble nature of Francis, paſſed through France, for the appeaſing of the rebellion of Gaunt, Breſquet put him into his calendar. The king aſked him the cauſe. He anſwered; "Becauſe you having ſuffered at the hands of Charles the "greateſt bitterneſs that ever prince did from another, nevertheleſs he would truſt "his perſon into your hands." "Why, Breſquet," ſaid the king, "what wilt thou "ſay, if thou ſeeſt him paſs back in as great ſafety, as if he marched through "the midſt of Spain?" Saith Breſquet; "Why then I will put him out, and put "in you."

148. Archbiſhop Grindall was wont to ſay; "that the phyſicians here in England "were not good at the cure of particular diſeaſes; but had only the power of the "church, to bind and looſe."

149. Coſmus duke of Florence was wont to ſay of perfidious friends, "that we "read, that we ought to forgive our enemies; but we do not read that we ought "our friends."

150. A papiſt being oppoſed by a proteſtant, "that they had no Scripture for ima-
"ges," anſwered, "Yes; for you read that the people laid their ſick in the ſtreets, that
"the ſhadow of ſaint Peter might come upon them; and that a ſhadow was an
"image, and the obſcureſt of all images."

151. Sir Edward Dyer, a grave and wiſe gentleman, did much believe in Kelley the alchemiſt, that he did indeed the work, and did make gold; inſomuch that he went into Germany, where Kelley then was, to inform himſelf fully thereof. After his return, he dined with my lord of Canterbury; where at that time was at the table Dr. Brown the phyſician. They fell in talk of Kelley. Sir Edward Dyer, turning to the archbiſhop, ſaid; I do aſſure your grace, that what I ſhall tell you is truth; I am an eye-witneſs thereof; and if I had not ſeen it, I ſhould not have believed it. I ſaw Mr. Kelley put of the baſe metal into the crucible; and after it was ſet a little upon the fire, and a very ſmall quantity of the medicine put in, and ſtirred with a ſtick of wood, it came forth in great proportion, perfect gold; to the touch, to the hammer, and to the teſt. My lord archbiſhop ſaid; "You had need
"take heed what you ſay, Sir Edward Dyer, for here is an infidel at the board." Sir Edward Dyer ſaid again pleaſantly; "I ſhould have looked for an infidel ſooner in
"any place than at your grace's table." "What ſay you, Dr. Brown," ſaid the archbiſhop? Dr. Brown anſwered, after his blunt and huddling manner; "The gentle-
"man hath ſpoken enough for me." "Why," ſaid the archbiſhop, "what hath he
"ſaid?" "Marry," ſaith Dr. Brown, "he ſaid, he would not have believed it,
"except he had ſeen it; and no more will I."

152. Doctor Johnſon ſaid, that in ſickneſs there were three things that were material; the phyſician, the diſeaſe, and the patient: and if any two of theſe joined, then they get the victory; for, *Ne Hercules quidem contra duos.* If the phyſician and the patient join, then down goes the diſeaſe; for then the patient recovers: if the phyſician and the diſeaſe join, that is a ſtrong diſeaſe; and the phyſician miſtaking the cure, then down goes the patient: if the patient and the diſeaſe join, then down goes the phyſician; for he is diſcredited.

153. Mr. Bettenham ſaid; that virtuous men were like ſome herbs and ſpices, that give not out their ſweet ſmell, till they be broken or cruſhed.

154. There was a painter became a phyſician; whereupon one ſaid to him;
"You have done well; for before the faults of your work were ſeen; but now they
"are unſeen."

155. There was a gentleman that came to the Tilt all in orange-tawny, and ran very ill. The next day he came again all in green, and ran worſe. There was one of the lookers on aſked another; "What is the reaſon that this gentleman
"changeth his colours?" The other anſwered, "Sure, becauſe it may be re-
"ported, that the gentleman in the green ran worſe than the gentleman in the
"orange-tawny."

156. Zelim was the firſt of the Ottomans that did ſhave his beard, whereas his predeceſſors wore it long. One of his baſhaws aſked him, Why he altered the cuſtom of his predeceſſors? He anſwered, "Becauſe you baſhaws may not lead me by the
"beard, as you did them."

157. Æneas Sylvius, that was pope Pius Secundus, was wont to ſay; That the former popes did wiſely to ſet the lawyers a work to debate, whether the donation of Conſtantine the Great to Sylveſter, of St. Peter's patrimony, were good or valid in

law or no? the better to ſkip over the matter in fact, whether there was ever any ſuch thing at all or no.

158. The lord biſhop Andrews was aſked at the firſt coming over of the archbiſhop of Spalato, whether he were a proteſtant or no? He anſwered; "Truly "I know not; but I think he is a deteſtant;" that was, of moſt of the opinions of Rome.

159. It was ſaid amongſt ſome of the grave prelates of the council of Trent, in which the ſchool-divines bare the ſway; that the ſchool-men were like the aſtronomers, who to ſave the phænomena framed to their conceit eccentrics and epicycles, and a wonderful engine of orbs; though no ſuch things were: ſo they, to ſave the practice of the church, had deviſed a great number of ſtrange poſitions.

160. Æneas Sylvius would ſay, that the Chriſtian faith and law, though it had not been confirmed by miracles, yet was worthy to be received for the honeſty thereof.

161. Mr. Bacon would ſay, that it was in his buſineſs, as it is frequently in the ways: that the next way is commonly the fouleſt; and that if a man will go the faireſt way, he muſt go ſomewhat about.

162. Mr. Bettenham, reader of Gray's Inn, uſed to ſay, that riches were like muck; when it lay in a heap it gave but a ſtench and ill odour; but when it was ſpread upon the ground, then it was cauſe of much fruit.

163. Cicero married his daughter to Dolabella, that held Cæſar's party: Pompey had married Julia, that was Cæſar's daughter. After, when Cæſar and Pompey took arms one againſt the other, and Pompey had paſſed the ſeas, and Cæſar poſſeſſed Italy, Cicero ſtayed ſomewhat long in Italy, but at laſt ſailed over to join with Pompey; who when he came to him, Pompey ſaid, "You are welcome, but where "left you your ſon-in-law?" Cicero anſwered, "With your father-in-law."

164. Veſpaſian and Titus his eldeſt ſon were both abſent from Rome when the empire was caſt upon Veſpaſian; Domitian his younger ſon was at Rome, who took upon him the affairs; and being of a turbulent ſpirit, made many changes; and diſplaced divers officers and governors of provinces, ſending them ſucceſſors. So when Veſpaſian returned to Rome, and Domitian came into his preſence, Veſpaſian ſaid to him; "Son, I looked when you would have ſent me a ſucceſſor."

165. Nero loved a beautiful youth, whom he uſed viciouſly, and called him wife: there was a ſenator of Rome that ſaid ſecretly to his friend, "It was pity Nero's "father had not ſuch a wife."

166. Galba ſucceeded Nero, and his age being deſpiſed, there was much licence and confuſion in Rome during his empire; whereupon a ſenator ſaid in full ſenate; "It were better to live where nothing is lawful, than where all things are "lawful."

167. Auguſtus Cæſar did write to Livia, who was over-ſenſible of ſome ill words that had been ſpoken of them both: "Let it not trouble thee, my Livia, if any "man ſpeak ill of us; for we have enough that no man can do ill unto us."

168. Chilon ſaid, that kings, friends, and favourites, were like caſting counters; that ſometimes ſtood for one, ſometimes for ten, ſometimes for an hundred.

169. Theodoſius, when he was preſſed by a ſuitor, and denied him; the ſuitor ſaid, "Why, Sir, you promiſed it." He anſwered; "I ſaid it, but I did not promiſe "it, if it be unjuſt."

170. The Romans, when they ſpake to the people, were wont to ſtile them, Ye Romans; when commanders in war ſpake to their army, they ſtiled them, My ſoldiers. There was a mutiny in Cæſar's army, and ſomewhat the ſoldiers would have had, yet they would not declare themſelves in it, but only demanded a miſſion or diſcharge; though with no intention it ſhould be granted: but, knowing that Cæſar had at that time great need of their ſervice, thought by that means to wrench him to their other deſires: whereupon with one cry they aſked miſſion. Cæſar, after ſilence made, ſaid; "I for my part, ye Romans." This title did actually ſpeak them to be diſmiſſed: which voice they had no ſooner heard, but they mutinied again; and would not ſuffer him to go on with his ſpeech, until he had called them by the name of his Soldiers: and ſo with that one word he appeaſed the ſedition.

171. Cæſar would ſay of Sylla, for that he did reſign his dictatorſhip; "Sylla "was ignorant of letters, he could not dictate."

172. Seneca ſaid of Cæſar, "that he did quickly ſhew the ſword, but never leave "it off."

173. Diogenes begging, as divers philoſophers then uſed, did beg more of a prodigal man, than of the reſt which were preſent. Whereupon one ſaid to him; "See "your baſeneſs, that when you find a liberal mind, you will take moſt of him." "No," ſaid Diogenes, "but I mean to beg of the reſt again."

174. Themiſtocles, when an ambaſſador from a mean eſtate did ſpeak great matters; ſaid to him, "Friend, thy words would require a city."

175. They would ſay of the duke of Guiſe, Henry; "that he was the greateſt "uſurer in France, for that he had turned all his eſtate into obligations." Meaning, that he had ſold and oppignerated all his patrimony, to give large donatives to other men.

176. Cæſar Borgia, after long diviſion between him and the lords of Romagna, fell to accord with them. In this accord there was an article, that he ſhould not call them at any time all together in perſon. The meaning was, that knowing his dangerous nature, if he meant them treaſon, he might have opportunity to oppreſs them all together at once. Nevertheleſs, he uſed ſuch fine art and fair carriage, that he won their confidence to meet all together in council at Cinigaglia; where he murdered them all. This act, when it was related unto pope Alexander, his father, by a cardinal, as a thing happy, but very perfidious; the pope ſaid, "It was they that "broke their covenant firſt, in coming all together."

177. Titus Quinctius was in the council of the Achaians, what time they deliberated, whether in the war then to follow, between the Romans and king Antiochus, they ſhould confederate themſelves with the Romans, or with king Antiochus? In that council the Ætolians, who incited the Achaians againſt the Romans, to diſable their forces, gave great words, as if the late victory the Romans had obtained againſt Philip king of Macedon, had been chiefly by the ſtrength and forces of the Ætolians themſelves: and on the other ſide the ambaſſador of Antiochus did extol the forces of his maſter; ſounding what an innumerable company he brought in his army; and gave the nations ſtrange names; as Elymæans, Caducians, and others. After both their harangues, Titus Quinctius, when he roſe up, ſaid; "it was an "eaſy matter to perceive what it was that had joined Antiochus and the Ætolians "together; that it appeared to be by the reciprocal lying of each, touching the "others forces."

178. Plato,

178. Plato was amorous of a young gentleman, whoſe name was Stella, that ſtudied aſtronomy, and went oft in the clear nights to look upon the ſtars. Whereupon Plato wiſhed himſelf heaven, that he might look upon Stella with a thouſand eyes.

179. The Lacedæmonians were beſieged by the Athenians in the port of Pyle, which was won, and ſome ſlain, and ſome taken. There was one ſaid to one of them that was taken, by way of ſcorn; Were they not brave men that loſt their lives at the port of Pyle? He anſwered; "Certainly a Perſian arrow is much to be ſet by, "if it can chooſe out a brave man."

180. Clodius was acquitted by a corrupt jury, that had palpably taken ſhares of money: before they gave up their verdict, they prayed of the ſenate a guard, that they might do their conſciences, for that Clodius was a very ſeditious young nobleman. Whereupon all the world gave him for condemned. But acquitted he was. Catulus, the next day ſeeing ſome of them that had acquitted him together, ſaid to them; "What made you aſk of us a guard? Were you afraid your money ſhould "be taken from you?"

181. At the ſame judgment, Cicero gave in evidence upon oath: and when the jury, which conſiſted of fifty-ſeven, had paſſed againſt his evidence, one day in the ſenate Cicero and Clodius being in altercation, Clodius upbraided him, and ſaid; "The "jury gave you no credit." Cicero anſwered, "Five and twenty gave me credit; "but there were two and thirty that gave you no credit, for they had their money "beforehand."

182. Sir Henry Savil was aſked by my lord of Eſſex his opinion touching poets? He anſwered my lord; "that he thought them the beſt writers, next to them that "writ proſe."

183. Diogenes having ſeen that the kingdom of Macedon, which before was contemptible and low, began to come aloft when he died, was aſked, how he would be buried? He anſwered; "With my face downward; for within a while the world "will be turned upſide down, and then I ſhall lie right."

184. Cato the elder was wont to ſay; that the Romans were like ſheep; a man were better to drive a flock of them, than one of them.

185. When Lycurgus was to reform and alter the ſtate of Sparta; in conſultation one adviſed, that it ſhould be reduced to an abſolute popular equality: but Lycurgus ſaid to him; "Sir, begin it in your own houſe."

186. Bion, that was an atheiſt, was ſhewed in a port city, in a temple of Neptune, many tables of pictures, of ſuch as had in tempeſts made their vows to Neptune, and were ſaved from ſhipwreck: and was aſked, How ſay you now? Do you not acknowledge the power of the Gods? But ſaith he; "Ay, but where are they painted "that have been drowned after their vows?"

187. Cicero was at dinner, where there was an ancient lady that ſpake of her own years, and ſaid; "ſhe was but forty years old." One that ſat by Cicero, rounded him in the ear, and ſaid; "She talks of forty years old; but ſhe is far more, out of "queſtion." Cicero anſwered him again; "I muſt believe her, for I have heard her "ſay ſo any time theſe ten years."

188. There was a ſoldier that vaunted before Julius Cæſar of the hurts he had received in his face. Julius Cæſar knowing him to be but a coward, told him; "You were beſt take heed next time you run away, how you look "back."

189. There

189. There was a ſuitor to Veſpaſian, who to lay his ſuit fairer, ſaid it was for his brother; whereas indeed it was for a piece of money. Some about Veſpaſian told the emperor, to croſs him: that the party his ſervant ſpoke for, was not his brother; but that he did it upon a bargain. Veſpaſian ſent for the party intereſted, and aſked him; "Whether his mean employed by him was his brother or no?" He durſt not tell untruth to the emperor, and confeſſed he was not his brother. Whereupon the emperor ſaid, "This do, fetch me the money, and you ſhall have your ſuit "diſpatched." Which he did. The courtier which was the mean, ſolicited Veſpaſian ſoon after about his ſuit: "Why, ſaith Veſpaſian, I gave it laſt day to a brother "of mine."

190. Veſpaſian aſked of Apollonius, what was the cauſe of Nero's ruin? Who anſwered, "Nero could tune the harp well, but in government he did always wind "up the ſtrings too high, or let them down too low."

191. Dionyſius the tyrant, after he was depoſed and brought to Corinth, kept a ſchool. Many uſed to viſit him; and amongſt others, one when he came in, opened his mantle and ſhook his clothes; thinking to give Dionyſius a gentle ſcorn; becauſe it was the manner to do ſo for them that came in to ſee him while he was tyrant. But Dionyſius ſaid to him; "I prithee do ſo, rather when thou goeſt out, "that we may ſee thou ſtealeſt nothing away."

192. Diogenes, one terrible froſty morning, came into the market-place, and ſtood naked, ſhaking, to ſhew his tolerance. Many of the people came about him pitying him: Plato paſſing by, and knowing he did it to be ſeen, ſaid to the people as he went by; "If you pity him indeed, let him alone to himſelf."

193. Ariſtippus was earneſt ſuitor to Dionyſius for ſome grant, who would give no ear to his ſuit. Ariſtippus fell at his feet, and then Dionyſius granted it. One that ſtood by ſaid afterwards to Ariſtippus; "You a philoſopher, and be ſo baſe as "to throw yourſelf at the tyrant's feet to get a ſuit." Ariſtippus anſwered, "The "fault is not mine, but the fault is in Dionyſius, that carries his ears in his feet."

194. Solon, when he wept for his ſon's death, and one ſaid to him, "Weeping "will not help;" anſwered, "Alas, therefore I weep, becauſe weeping will not "help."

195. The ſame Solon being aſked; whether he had given the Athenians the beſt laws? anſwered, "The beſt of thoſe that they would have received."

196. One ſaid to Ariſtippus; 'Tis a ſtrange thing, why men ſhould rather give to the poor, than to philoſophers. He anſwered, "Becauſe they think themſelves may "ſooner come to be poor, than to be philoſophers."

197. Trajan would ſay of the vain jealouſy of princes, that ſeek to make away thoſe that aſpire to their ſucceſſion; "that there was never king that did put to death "his ſucceſſor."

198. When it was repreſented to Alexander, to the advantage of Antipater, who was a ſtern and imperious man, that he only of all his lieutenants wore no purple, but kept the Macedonian habit of black; Alexander ſaid, "Yea, but Antipater is "all purple within."

199. Alexander uſed to ſay of his two friends, Craterus, and Hephæſtion; that Hephæſtion loved Alexander, and Craterus loved the king.

200. It fell out ſo, that as Livia went abroad in Rome, there met her naked young men that were ſporting in the ſtreets, which Auguſtus went about ſeverely

to

to puniſh in them: but Livia ſpake for them, and ſaid; "It was no more to chaſte "women, than ſo many ſtatues."

201. Philip of Macedon was wiſhed to baniſh one for ſpeaking ill of him. But Philip anſwered; "Better he ſpeak where we are both known, than where we are "both unknown."

202. Lucullus entertained Pompey in one of his magnificent houſes: Pompey ſaid, "This is a marvellous fair and ſtately houſe for the ſummer: but methinks it "ſhould be very cold for winter." Lucullus anſwered, "Do you not think me as wiſe "as divers fowls are, to change my habitation in the winter ſeaſon."

203. Plato entertained ſome of his friends at a dinner, and had in the chamber a bed, or couch, neatly and coſtly furniſhed. Diogenes came in, and got up upon the bed, and trampled it, ſaying, "I trample upon the pride of Plato." Plato mildly anſwered, "But with greater pride, Diogenes."

204. Pompey being commiſſioner for ſending grain to Rome in time of dearth, when he came to the ſea, found it very tempeſtuous and dangerous; inſomuch as thoſe about him adviſed him by no means to embark; but Pompey ſaid, "It is "of neceſſity that I go, not that I live."

205. Demoſthenes was upbraided by Æſchines, that his ſpeeches did ſmell of the lamp. But Demoſthenes ſaid, "Indeed there is a great deal of difference between "that which you and I do by lamp-light."

206. Demades the orator, in his age was talkative, and would eat hard: Antipater would ſay of him, that he was like a ſacrifice, that nothing was left of it but the tongue and the paunch.

207. Themiſtocles, after he was baniſhed, and had wrought himſelf into great favour afterwards, ſo that he was honoured and ſumptuouſly ſerved, ſeeing his preſent glory, ſaid unto one of his friends, "If I had not been undone, I had been "undone."

208. Philo Judæus ſaith, that the ſenſe is like the ſun; for the ſun ſeals up the globe of heaven, and opens the globe of earth: ſo the ſenſe doth obſcure heavenly things, and reveals earthly things.

209. Alexander, after the battle of Granicum, had very great offers made him by Darius; conſulting with his captains concerning them, Parmenio ſaid, "Sure I "would accept of theſe offers, if I were as Alexander." Alexander anſwered, "So "would I, if I were as Parmenio."

210. Alexander was wont to ſay, he knew himſelf to be mortal, chiefly by two things; ſleep, and luſt.

211. Auguſtus Cæſar would ſay, that he wondered that Alexander feared he ſhould want work, having no more worlds to conquer: as if it were not as hard a matter to keep, as to conquer.

212. Antigonus, when it was told him that the enemy had ſuch volleys of arrows that they did hide the ſun, ſaid, "That falls out well, for it is hot weather, and ſo we "ſhall fight in the ſhade."

213. Cato the elder, being aged, buried his wife, and married a young woman. His ſon came to him, and ſaid; "Sir, what have I offended, that you have brought a "ſtep-mother into your houſe?" The old man anſwered, "Nay, quite contrary, "ſon; thou pleaſeſt me ſo well, as I would be glad to have more ſuch."

214. Craſſus the orator had a fiſh which the Romans called *Muraena*, that he made very tame and fond of him; the fiſh died, and Craſſus wept for it. One day falling

falling in contention with Domitius in the ſenate, Domitius ſaid, " Fooliſh Craſſus, " you wept for your *Muraena*." Craſſus replied, " That it is more than you did for " both your wives."

215. Philip, Alexander's father, gave ſentence againſt a priſoner what time he was drouſy, and ſeemed to give ſmall attention. The priſoner after ſentence was pronounced, ſaid, " I appeal." The king ſomewhat ſtirred, ſaid; " To whom do you ap- " peal?" The priſoner anſwered, " From Philip when he gave no ear, to Philip when " he ſhall give ear."

216. There was a philoſopher that diſputed with the emperor Adrian, and did it but weakly. One of his friends that ſtood by, afterwards ſaid unto him: " Methinks " you were not like yourſelf laſt day, in argument with the emperor; I could have an- " ſwered better myſelf." " Why," ſaid the philoſopher, " would you have me con- " tend with him that commands thirty legions?"

217. When Alexander paſſed into Aſia, he gave large donatives to his captains, and other principal men of virtue; inſomuch as Parmenio aſked him, " Sir, what do " you keep for yourſelf?" He anſwered, " Hope."

218. Veſpaſian ſet a tribute upon urine, Titus his ſon emboldened himſelf to ſpeak to his father of it: and repreſented it as a thing indign and ſordid. Veſpaſian ſaid nothing for the time; but a while after, when it was forgotten, ſent for a piece of ſilver out of the tribute-money; and called to his ſon, bidding him to ſmell to it; and aſked him, whether he found any offence? Who ſaid, No: " Why ſo?" ſaith Veſpaſian again; " yet this money comes out of urine."

219. Nerva the emperor ſucceeded Domitian, who had been tyrannical; and in his time many noble houſes were overthrown by falſe accuſations; the inſtruments whereof were chiefly Marcellus and Regulus. The emperor Nerva one night ſupped privately with ſome ſix or ſeven: amongſt whom there was one that was a dangerous man; and he began to take the like courſes as Marcellus and Regulus had done. The emperor fell into diſcourſe of the injuſtice and tyranny of the former time; and by name, of the two accuſers; and ſaid, " What ſhould we do with them, if " we had them now?" One of them that was at ſupper, and was a free-ſpoken ſenator, ſaid; " Marry, they ſhould ſup with us."

220. There was one that found a great maſs of money digging under ground in his grandfather's houſe; and being ſomewhat doubtful of the caſe, ſignified it to the emperor, that he had found ſuch treaſure. The emperor made a reſcript thus; " Uſe it." He writ back again, that the ſum was greater than his eſtate or condition could uſe. The emperor writ a new reſcript, thus: " Abuſe it."

221. Julius Cæſar, as he paſſed by, was, by acclamation of ſome that ſtood in the way, termed King, to try how the people would take it. The people ſhewed great murmur and diſtaſte at it. Cæſar, finding where the wind ſtood, ſlighted it, and ſaid; " I am not king, but Cæſar;" as if they had miſtaken his name. For *Rex* was a ſurname amongſt the Romans, as King is with us.

222. When Crœſus, for his glory, ſhewed Solon his great treaſures of gold, Solon ſaid to him; " If another king come that hath better iron than you, he will be maſter " of all this gold."

223. Ariſtippus being reprehended of luxury by one that was not rich, for that he gave ſix crowns for a ſmall fiſh, anſwered; " Why, what would you have given?" The other ſaid, " Some twelve pence." Ariſtippus ſaid again; " And ſix crowns is " no more with me."

224. Plato reprehended ſeverely a young man for entering into a diſſolute houſe. The young man ſaid to him; "Why do you reprehend ſo ſharply for ſo ſmall a mat-"ter?" Plato replied, "But cuſtom is no ſmall matter."

225. Archidamus, king of Lacedæmon, having received from Philip king of Macedon, after Philip had won the victory of Chærona upon the Athenians, proud letters, writ back to him; "That if he meaſured his own ſhadow, he would find it no "longer than it was before his victory."

226. Pyrrhus, when his friends congratulated to him his victory over the Romans, under the conduct of Fabricius, but with great ſlaughter of his own ſide, ſaid to them again; "Yes, but if we have ſuch another victory, we are undone."

227. Plato was wont to ſay of his maſter Socrates, that he was like the apothecaries gally-pots; that had on the out-ſide apes, and owls, and ſatyrs; but within, precious drugs.

228. Alexander ſent to Phocion a great preſent of money. Phocion ſaid to the meſſenger; "why doth the king ſend to me, and to none elſe?" The meſſenger anſwered; "Becauſe he takes you to be the only good man in Athens." Phocion replied; "If he think ſo, pray let him ſuffer me to be ſo ſtill."

229. At a banquet, where thoſe that were called the ſeven wiſe men of Greece, were invited by the ambaſſador of a barbarous king; the ambaſſador related, that there was a neighbour mightier than his maſter, picked quarrels with him, by making impoſſible demands; otherwiſe threatning war; and now at that preſent had demanded of him, to drink up the ſea. Whereunto one of the wiſe men ſaid, "I would have him "undertake it." "Why," ſaith the ambaſſador, "how ſhall we come off?" "Thus," ſaith the wiſe men; "let that king firſt ſtop the rivers which run into the ſea, "which are no part of the bargain, and then your maſter will perform it."

230. At the ſame banquet, the ambaſſador deſired the ſeven, and ſome other wiſe men that were at the banquet, to deliver every one of them ſome ſentence or parable, that he might report to his king the wiſdom of Greece, which they did; only one was ſilent; which the ambaſſador perceiving, ſaid to him; "Sir, let it not diſpleaſe "you; why do not you ſay ſomewhat that I may report?" He anſwered, "Report to "your lord, that there are of the Grecians that can hold their peace."

231. The Lacedæmonians had in cuſtom to ſpeak very ſhort, which being an empire, they might do at pleaſure: but after their defeat at Leuctra, in an aſſembly of the Grecians, they made a long invective againſt Epaminondas; who ſtood up, and ſaid no more than this; "I am glad we have brought you to ſpeak long."

232. Fabius Maximus being reſolved to draw the war in length, ſtill waited upon Hannibal's progreſs to curb him; and for that purpoſe he encamped upon the high ground: but Terentius his collegue fought with Hannibal, and was in great peril of overthrow; but then Fabius came down from the high grounds, and got the day. Whereupon Hannibal ſaid; "that he did ever think that that ſame cloud that hanged "upon the hills, would at one time or other give a tempeſt."

233. Hanno the Carthaginian was ſent commiſſioner by the ſtate, after the ſecond Carthaginian war, to ſupplicate for peace, and in the end obtained it: yet one of the ſharper ſenators ſaid, "You have often broken with us the peaces whereunto you "have been ſworn; I pray, by what god will you ſwear?" Hanno anſwered; "By "the ſame gods that have puniſhed the former perjury ſo ſeverely."

234. Cæſar, when he firſt poſſeſſed Rome, Pompey being fled, offered to enter the ſacred treaſury to take the moneys that were there ſtored; and Metellus, tribune of the people,

people, did forbid him: and when Metellus was violent in it and would not desist, Cæsar turned to him, and said; "Presume no farther, or I will lay you dead." And when Metellus was with those words somewhat astonished, Cæsar added; "Young "man, it had been easier for me to do this than to speak it."

235. Caius Marius was general of the Romans against the Cimbers, who came with such a sea of people upon Italy. In the fight there was a band of the Cadurcians of a thousand, that did notable service; whereupon, after the fight, Marius did denison them all for citizens of Rome, though there was no law to warrant it. One of his friends did present it unto him, that he had transgressed the law, because that privilege was not granted but by the people. Whereunto Marius answered; "That for the "noise of arms he could not hear the laws."

236. Pompey did consummate the war against Sertorius, when Metellus had brought the enemy somewhat low. He did also consummate the war against the fugitives, whom Crassus had before defeated in a great battle. So when Lucullus had had great and glorious victories against Mithridates and Tigranes; yet Pompey, by means his friends made, was sent to put an end to that war. Whereupon Lucullus taking indignation, as a disgrace offered to himself, said; "that Pompey was a carrion crow; "when others had stricken down the bodies, then Pompey came and preyed upon them."

237. Antisthenes being asked of one what learning was most necessary for man's life? answered; "To unlearn that which is nought."

238. Alexander visited Diogenes in his tub; and when he asked him, what he would desire of him? Diogenes answered; "That you would stand a little aside, "that the sun may come to me."

239. The same Diogenes, when mice came about him as he was eating, said; "I see, "that even Diogenes nourisheth parasites."

240. Hiero visited by Pythagoras, asked him, "of what condition he was?" Pythagoras answered; "Sir, I know you have been at the Olympian games." "Yes," saith Hiero. "Thither," saith Pythagoras, "come some to win the prizes. Some come "to sell their merchandize, because it is a kind of mart of all Greece. Some come "to meet their friends, and to make merry; because of the great confluence of all "sorts. Others come only to look on. I am one of them that come to look on." Meaning it, of philosophy, and the contemplative life.

241. Heraclitus the obscure said; "The dry light is the best soul:" meaning when the faculties intellectual are in vigour, not drenched, or, as it were, blooded by the affections.

242. One of the philosophers was asked; "what a wise man differed from a fool?" He answered, "Send them both naked to those that know them not, and you shall "perceive."

243. There was a law made by the Romans against the bribery and extortion of the governors of provinces. Cicero saith in a speech of his to the people, "that he thought "the provinces would petition to the state of Rome to have that law repealed." "For," saith he, "before the governors did bribe and extort as much as was suffi-"cient for themselves: but now they bribe and extort as much as may be enough not "only for themselves, but for the judges, and jurors, and magistrates."

244. Aristippus sailing in a tempest, shewed signs of fear. One of the seamen said to him, in an insulting manner: "We that are plebeians are not troubled; you that "are a philosopher are afraid." Aristippus answered; "That there is not the like "wager upon it, for you to perish and for me."

245. There was an orator that defended a cauſe of Ariſtippus, and prevailed. Afterwards he aſked Ariſtippus; "Now, in your diſtreſs, what did Socrates doy ou "good?" Ariſtippus anſwered; "Thus, in making that which you ſaid of me to "be true."

246. There was an Epicurean vaunted, that divers of other ſects of philoſophers did after turn Epicureans; but there never were any Epicureans that turned to any other ſect. Whereupon a philoſopher that was of another ſect, ſaid; "The reaſon "was plain, for that cocks may be made capons, but capons could never be made "cocks."

247. Chilon would ſay, "That gold was tried with the touchſtone, and men with "gold."

248. Simonides being aſked of Hiero, "what he thought of God?" aſked a ſeven-night's time to conſider of it: and at the ſeven-night's end, he aſked a fortnight's time; at the fortnight's end, a month. At which Hiero marvelling, Simonides anſwered; "that the longer he thought upon the matter, the more difficult he "found it."

249. A Spaniard was cenſuring to a French gentleman the want of devotion amongſt the French; in that, whereas in Spain, when the ſacrament goes to the ſick, any that meets with it, turns back and waits upon it to the houſe whither it goes; but in France they only do reverence, and paſs by. But the French gentleman anſwered him, "There is reaſon for it; for here with us, Chriſt is ſecure amongſt his friends; "but in Spain there be ſo many Jews and Moranos, that it is not amiſs for him to "have a convoy."

250. Mr. Popham, afterwards lord chief juſtice Popham, when he was ſpeaker, and the houſe of commons had ſat long, and done in effect nothing; coming one day to queen Elizabeth, ſhe ſaid to him; "Now, Mr. Speaker, what hath paſſed in the com-"mons' houſe?" He anſwered, "If it pleaſe your majeſty, ſeven weeks."

251. Themiſtocles in his lower fortune was in love with a young gentleman who ſcorned him; but when he grew to his greatneſs, which was ſoon after, he ſought him: Themiſtocles ſaid; "We are both grown wiſe, but too late."

252. Bion was ſailing, and there fell out a great tempeſt; and the mariners that were wicked and diſſolute fellows, called upon the gods; but Bion ſaid to them, "Peace, let them not know you are here."

253. The Turks made an expedition into Perſia; and becauſe of the ſtrait jaws of the mountains of Armenia, the baſhaws conſulted which way they ſhould get in. One that heard the debate ſaid, "Here is much ado how you ſhall get in; but I hear no "body take care how you ſhould get out."

254. Philip king of Macedon maintained arguments with a muſician in points of his art, ſomewhat peremptorily; but the muſician ſaid to him, "God forbid, Sir, your "fortune were ſo hard, that you ſhould know theſe things better than myſelf."

255. Antalcidas, when an Athenian ſaid to him, "Ye Spartans are unlearned;" ſaid again, "True, for we have learned no evil nor vice of you."

256. Pace, the bitter fool, was not ſuffered to come at queen Elizabeth, becauſe of his bitter humour. Yet at one time, ſome perſuaded the queen that he ſhould come to her; undertaking for him, that he ſhould keep within compaſs: ſo he was brought to her, and the queen ſaid; "Come on, Pace; now we ſhall hear of our faults." Saith Pace; "I do not uſe to talk of that that all the town talks of."

257. Biſhop

257. Biſhop Latimer ſaid, in a ſermon at court, " That he heard great ſpeech that " the king was poor; and many ways were propounded to make him rich: for his " part he had thought of one way, which was, that they ſhould help the king to ſome " good office, for all his officers were rich."

258. After the defeat of Cyrus the younger, Falinus was ſent by the king to the Grecians, who had for their part rather victory than otherwiſe, to command them to yield their arms; which when it was denied, Falinus ſaid to Clearchus; " Well " then, the king lets you know, that if you remove from the place where you are " now encamped, it is war: if you ſtay, it is truce. What ſhall I ſay you will do?" Clearchus anſwered, " It pleaſeth us, as it pleaſeth the king." " How is that?" ſaith Falinus. Saith Clearchus, " If we remove, war: if we ſtay, truce:" and ſo would not diſcloſe his purpoſe.

259. Alcibiades came to Pericles, and ſtayed a while ere he was admitted. When he came in, Pericles civilly excuſed it, and ſaid; " I was ſtudying how to give mine " account." But Alcibiades ſaid to him, " If you will be ruled by me, ſtudy rather " how to give no account."

260. Mendoza that was vice-roy of Peru, was wont to ſay, " That the government " of Peru was the beſt place the king of Spain gave, ſave that it was ſomewhat too " near Madrid."

261. When Veſpaſian paſſed from Jewry to take upon him the empire, he went by Alexandria, where remained two famous philoſophers, Apollonius and Euphrates. The emperor heard the diſcourſe, touching matter of ſtate, in the preſence of many. And when he was weary of them, he brake off, and in a ſecret deriſion, finding their diſcourſes but ſpeculative, and not to be put in practice, ſaid; " O that I may go- " vern wiſe men, and wiſe men govern me."

262. Cardinal Ximenes, upon a muſter, which was taken againſt the Moors, was ſpoken to by a ſervant of his to ſtand a little out of the ſmoke of the harquebuſs; but he ſaid again, " That that was his incenſe."

263. Nero was wont to ſay of his maſter Seneca, " That his ſtile was like mortar " without lime."

264. Auguſtus Cæſar, out of great indignation againſt his two daughters, and Poſthumus Agrippa his grand-child; whereof the two firſt were infamous, and the laſt otherwiſe unworthy; would ſay, " That they were not his ſeed, but ſome im- poſthumes that had broken from him."

265. A ſeaman coming before the judges of the admiralty for admittance into an office of a ſhip bound for the Indies, was by one of the judges much ſlighted, as an inſufficient perſon for that office he ſought to obtain; the judge telling him, " that he " believed he could not ſay the points of his compaſs." The ſeaman anſwered; " that " he could ſay them, under favour, better than he could ſay his *Pater-noſter*." The judge replied; " that he would wager twenty ſhillings with him upon that." The ſeaman taking him up, it came to trial: and the ſeaman began, and ſaid all the points of his compaſs very exactly: the judge likewiſe ſaid his *Pater-noſter*: and when he had finiſhed it, he required the wager according to agreement; becauſe the ſeaman was to ſay his compaſs better than he his *Pater-noſter*, which he had not performed. " Nay, " I pray, Sir, hold," quoth the ſeaman, " the wager is not finiſhed; for I have but " half done:" and ſo he immediately ſaid his compaſs backward very exactly; which the judge failing of in his *Pater-noſter*, the ſeaman carried away the prize.

266. There-

266. There was a conſpiracy, againſt the emperor Claudius by Scribonianus, examined in the ſenate; where Claudius ſat in his chair, and one of his freed ſervants ſtood at the back of his chair. In the examination, that freed ſervant, who had much power with Claudius, very ſaucily, had almoſt all the words: and amongſt other things, he aſked in ſcorn one of the examinates, who was likewiſe a freed ſervant of Scribonianus; "I pray, Sir, if Scribonianus had been an emperor, what would you have "done?" He anſwered, "I would have ſtood behind his chair and held my peace."

267. One was ſaying, that his great grand-father, and grand-father, and father, died at ſea; ſaid another that heard him; "And I were as you, I would never come at "ſea." "Why," ſaith he, "where did your great grand-father, and grand-father, and "father die?" He anſwered; "Where but in their beds?" He anſwered; "And "I were as you, I would never come in bed."

268. There was a diſpute, whether great heads or little heads had the better wit? And one ſaid, "It muſt needs be the little; for that it is a maxim, *Omne majus con-*"*tinet in ſe minus.*"

269. Sir Thomas More, when the counſel of the party preſſed him for a longer day to perform the decree, ſaid; "Take ſaint Barnaby's day, which is the longeſt day in the year." Now ſaint Barnaby's day was within a few days following.

270. One of the fathers ſaith, "That there is but this difference between the death "of old men and young men; that old men go to death, and death comes to young "men."

271. Caſſius, after the defeat of Craſſus by the Parthians, whoſe weapons were chiefly arrows, fled to the city of Charrus, where he durſt not ſtay any time, doubting to be purſued and beſieged; he had with him an aſtrologer, who ſaid to him, "Sir, "I would not have you go hence, while the moon is in the ſign of Scorpio." Caſſius anſwered, "I am more afraid of that of Sagittarius."

272. Jaſon the Theſſalian was wont to ſay, "That ſome things muſt be done un-"juſtly, that many things may be done juſtly."

273. Demetrius king of Macedon would at times retire himſelf from buſineſs, and give himſelf wholly to pleaſures. One of thoſe his retirings, giving out that he was ſick, his father Antigonus came on the ſudden to viſit him; and met a fair dainty youth coming out of his chamber. When Antigonus came in, Demetrius ſaid; "Sir, "the fever left me right now." Antigonus replied, "I think it was he that I met "at the door."

274. Cato Major would ſay, "That wiſe men learned more by fools, than fools by "wiſe men."

275. When it was ſaid to Anaxagoras; "The Athenians have condemned you to "die;" he ſaid again, "And nature them."

276. Alexander, when his father wiſhed him to run for the prize of the race at the Olympian games, for he was very ſwift, anſwered; "He would, if he might run with "kings."

277. Antigonus uſed often to go diſguiſed, and to liſten at the tents of his ſoldiers; and at a time heard ſome that ſpoke very ill of him. Whereupon he opened the tent a little, and ſaid to them; "If you would ſpeak ill of me, you ſhould go a lit-"tle farther off."

278. Ariſtippus ſaid; "That thoſe that ſtudied particular ſciences, and neglected "philoſophy, were like Penelope's wooers, that made love to the waiting woman."

279. The

279. The ambaſſadors of Aſia Minor came to Antonius after he had impoſed upon them a double tax, and ſaid plainly to him; "That if he would have two tributes in "one year, he muſt give them two ſeed-times, and two harveſts."

280. An orator of Athens ſaid to Demoſthenes; "The Athenians will kill you "if they wax mad." Demoſthenes replied, "And they will kill you if they be in "good ſenſe."

281. Epictetus uſed to ſay; "That one of the vulgar, in any ill that happens to "him, blames others; a novice in philoſophy blames himſelf; and a philoſopher "blames neither the one nor the other."

282. Cæſar, in his book that he made againſt Cato, which is loſt, did write, to ſhew the force of opinion and reverence of a man that had once obtained a popular reputation; "That there were ſome that found Cato drunk, and were aſhamed inſtead "of Cato."

283. There was a nobleman ſaid of a great counſellor, "That he would have made "the worſt farrier in the world; for he never ſhod horſe, but he cloyed him: for he "never commended any man to the king for ſervice, or upon occaſion of ſuit, or "otherwiſe, but that he would come in, in the end, with a *but*; and drive in a nail "to his diſadvantage."

284. Diogenes called an ill phyſician, Cock. "Why?" ſaith he. Diogenes anſwered; "Becauſe when you crow, men uſe to riſe."

285. There was a gentleman fell very ſick, and a friend of his ſaid to him; "Surely, "you are in danger; I pray ſend for a phyſician." But the ſick man anſwered; "It is no matter, for if I die, I will die at leiſure."

286. Cato the elder, what time many of the Romans had ſtatues erected in their honour, was aſked by one in a kind of wonder, "Why he had none?" He anſwered, "He had much rather men ſhould aſk and wonder why he had no ſtatue, than why "he had a ſtatue."

287. A certain friend of Sir Thomas More's, taking great pains about a book, which he intended to publiſh, being well conceited of his own wit, which no man elſe thought worthy of commendation, brought it to Sir Thomas More to peruſe it, and paſs his judgment upon it; which he did: and finding nothing therein worthy the preſs, he ſaid to him with a grave countenance; "That if it were in verſe it would be "more worthy." Upon which words, he went immediately and turned it into verſe, and then brought it to Sir Thomas again; who looking thereon, ſaid ſoberly; "Yes, "marry, now it is ſomewhat; for now it is rhime; whereas before it was neither "rhime nor reaſon."

288. Sir Henry Wotton uſed to ſay, "That critics were like bruſhers of noble-"mens clothes."

289. Hannibal ſaid of Fabius Maximus, and of Marcellus, whereof the former waited upon him, that he could make no progreſs, and the latter had many ſharp fights with him; "That he feared Fabius like a tutor, and Marcellus like an "enemy."

290. When king Edward the ſecond was amongſt his torturers, who hurried him to and fro, that no man ſhould know where he was, they ſet him down upon a bank: and one time the more to diſguiſe his face, ſhaved him, and waſhed him with cold water of a ditch by: the king ſaid; "Well, yet I will have warm water for my "beard: and ſo ſhed abundance of tears."

291. One

291. One of the Seven was wont to ſay; "That laws were like cobwebs; where "the ſmall flies were caught, and the great brake through."

292. Lewis the eleventh of France, having much abated the greatneſs and power of the peers, nobility, and court of parliament, would ſay, "That he had brought "the crown out of ward."

293. There was a cowardly Spaniſh ſoldier, that in a defeat the Moors gave, ran away with the foremoſt. Afterwards when the army generally fled, this ſoldier was miſſing. Whereupon it was ſaid by ſome, that he was ſlain. "No ſure, ſaid one, he is alive; for the Moors eat no hares fleſh."

294. A gentleman that was punctual of his word, and loved the ſame in others, when he heard that two perſons had agreed upon a meeting about ſerious affairs, at a certain time and place; and that the one party failed in the performance, or neglected his hour; would uſually ſay of him, "He is a young man then."

295. Anacharſis would ſay, concerning the popular eſtates of Græcia, that "he "wondered how at Athens wiſe men did propoſe, and fools diſpoſe."

His lordſhip, when he had finiſhed this collection of Apophthegms, concluded thus: Come, now all is well: they ſay, he is not a wiſe man that will loſe his friend for his wit; but he is leſs a wiſe man, that will loſe his friend for another man's wit.

APOPHTHEGMS

Contained in the original edition in octavo, but omitted in later copies.

1. WHEN queen Elizabeth had advanced Raleigh, ſhe was one day playing on the virginals, and my lord of Oxford and another nobleman ſtood by. It fell out ſo, that the ledge before the jacks was taken away, ſo as the jacks were ſeen: my lord of Oxford and the other nobleman ſmiled, and a little whiſpered. The queen marked it, and would needs know what the matter was? My lord of Oxford anſwered; "That they ſmiled to ſee, that when jacks went up, heads "went down."

22. Sir Thomas More, who was a man, in all his life-time, that had an excellent vein in jeſting, at the very inſtant of his death, having a pretty long beard, after his head was upon the block, lift it up again, and gently drew his beard aſide, and ſaid; "This hath not offended the king."

27. Demonax the Philoſopher, when he died, was aſked touching his burial. He anſwered, "Never take care for burying me, for ſtink will bury me." He that aſked him, ſaid again; "Why, would you have your body left to the dogs and ra-"vens to feed upon?" Demonax anſwered; "Why, what great hurt is it, if hav-"ing fought to do good, when I lived, to men; my body do ſome good to beaſts, "when I am dead."

30. Phocion the Athenian, a man of great ſeverity, and no ways flexible to the will of the people, one day, when he ſpake to the people, in one part of his ſpeech, was applauded: whereupon, he turned to one of his friends, and aſked; "What have I "ſaid amiſs?"

34. Bion was wont to ſay; "That Socrates, of all the lovers of Alcibiades, only "held him by the ears."

37. There

37. There was a philoſopher about Tiberius, that looking into the nature of Caius, ſaid of him; "that he was mire mingled with blood."

42. There was a biſhop, that was ſomewhat a delicate perſon, and bathed twice a day. A friend of his ſaid to him; "My lord, why do you bathe twice a day?" The biſhop anſwered; "Becauſe I cannot conveniently bathe thrice."

89. When Sir Thomas More was lord chancellor, he did uſe, at maſs, to ſit in the chancel; and his lady in a pew. And becauſe the pew ſtood out of ſight, his gentleman-uſher, ever after ſervice, came to the lady's pew, and ſaid; "Madam, my lord "is gone." So when the chancellor's place was taken from him, the next time they went to church, Sir Thomas himſelf came to his lady's pew, and ſaid; "Madam, my lord is gone."

104. A Græcian captain adviſing the confederates, that were united againſt the Lacedæmonians, touching their enterpriſe, gave opinion, that they ſhould go directly upon Sparta, ſaying; "That the ſtate of Sparta was like rivers; ſtrong when they "had run a great way, and weak towards their head."

108. One was examined upon certain ſcandalous words ſpoken againſt the king. He confeſſed them, and ſaid; "It is true, I ſpake them, and if the wine had not failed, "I had ſaid much more."

110. Trajan would ſay, "That the king's exchequer was like the ſpleen; for when "that did ſwell, the whole body did pine."

111. Charles the Bald allowed one, whoſe name was Scottus, to ſit at the table with him, for his pleaſure: Scottus ſat on the other ſide of the table. One time the king being merry with him, ſaid to him; "What is there between Scott and "ſot?" Scottus anſwered: "The table only."

113. There was a marriage between a widow of great wealth, and a gentleman of a great houſe, that had no eſtate or means. Jack Roberts ſaid, "That marriage was like "a black pudding; the one brought blood, and the other brought ſuet and oatmeal."

149. Crœſus ſaid to Cambyſes, "That peace was better than war; becauſe in peace "the ſons did bury their fathers, but in the wars the fathers did bury their ſons."

154. Carvajal, when he was drawn to execution, being fourſcore and five years old, and laid upon the hurdle, ſaid; "What! young in cradle, old in cradle!"

161. Diogenes was aſked in a kind of ſcorn; "What was the matter, that philoſo-"phers haunted rich men, and not rich men philoſophers?" He anſwered; "Becauſe "the one knew what they wanted, the other did not."

162. Demetrius, king of Macedon, had a petition offered him divers times by an old woman, and ſtill anſwered; "He had no leiſure." Whereupon the woman ſaid aloud; "Why then give over to be king."

175. There were two gentlemen, otherwiſe of equal degree, ſave that the one was of the ancienter houſe. The other in courteſy aſked his hand to kiſs: which he gave him; and he kiſs'd it: but ſaid withal, to right himſelf, by way of friendſhip, "Well, "I and you, againſt any two of them:" putting himſelf firſt.

198. Themiſtocles would ſay of himſelf; "That he was like a plane-tree, that in "tempeſts men fled to him, and in fair weather men were ever cropping his leaves."

199. Themiſtocles ſaid of ſpeech; "That it was like arras that ſpread abroad "ſhews fair images, but contracted is but like packs."

211. Lycurgus would ſay of divers of the heroes of the heathen; "That he won-"dered that men ſhould mourn upon their days for them as mortal men, and yet "ſacrifice to them as gods."

213. There is an eccleſiaſtical writer of the Papiſts, to prove antiquity of confeſſion in the form that it now is, doth note, in very ancient times, even in the primitive times, amongſt other foul ſlanders ſpread againſt the chriſtians, one was; "That they did adore the genitories of their prieſts. Which, he ſaith, grew from "the poſture of the confeſſant, and the prieſt in confeſſion: which is, that the con-"feſſant kneels down, before the prieſt ſitting in a raiſed chair above him."

216. Fabricius, in conference with Pyrrhus, was tempted to revolt to him; Pyrrhus telling him, that he ſhould be partner of his fortunes, and ſecond perſon to him. But Fabricius anſwered, in a ſcorn, to ſuch a motion; "Sir, that would not "be good for yourſelf: for if the Epirotes once know me, they will rather deſire to "be governed by me than by you."

221. Thales ſaid; "that life and death were all one." One that was preſent aſked him; "Why do not you die then?" Thales ſaid again; "Becauſe they are "all one."

223. An Ægyptian prieſt having conference with Solon, ſaid to him; "You Græ-"cians are ever children; you have no knowledge of antiquity, nor antiquity of "knowledge."

227. Diogenes was one day in the market-place with a candle in his hand, and being aſked; "What he ſought?" he ſaid, "He ſought a man."

228. Bias being aſked; How a man ſhould order his life? anſwered; "As if a "man ſhould live long, or die quickly."

229. Queen Elizabeth was entertained by my lord Burleigh at Theobalds: and at her going away, my lord obtained of the queen to make ſeven knights. They were gentlemen of the country, of my lord's friends and neighbours. They were placed in a rank, as the queen ſhould paſs by the hall; and to win antiquity of knighthood, in order, as my lord favoured; though indeed the more principal gentlemen were placed loweſt. The queen was told of it, and ſaid nothing; but when ſhe went along, ſhe paſſed them all by, as far as the ſkreen, as if ſhe had forgot it: and when ſhe came to the ſkreen, ſhe ſeemed to take herſelf with the manner, and ſaid, "I "had almoſt forgot what I promiſed." With that ſhe turned back, and knighted the loweſt firſt, and ſo upward. Whereupon Mr. Stanhope, of the privy-chamber, a while after told her: "Your majeſty was too fine for my lord Burleigh." She anſwered; "I have but fulfilled the Scripture; *the firſt ſhall be laſt, and the laſt* "*firſt*."

235. Sir Fulke Grevill had much private acceſs to queen Elizabeth, which he uſed honourably, and did many men good; yet he would ſay merrily of himſelf; "That he was like Robin Goodfellow; for when the maids ſpilt the milkpans, "or kept any racket, they would lay it upon Robin: ſo what tales the ladies "about the queen told her, or other bad offices that they did, they would put it "upon him."

240. There was a politic ſermon, that had no divinity in it, was preached before the king. The king, as he came forth, ſaid to biſhop Andrews; "Call you this "a ſermon?" the biſhop anſwered; "And it pleaſe your majeſty, by a charitable "conſtruction, it may be a ſermon."

244. Henry Noel would ſay; "That courtiers were like faſting-days; they were "next the holy-days, but in themſelves they were the moſt meagre days of the "week."

247. Cato

247. Cato said; "The best way to keep good acts in memory, was to refresh "them with new."

259. Aristippus said; "He took money of his friends, not so much to use it him- "self, as to teach them how to bestow their money."

260. A strumpet said to Aristippus; "That she was with child by him:" he answered; "You know that no more, than if you went through a hedge of thorns, "you could say, This thorn pricked me."

263. Democritus said; "That truth did lie in profound pits, and when it was got, it needed much refining."

266. Diogenes said of a young man that danced daintily, and was much commended; "The better, the worse."

271. There was a nobleman that was lean of visage, but immediately after his marriage he grew pretty plump and fat. One said to him; "Your lordship doth "contrary to other married men; for they at the first wax lean, and you wax fat." Sir Walter Raleigh stood by, and said; "Why, there is no beast, that if you take "him from the common, and put him into the several, but he will wax fat."

272. Diogenes seeing one, that was a bastard, casting stones among the people, bad him take heed he hit not his father.

275. It was said by many concerning the canons of the council of Trent; "That "we are beholden to Aristotle for many articles of our faith."

Certain APOPHTHEGMS of Lord BACON.

First published in his *Remains*.

1. PLUTARCH said well, "It is otherwise in a commonwealth of men than "of bees: the hive of a city or kingdom is in best condition when there is "least of noise or buz in it."

2. The same Plutarch said of men of weak abilities set in great place, "that they "were like little statues set on great bases, made to appear the less by their ad- "vancement."

3. He said again; "Good fame is like fire. When you have kindled it, you "may easily preserve it; but if once you extinguish it, you will not easily kindle "it again; at least, not make it burn as bright as it did."

4. Queen Elizabeth seeing Sir Edward ------ in her garden, looked out at her window, and asked him in Italian, What does a man think of when he thinks of nothing? Sir Edward, who had not had the effect of some of the queen's grants so soon as he hoped and desired, paused a little; and then made answer, "Madam, he "thinks of a woman's promise." The queen shrunk in her head, but was heard to say, "Well, Sir Edward, I must not confute you." Anger makes dull men witty, but it keeps them poor.

5. When any great officer, ecclesiastical or civil, was to be made, the queen would inquire after the piety, integrity, and learning of the man. And when she was satisfied in these qualifications, she would consider of his personage. And upon such an occasion she pleased once to say to me, "Bacon, how can the magistrate "maintain his authority when the man is despised?"

6. In eighty-eight, when the queen went from Temple-bar along Fleet-street, the lawyers were ranked on one side, and the companies of the city on the other; said

Mr. Bacon to a lawyer who ſtood next to him : " Do but obſerve the courtiers, if " they bow firſt to the citizens, they are in debt ; if firſt to us, they are in law."

7. King James was wont to be very earneſt with the country gentlemen to go from London to their country houſes. And ſometimes he would ſay thus to them ; " Gentlemen, at London, you are like ſhips at ſea, which ſhew like nothing ; but " in your country villages, you are like ſhips in a river, which look like great " things."

8. Soon after the death of a great officer, who was judged no advancer of the king's matters, the king ſaid to his ſolicitor Bacon, who was his kinſman, " Now " tell me truly, what ſay you of your couſin that is gone ?" Mr. Bacon anſwered, " Sir, ſince your majeſty doth charge me, I'll e'en deal plainly with you, and give " you ſuch a character of him, as if I were to write his ſtory. I do think he was " no fit counſellor to make your affairs better: but yet he was fit to have kept them " from growing worſe." The king ſaid, " On my ſo'l, man, in the firſt thou " ſpeakeſt like a true man, and in the latter like a kinſman."

9. King James, as he was a prince of great judgment, ſo he was a prince of a marvellous pleaſant humour ; and there now come into my mind two inſtances of it. As he was going through Luſen by Greenwich, he aſked what town it was ? They ſaid, Luſen. He aſked a good while after, " What town is this we are now in ?" They ſaid, ſtill 'twas Luſen. " On my ſo'l," ſaid the king, " I will be king of Luſen."

10. In ſome other of his progreſſes, he aſked how far it was to a town whoſe name I have forgotten. They ſaid, Six miles. Half an hour after he aſked again. One ſaid, Six miles and an half. The king alighted out of his coach, and crept under the ſhoulder of his led horſe. And when ſome aſked his majeſty what he meant ? " I muſt ſtalk," ſaid he, " for yonder town is ſhy, and flies me."

11. Count Gondomar ſent a compliment to my lord St. Alban, wiſhing him a good Eaſter. My lord thanked the meſſenger, and ſaid, " he could not at preſent " requite the count better than in returning him the like ; that he wiſhed his lord- " ſhip a good Paſſover."

12. My lord chancellor Elſmere, when he had read a petition which he diſliked, would ſay ; " What, you would have my hand to this now ?" And the party anſwering, Yes : he would ſay farther, " Well, ſo you ſhall ; nay, you ſhall have both " my hands to it." And ſo would with both his hands tear it in pieces.

13. Sir Francis Bacon was wont to ſay of an angry man who ſuppreſſed his paſſion, " that he thought worſe than he ſpake :" and of an angry man that would chide, " that he ſpoke worſe than he thought."

14. He was wont alſo to ſay, " that power in an ill man was like the power " of a black witch ; he could do hurt, but no good with it." And he would add, " that the magicians could turn water into blood, but could not turn the " blood again to water."

15. When Mr. Attorney Coke, in the exchequer, gave high words to Sir Francis Bacon, and ſtood much upon his higher place ; Sir Francis ſaid to him, " Mr. Attorney, the leſs you ſpeak of your own greatneſs, the more I ſhall " think of it : and the more, the leſs."

16. Sir Francis Bacon coming into the earl of Arundel's garden, where there were a great number of ancient ſtatues of naked men and women, made a ſtand, and as aſtoniſhed, cried out, " The reſurrection !"

17. Sir

17. Sir Francis Bacon, who was always for moderate counſels, when one was ſpeaking of ſuch a reformation of the church of England, as would in effect make it no church; ſaid thus to him, "Sir, the ſubject we talk of is the eye of Eng-"land; and if there be a ſpeck or two in the eye, we endeavour to take them "off; but he were a ſtrange oculiſt who would pull out the eye."

18. The ſame Sir Francis Bacon was wont to ſay, "that thoſe who left "uſeful ſtudies for uſeleſs ſcholaſtic ſpeculations, were like the Olympic game-"ſters, who abſtained from neceſſary labours, that they might be fit for ſuch as "were not ſo."

19. He likewiſe often uſed this compariſon: "* The empirical philoſophers "are like to piſmires; they only lay up and uſe their ſtore. The rationaliſts are "like the ſpiders; they ſpin all out of their own bowels. But give me a philo-"ſopher, who like the bee hath a middle faculty, gathering from abroad, but "digeſting that which is gathered by his own virtue."

20. The lord St. Alban, who was not over-haſty to raiſe theories, but pro-ceeded ſlowly by experiments, was wont to ſay to ſome philoſophers, who would not go his pace; "Gentlemen, nature is a labyrinth, in which the very haſte "you move with, will make you loſe your way."

21. The ſame lord, when he ſpoke of the Dutchmen, uſed to ſay, "that "we could not abandon them for our ſafety, nor keep them for our profit." And ſometimes he would expreſs the ſame ſenſe in this manner; "We hold "the Belgic lion by the ears."

22. The ſame lord, when a gentleman ſeemed not much to approve of his liberality to his retinue, ſaid to him; "Sir, I am all of a piece; if the head be "lifted up, the inferior parts of the body muſt too."

23. The lord Bacon was wont to commend the advice of the plain old man at Buxton that ſold beſoms: a proud lazy young fellow came to him for a beſom upon truſt; to whom the old man ſaid; "Friend, haſt thou no money? borrow "of thy back, and borrow of thy belly, they'll ne'er aſk thee again, I ſhall be "dunning thee every day."

24. Jack Weeks ſaid of a great man, juſt then dead, who pretended to ſome religion, but was none of the beſt livers; "Well, I hope he is in heaven. "Every man thinks as he wiſhes; but if he be in heaven, 'twere pity it were "known."

* See the ſubſtance of this in *Novum Organum*, Vol. IV. and *Cogitata et Viſa*. Vol. V.

ORNAMENTA RATIONALIA:

OR,

ELEGANT SENTENCES,

Some made, others collected by the Lord BACON;
and by him put under the aboveſaid title.

Collected out of the *Mimi* of Publius, and publiſhed in the *Remains*.

1. *ALEATOR, quanto in arte eſt melior, tanto eſt nequior.*
A gameſter, the greater maſter he is in his art, the worſe man he is.
2. *Arcum, intenſio frangit; animum, remiſſio.*
Much bending breaks the bow; much unbending, the mind.
3. *Bis vincit, qui ſe vincit in victoria.*
He conquers twice, who upon victory overcomes himſelf.
4. *Cum vitia proſint, peccat, qui recte facit.*
If vices were upon the whole matter profitable, the virtuous man would be the ſinner.
5. *Bene dormit, qui non ſentit quod male dormiat.*
He ſleeps well, who feels not that he ſleeps ill.
6. *Deliberare utilia, mora eſt tutiſſima.*
To deliberate about uſeful things, is the ſafeſt delay.
7. *Dolor decreſcit, ubi quo creſcat non habet.*
The flood of grief decreaſeth, when it can ſwell no higher.
8. *Etiam innocentes cogit mentiri dolor.*
Pain makes even the innocent man a liar.
9. *Etiam celeritas in deſiderio, mora eſt.*
In deſire, ſwiftneſs itſelf is delay.
10. *Etiam capillus unus habet umbram ſuam.*
The ſmalleſt hair caſts a ſhadow.
11. *Fidem qui perdit, quo ſe ſervat in reliquum?*
He that has loſt his faith, what has he left to live on?
12. *Formoſa facies muta commendatio eſt.*
A beautiful face is a ſilent commendation.
13. *Fortuna nimium quem fovet, ſtultum facit.*
Fortune makes him a fool, whom ſhe makes her darling.
14. *Fortuna obeſſe nulli contenta eſt ſemel.*
Fortune is not content to do a man but one ill turn.

15. *Facit*

15. *Facit gratum fortuna, quem nemo videt.*
The fortune which no body ſees, makes a man happy and unenvied.
16. *Heu! quam miſerum eſt ab illo laedi, de quo non poſſis queri.*
O! what a miſerable thing it is to be hurt by ſuch a one of whom it is in vain to complain.
17. *Homo toties moritur quoties amittit ſuos.*
A man dies as often as he loſes his friends.
18. *Haeredis fletus ſub perſona riſus eſt.*
The tears of an heir are laughter under a vizard.
19. *Jucundum nihil eſt, niſi quod reficit varietas.*
Nothing is pleaſant, to which variety does not give a reliſh.
20. *Invidiam ferre, aut fortis, aut felix poteſt.*
He may bear envy, who is either couragious or happy.
21. *In malis ſperare bonum, niſi innocens, nemo poteſt.*
None but a virtuous man can hope well in ill circumſtances.
22. *In vindicando, criminoſa eſt celeritas.*
In taking revenge, the very haſte we make is criminal.
23. *In calamitoſo riſus etiam injuria eſt.*
When men are in calamity, if we do but laugh we offend.
24. *Improbe Neptunum accuſat, qui iterum naufragium facit.*
He accuſeth Neptune unjuſtly, who makes ſhipwreck a ſecond time.
25. *Multis minatur, qui uni facit injuriam.*
He that injures one, threatens an hundred.
26. *Mora omnis ingrata eſt, ſed facit ſapientiam.*
All delay is ungrateful, but we are not wiſe without it.
27. *Mori eſt felicis antequam mortem invocet.*
Happy he who dies ere he calls for death to take him away.
28. *Malus ubi bonum ſe ſimulat, tunc eſt peſſimus.*
An ill man is always ill; but he is then worſt of all, when he pretends to be a ſaint.
29. *Magno cum periculo cuſtoditur, quod multis placet.*
Lock and key will ſcarce keep that ſecure, which pleaſes every body.
30. *Male vivunt qui ſe ſemper victuros putant.*
They think ill, who think of living always.
31. *Male ſecum agit aeger, medicum qui haeredem facit.*
That ſick man does ill for himſelf, who makes his phyſician his heir.
32. *Multos timere debet, quem multi timent.*
He of whom many are afraid, ought himſelf to fear many.
33. *Nulla tam bona eſt fortuna, de qua nil poſſis queri.*
There is no fortune ſo good, but it bates an ace.
34. *Pars beneficii eſt, quod petitur ſi bene neges.*
It is part of the gift, if you deny genteely what is aſked of you.
35. *Timidus vocat ſe cautum, parcum ſordidus.*
The coward calls himſelf a wary man; and the miſer ſays he is frugal.
36. *O vita! miſero longa, felici brevis.*
O life! an age to him that is in miſery; and to him that is happy, a moment.

A COLLECTION of SENTENCES

OUT OF SOME OF THE

WRITINGS of the Lord BACON.

1. IT is a ſtrange deſire which men have, to ſeek power and loſe liberty.

2. Children increaſe the cares of life; but they mitigate the remembrance of death.

3. Round dealing is the honour of man's nature; and a mixture of falſhood is like allay in gold and ſilver, which may make the metal work the better, but it embaſeth it.

4. Death openeth the gate to good fame, and extinguiſheth envy.

5. Schiſm in the ſpiritual body of the church, is a greater ſcandal than a corruption in manners: as, in the natural body, a wound or ſolution of continuity is worſe than a corrupt humour.

6. Revenge is a kind of wild juſtice, which the more a man's nature runs to, the more ought law to weed it out.

7. He that ſtudieth revenge, keepeth his own wounds green.

8. Revengeful perſons live and die like witches: their life is miſchievous, and their end is unfortunate.

9. It is an high ſpeech of Seneca, after the manner of the Stoics, that the good things which belong to proſperity, are to be wiſhed; but the good things which belong to adverſity, are to be admired.

10. He that cannot ſee well, let him go ſoftly.

11. If a man be thought ſecret, it inviteth diſcovery; as the more cloſe air ſucketh in the more open.

12. Keep your authority wholly from your children, not ſo your purſe.

13. Men of noble birth are noted to be envious towards new men when they riſe: for the diſtance is altered; and it is like a deceit of the eye, that when others come on, they think themſelves go back.

14. That envy is moſt malignant which is like Cain's, who envied his brother, becauſe his ſacrifice was better accepted, when there was no body but God to look on.

15. The lovers of great place are impatient of privateneſs, even in age, which requires the ſhadow: like old townſmen that will be ſtill ſitting at their ſtreet door, though there they offer age to ſcorn.

16. In evil, the beſt condition is, not to will; the next not to can.

17. In great place, aſk counſel of both times: of the ancient time, what is beſt; and of the latter time, what is fitteſt.

18. As in nature things move more violently to their place, and calmly in their place: ſo virtue in ambition is violent; in authority, ſettled and calm.

19. Boldneſs in civil buſineſs, is like pronunciation in the orator of Demoſthenes; the firſt, ſecond, and third thing.

20. Boldneſs is blind: wherefore it is ill in counſel, but good in execution. For in counſel it is good to ſee dangers; in execution not to ſee them, except they be very great.

21. Without good-nature, man is but a better kind of vermin.

22. God

22. God never wrought miracle to convince atheiſm, becauſe his ordinary works convince it.

23. The great atheiſts indeed are hypocrites, who are always handling holy things, but without feeling; ſo as they muſt needs be cauterized in the end.

24. The maſter of ſuperſtition is the people. And in all ſuperſtition, wiſe men follow fools.

25. In removing ſuperſtitions, care would be had, that, as it fareth in ill purgings, the good be not taken away with the bad: which commonly is done when the people is the phyſician.

26. He that goeth into a country before he hath ſome entrance into the language, goeth to ſchool, and not to travel.

27. It is a miſerable ſtate of mind, and yet it is commonly the caſe of kings, to have few things to deſire, and many things to fear.

28. Depreſſion of the nobility may make a king more abſolute, but leſs ſafe.

29. All precepts concerning kings are, in effect, comprehended in theſe remembrances: remember thou art a man; remember thou art God's vicegerent: The one bridleth their power, and the other their will.

30. Things will have their firſt or ſecond agitation: if they be not toſſed upon the arguments of counſel, they will be toſſed upon the waves of fortune.

31. The true compoſition of a counſellor is, rather to be ſkilled in his maſter's buſineſs than his nature; for then he is like to adviſe him, and not to feed his humour.

32. Private opinion is more free, but opinion before others is more reverend.

33. Fortune is like a market, where many times if you ſtay a little the price will fall.

34. Fortune ſometimes turneth the handle of the bottle, which is eaſy to be taken hold of; and after the belly, which is hard to graſp.

35. Generally it is good to commit the beginning of all great actions to Argus with an hundred eyes; and the ends of them to Briareus with an hundred hands; firſt to watch, and then to ſpeed.

36. There is great difference betwixt a cunning man and a wiſe man. There be that can pack the cards, who yet cannot play well; they are good in canvaſſes and factions, and yet otherwiſe mean men.

37. Extreme ſelf-lovers will ſet a man's houſe on fire, though it were but to roſt their eggs.

38. New things, like ſtrangers, are more admired, and leſs favoured.

39. It were good that men, in their innovations, would follow the example of time itſelf, which indeed innovateth greatly, but quietly, and by degrees ſcarce to be perceived.

40. They that reverence too much old time, are but a ſcorn to the new.

41. The Spaniards and Spartans have been noted to be of ſmall diſpatch. *Mi venga la muerte de Spagna*; Let my death come from Spain, for then it will be ſure to be long a coming.

42. You had better take for buſineſs a man ſomewhat abſurd, than over-formal.

43. Thoſe who want friends to whom to open their griefs, are canibals of their own hearts.

44. Number itſelf importeth not much in armies, where the people are of weak courage: for, as Virgil ſays, it never troubles a wolf how many the ſheep be.

45. Let ſtates, that aim at greatneſs, take heed how their nobility and gentry multiply too faſt. In coppice woods, if you leave your ſtaddles too thick, you ſhall never have clean underwood, but ſhrubs and buſhes.

46. A civil war is like the heat of a fever; but a foreign war is like the heat of exerciſe, and ſerveth to keep the body in health.

47. Suſpicions among thoughts, are like bats among birds, they ever fly by twilight.

48. Baſe natures, if they find themſelves once ſuſpected, will never be true.

49. Men ought to find the difference between ſaltneſs and bitterneſs. Certainly he that hath a ſatirical vein, as he maketh others afraid of his wit, ſo he had need be afraid of others' memory.

50. Diſcretion in ſpeech is more than eloquence.

51. Men ſeem neither well to underſtand their riches, nor their ſtrength: of the former they believe greater things than they ſhould, and of the latter much leſs. And from hence certain fatal pillars have bounded the progreſs of learning.

52. Riches are the baggage of virtue; they cannot be ſpared, nor left behind, but they hinder the march.

53. Great riches have ſold more men than ever they have bought out.

54. Riches have wings, and ſometimes they fly away of themſelves, and ſometimes they muſt be ſet flying to bring in more.

55. He that defers his charity until he is dead, is, if a man weighs it rightly, rather liberal of another man's, than of his own.

56. Ambition is like choler, if it can move, it makes men active; if it be ſtopped, it becomes aduſt, and makes men melancholy.

57. To take a ſoldier without ambition, is to pull off his ſpurs.

58. Some ambitious men ſeem as ſkreens to princes in matters of danger and envy. For no man will take ſuch parts, except he be like the ſeel'd dove, that mounts and mounts, becauſe he cannot ſee about him.

59. Princes and ſtates ſhould chooſe ſuch miniſters as are more ſenſible of duty than riſing; and ſhould diſcern a buſy nature from a willing mind.

60. A man's nature runs either to herbs or weeds; therefore let him ſeaſonably water the one, and deſtroy the other.

61. If a man look ſharply and attentively, he ſhall ſee fortune; for though ſhe be blind, ſhe is not inviſible.

62. Uſury bringeth the treaſure of a realm or ſtate into few hands: for the uſurer being at certainties, and others at uncertainties; at the end of the game, moſt of the money will be in the box.

63. Virtue is beſt in a body that hath rather dignity of preſence, than beauty of aſpect. The beautiful prove accompliſhed, but not of great ſpirit; and ſtudy, for the moſt part, rather behaviour than virtue.

64. The beſt part of beauty is that which a picture cannot expreſs.

65. He who builds a fair houſe upon an ill ſeat, commits himſelf to priſon.

66. If you will work on any man, you muſt either know his nature and faſhions, and ſo lead him; or his ends, and ſo perſuade him; or his weakneſſes and diſadvantages, and ſo awe him; or thoſe that have intereſt in him, and ſo govern him.

67. Coſtly followers, among whom we may reckon thoſe who are importunate in ſuits, are not to be liked; leſt, while a man maketh his train longer, he make his wings ſhorter.

68. Fame

68. Fame is like a river that beareth up things light and ſwollen, and drowns things weighty and ſolid.

69. Seneca ſaith well, that anger is like ruin, which breaks itſelf upon that it falls.

70. Excuſations, ceſſions, modeſty itſelf well governed, are but arts of oſtentation.

71. High treaſon is not written in ice; that when the body relenteth, the impreſſion ſhould go away.

72. The beſt governments are always ſubject to be like the faireſt cryſtals, wherein every iſicle or grain is ſeen, which in a fouler ſtone is never perceived.

73. Hollow church papiſts are like the roots of nettles, which themſelves ſting not; but yet they bear all the ſtinging leaves.

SHORT NOTES FOR CIVIL CONVERSATION.

1. TO deceive mens expectations generally, with cautel, argueth a ſtaid mind, and unexpected conſtancy: namely, in matters of fear, anger, ſudden joy or grief, and all things which may affect or alter the mind in public or ſudden accidents, or ſuch like.

2. It is neceſſary to uſe a ſtedfaſt countenance, not wavering with action, as in moving the head or hand too much, which ſheweth a fantaſtical, light and fickle operation of the ſpirit, and conſequently like mind as geſture: only it is ſufficient, with leiſure, to uſe a modeſt action in either.

3. In all kinds of ſpeech, either pleaſant, grave, ſevere, or ordinary, it is convenient to ſpeak leiſurely, and rather drawingly, than haſtily; becauſe haſty ſpeech confounds the memory, and oftentimes, beſides unſeemlineſs, drives a man either to a non-plus or unſeemly ſtammering, harping upon that which ſhould follow; whereas a ſlow ſpeech confirmeth the memory, addeth a conceit of wiſdom to the hearers, beſides a ſeemlineſs of ſpeech and countenance.

4. To deſire in diſcourſe to hold all arguments, is ridiculous, wanting true judgement; for in all things no man can be exquiſite.

5, 6. To have common places to diſcourſe, and to want variety, is both tedious to the hearers, and ſhews a ſhallowneſs of conceit; therefore it is good to vary, and ſuit ſpeeches with the preſent occaſions; and to have a moderation in all our ſpeeches, eſpecially in jeſting of religion, ſtate, great perſons, weighty and important buſineſs, poverty, or any thing deſerving pity.

7. A long continued ſpeech, without a good ſpeech of interlocution, ſheweth ſlowneſs; and a good reply, without a good ſet ſpeech, ſheweth ſhallowneſs and weakneſs.

8. To uſe many circumſtances, ere you come to the matter, is wearisome; and to uſe none at all, is but blunt.

9. Baſhfulneſs is a great hindrance to a man, both of uttering his conceit, and underſtanding what is propounded unto him: wherefore, it is good to preſs himſelf forwards with diſcretion, both in ſpeech, and company of the better ſort.

Uſus promptos facit.

An ESSAY on DEATH.

1. I Have often thought upon death, and I find it the leaſt of all evils. All that which is paſt is as a dream; and he that hopes or depends upon time coming, dreams waking. So much of our life as we have diſcovered is already dead; and all thoſe hours which we ſhare, even from the breaſts of our mother, until we return to our grand-mother the earth, are part of our dying days; whereof even this is one, and thoſe that ſucceed are of the ſame nature, for we die daily; and as others have given place to us, ſo we muſt in the end give way to others.

2. Phyſicians, in the name of death include all ſorrow, anguiſh, diſeaſe, calamity, or whatſoever can fall in the life of man, either grievous or unwelcome: but theſe things are familiar unto us, and we ſuffer them every hour; therefore we die daily, and I am older ſince I affirmed it.

3. I know many wiſe men, that fear to die; for the change is bitter, and fleſh would refuſe to prove it: beſides, the expectation brings terror, and that exceeds the evil. But I do not believe, that any man fears to be dead, but only the ſtroke of death: and ſuch are my hopes, that if heaven be pleaſed, and nature renew but my leaſe for twenty-one years more, without aſking longer days, I ſhall be ſtrong enough to acknowledge without mourning, that I was begotten mortal. Virtue walks not in the high-way, though ſhe go *per alta*; this is ſtrength and the blood to virtue, to contemn things that be deſired, and to neglect that which is feared.

4. Why ſhould man be in love with his fetters, though of gold? Art thou drowned in ſecurity? Then I ſay thou art perfectly dead. For though thou moveſt, yet thy ſoul is buried within thee, and thy good angel either forſakes his guard or ſleeps. There is nothing under heaven, ſaving a true friend, who cannot be counted within the number of moveables, unto which my heart doth lean. And this dear freedom hath begotten me this peace, that I mourn not for that end which muſt be, nor ſpend one wiſh to have one minute added to the uncertain date of my years. It was no mean apprehenſion of Lucian, who ſays of Menippus, that in his travels through hell he knew not the kings of the earth from other men, but only by their louder cryings and tears: which was foſtered in them through the remorſeful memory of the good days they had ſeen, and the fruitful havings which they ſo unwillingly left behind them: he that was well ſeated, looked back at his portion, and was loth to forſake his farm; and others either minding marriages, pleaſures, profit, or preferment, deſired to be excuſed from death's banquet: they had made an appointment with earth, looking at the bleſſings, not the hand that enlarged them, forgetting how unclothedly they came hither, or with what naked ornaments they were arrayed.

5. But were we ſervants of the precept given, and obſervers of the heathens rule *memento mori*, and not become benighted with this ſeeming felicity, we ſhould enjoy it as men prepared to loſe, and not wind up our thoughts upon ſo periſhing a fortune: he that is not ſlackly ſtrong, as the ſervants of pleaſure, how can he be found unready to quit the veil and falſe viſage of his perfection? The ſoul having

having ſhaken off her fleſh, doth then ſet up for herſelf, and contemning things that are under, ſhews what finger hath enforced her; for the ſouls of idiots are of the ſame piece with thoſe of ſtateſmen, but now and then nature is at a fault, and this good gueſt of ours takes ſoil in an imperfect body, and ſo is ſlackened from ſhewing her wonders; like an excellent muſician, which cannot utter himſelf upon a defective inſtrument.

6. But ſee how I am ſwerved, and loſe my courſe, touching at the ſoul, that doth leaſt hold action with death, who hath the ſureſt property in this frail act; his ſtile is the end of all fleſh, and the beginning of incorruption.

This ruler of monuments leads men for the moſt part out of this world with their heels forward; in token that he is contrary to life; which being obtained, ſends men headlong into this wretched theatre, where being arrived, their firſt language is that of mourning. Nor in my own thoughts, can I compare men more fitly to any thing, than to the Indian fig-tree, which being ripened to his full height, is ſaid to decline his branches down to the earth; whereof ſhe conceives again, and they become roots in their own ſtock.

So man having derived his being from the earth, firſt lives the life of a tree, drawing his nouriſhment as a plant, and made ripe for death he tends downwards, and is ſowed again in his mother the earth, where he periſheth not but expects a quickening.

7. So we ſee death exempts not a man from being, but only preſents an alteration; yet there are ſome men, I think, that ſtand otherwiſe perſuaded. Death finds not a worſe friend than an alderman, to whoſe door I never knew him welcome; but he is an importunate gueſt, and will not be ſaid nay.

And though they themſelves ſhall affirm, that they are not within, yet the anſwer will not be taken; and that which heightens their fear is, that they know they are in danger to forfeit their fleſh, but are not wiſe of the payment day: which ſickly uncertainty is the occaſion that, for the moſt part, they ſtep out of this world unfurniſhed for their general account, and being all unprovided, deſire yet to hold their gravity, preparing their ſouls to anſwer in ſcarlet.

Thus I gather, that death is diſagreeable to moſt citizens, becauſe they commonly die inteſtate; this being a rule, that when their will is made, they think themſelves nearer a grave than before: now they, out of the wiſdom of thouſands, think to ſcare deſtiny, from which there is no appeal, by not making a will, or to live longer by proteſtation of their unwillingneſs to die. They are for the moſt part well made in this world, accounting their treaſure by legions, as men do devils, their fortune looks toward them, and they are willing to anchor at it, and deſire, if it be poſſible, to put the evil day far off from them, and to adjourn their ungrateful and killing period.

No, theſe are not the men which have beſpoken death, or whoſe looks are aſſured to entertain a thought of him.

8. Death arrives gracious only to ſuch as ſit in darkneſs, or lie heavy burdened with grief and irons; to the poor Chriſtian, that ſits bound in the galley; to deſpairful widows, penſive priſoners, and depoſed kings; to them whoſe fortune runs back, and whoſe ſpirit mutinies; unto ſuch death is a redeemer, and the grave a place for retiredneſs and reſt.

Theſe wait upon the ſhore of death, and waft unto him to draw near, wiſhing above all others, to ſee his ſtar, that they might be led to his place; wooing the

remorſeleſs

remorſeleſs ſiſters to wind down the watch of their life, and to break them off before the hour.

9. But death is a doleful meſſenger to an uſurer, and fate untimely cuts their thread; for it is never mentioned by him, but when rumours of war and civil tumults put him in mind thereof.

And when many hands are armed, and the peace of a city in diſorder, and the foot of the common ſoldiers ſounds an alarm on his ſtairs, then perhaps ſuch a one, broken in thoughts of his moneys abroad, and curſing the monuments of coin which are in his houſe, can be content to think of death, and, being haſty of perdition, will perhaps hang himſelf, leſt his throat ſhould be cut; provided that he may do it in his ſtudy, ſurrounded with wealth, to which his eye ſends a faint and languiſhing ſalute, even upon the turning off; remembring always, that he have time and liberty, by writing, to depute himſelf as his own heir.

For that is a great peace to his end, and reconciles him wonderfully upon the point.

10. Herein we all dally with ourſelves, and are without proof till neceſſity. I am not of thoſe that dare promiſe to pine away myſelf in vain-glory, and I hold ſuch to be but feat boldneſs, and them that dare commit it to be vain. Yet for my part, I think nature ſhould do me great wrong, if I ſhould be ſo long in dying, as I was in being born.

To ſpeak truth, no man knows the lifts of his own patience; nor can divine how able he ſhall be in his ſufferings, till the ſtorm come, the perfecteſt virtue being tried in action, but I would, out of a care to do the beſt buſineſs well, ever keep a guard, and ſtand upon keeping faith and a good conſcience.

11. And if wiſhes might find place, I would die together, and not my mind often, and my body once; that is, I would prepare for the meſſengers of death, ſickneſs, and affliction, and not wait long, or be attempted by the violence of pain.

Herein I do not profeſs myſelf a Stoic, to hold grief no evil, but opinion, and a thing indifferent.

But I conſent with Cæſar, that the ſuddeneſt paſſage is eaſieſt, and there is nothing more awakens our reſolve and readineſs to die, than the quieted conſcience, ſtrengthened with opinion that we ſhall be well ſpoken of upon earth by thoſe that are juſt, and of the family of virtue; the oppoſite whereof is a fury to man, and makes even life unſweet.

Therefore, what is more heavy than evil fame deſerved? Or likewiſe, who can ſee worſe days, than he that yet living doth follow at the funerals of his own reputation?

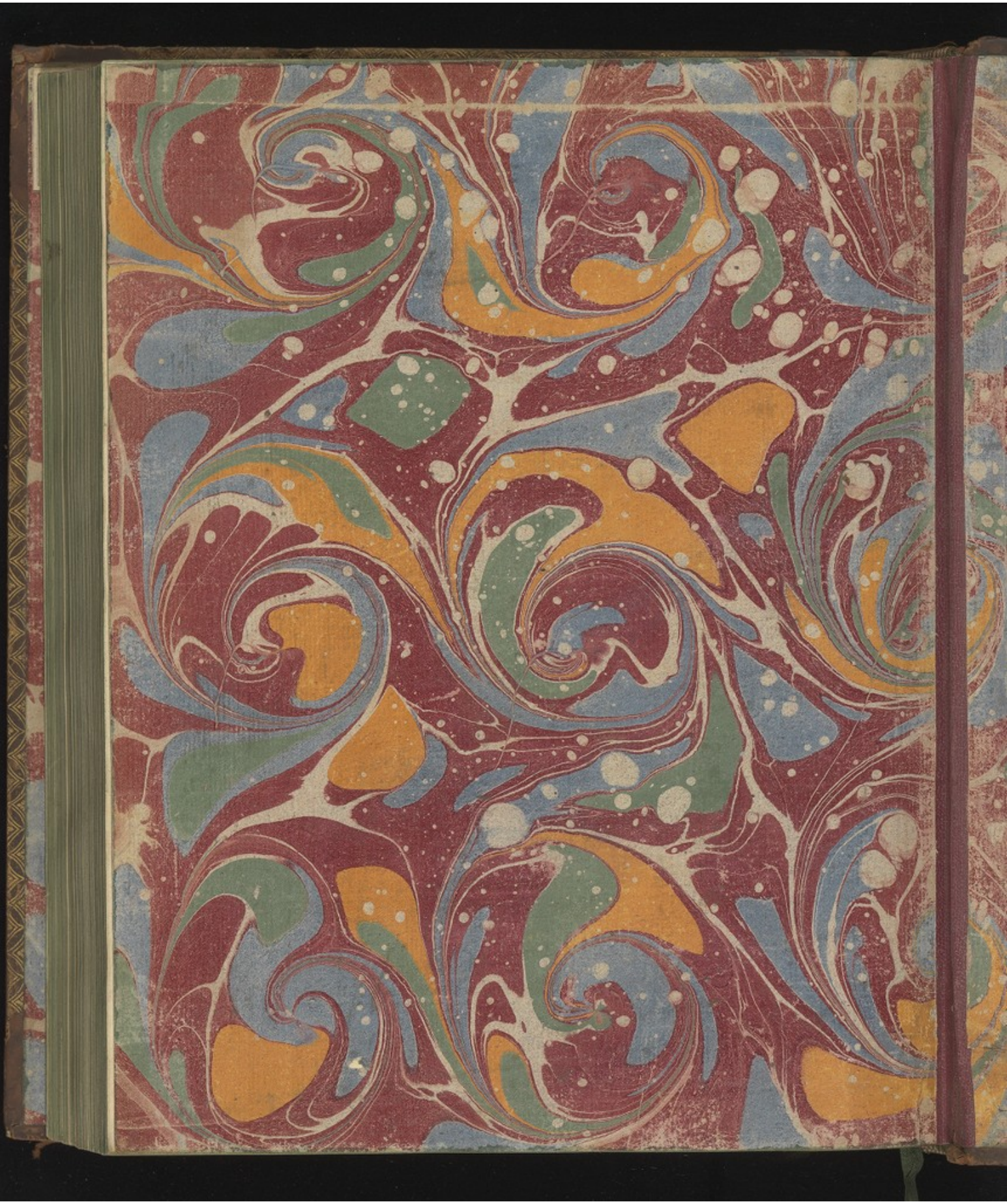
I have laid up many hopes, that I am privileged from that kind of mourning, and could wiſh the like peace to all thoſe with whom I wage love.

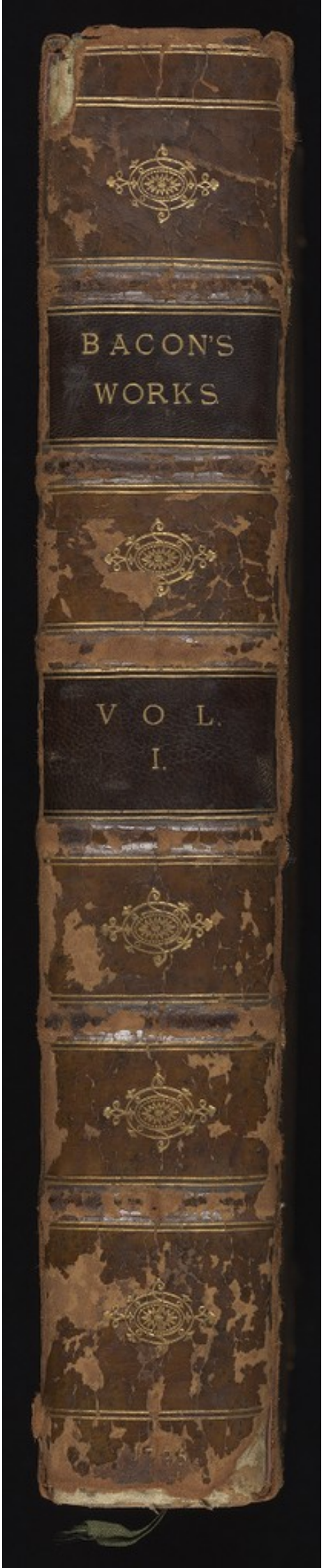
12. I might ſay much of the commodities that death can ſell a man; but briefly, death is a friend of ours, and he that is not ready to entertain him, is not at home. Whilſt I am, my ambition is not to fore-flow the tide; I have but ſo to make my intereſt of it as I may account for it; I would wiſh nothing but what might better my days, nor deſire any greater place than the front of good opinion. I make not love to the continuance of days, but to the goodneſs of them; nor wiſh to die, but refer myſelf to my hour, which the great diſpenſer of all things hath appointed me; yet as I am frail, and ſuffered for the firſt fault, were it given me to chooſe, I ſhould not be earneſt to ſee the evening of my age; that

extremity

extremity of itſelf being a diſeaſe, and a mere return into infancy: ſo that if perpetuity of life might be given me, I ſhould think what the Greek poet ſaid, Such an age is a mortal evil. And ſince I muſt needs be dead, I require it may not be done before mine enemies, that I be not ſtript before I be cold; but before my friends. The night was even now; but that name is loſt; it is not now late but early. Mine eyes begin to diſcharge their watch, and compound with this fleſhly weakneſs for a time of perpetual reſt; and I ſhall preſently be as happy for a few hours, as I had died the firſt hour I was born.

The END *of the Firſt* VOLUME.

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I.