

**The Works of Sir  
Thomas Browne  
Volume 1**

**By  
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# THE WORKS OF SIR THOMAS BROWNE VOLUME 1

## CHAPTER I

### Of the Causes of Common Errors

#### The Introduction

The First and Fathercause of common Error, is, The common infirmity of Human Nature; of whose deceptible condition, although perhaps there should not need any other evicition, than the frequent Errors we shall our selves commit, even in the express declarement hereof: yet shall we illustrate the same from more infallible constitutions, and persons presumed as far from us in condition, as time, that is, our first and ingenerated forefathers. From whom as we derive our Being, and the several wounds of constitution; so, may we in some manner excuse our infirmities in the depravity of those parts, whose Traductions were pure in them, and their Originals but once removed from God. Who notwithstanding (if posterity may take leave to judge of the fact, as they are assured to suffer in the punishment) were grossly deceived, in their perfection; and so weakly deluded in the clarity of their understanding, that it hath left no small obscurity in ours, How error should gain upon them.

Matter of great dispute, how our first parents could be so deceived.

For first, They were deceived by Satan; and that not in an invisible insinuation; but an open and discoverable apparition, that is, in the form of a Serpent; whereby although there were many occasions of suspition, and such as could not easily escape a weaker circumspection, yet did the unwary apprehension of Eve take no advantage thereof. It hath therefore seemed strange unto some, she should be deluded by a Serpent, or subject her reason to a beast, which God had subjected unto hers. It hath empuzzled the enquiries of others to apprehend, and enforced them unto strange conceptions, to make out, how without fear or doubt she could discourse with such a creature, or hear a Serpent speak, without suspition of Imposture. The wits of others have been so bold, as to accuse her simplicity, in receiving his Temptation so coldly; and when such specious effects of the Fruit were Promised, as to make them like God; not to desire, at least not to wonder he pursued not that benefit himself. And had it been their own case, would perhaps have replied, If the tast of this Fruit maketh the eaters like Gods, why remainest thou a Beast? If it maketh us but like Gods, we are so already. If thereby our eyes shall be opened hereafter, they are at present quick enough, to discover thy deceit; and we desire them no opener, to behold our own shame. If to know good and evil be our

advantage, although we have Freewill unto both, we desire to perform but one; We know 'tis good to obey the commandment of God, but evil if we transgress it.

Adam supposed by some to have been the wisest man that ever was.

They were deceived by one another, and in the greatest disadvantage of Delusion, that is, the stronger by the weaker: For Eve presented the Fruit, and Adam received it from her. Thus the Serpent was cunning enough, to begin the deceit in the weaker, and the weaker of strength, sufficient to consummate the fraud in the stronger. Art and fallacy was used unto her; a naked offer proved sufficient unto him: So his superstruction was his Ruine, and the fertility of his Sleep an issue of Death unto him. And although the condition of Sex, and posteriority of Creation, might somewhat extenuate the Error of the Woman: Yet was it very strange and inexcusable in the Man; especially, if as some affirm, he was the wisest of all men since; or if, as others have conceived, he was not ignorant of the Fall of the Angels, and had thereby Example and punishment to deter him.

Adam and Eve how they fell.

They were deceived from themselves, and their own apprehensions; for Eve either mistook, or traduced the commandment of God. Of every Tree of the Garden thou mayest freely eat, but of the Tree of knowledge of good and evil thou shalt not eat: for in the day thou eatest thereof, thou shalt surely die. Now Eve upon the question of the Serpent, returned the Precept in different terms: You shall not eat of it, neither shall you touch it, less perhaps you die. In which delivery, there were no less than two mistakes, or rather additional mendacities; for the Commandment forbad not the touch of the Fruit; and positively said, Ye shall surely die: but she extenuating, replied, ne fortè moriamini, lest perhaps ye die. For so in the vulgar translation it runneth, and so it is expressed in the Thargum or Paraphrase of Jonathan. And therefore although it be said, and that very truly, that the Devil was a lyer from the beginning, yet was the Woman herein the first express beginner: and falsified twice, before the reply of Satan. And therefore also, to speak strictly, the sin of the Fruit was not the first Offence: They first transgressed the Rule of their own Reason; and after the Commandment of God.

They were deceived through the Conduct of their Senses, and by Temptations from the Object it self; whereby although their intellectuals had not failed in the Theory of truth, yet did the inservient and brutal Faculties controll the suggestion of Reason: Pleasure and Profit already overswaying the instructions of Honesty, and Sensuality perturbing the reasonable commands of Vertue. For so it is delivered in the Text: That when the Woman saw, that the Tree was good for food, and that it was pleasant unto the eye, and a Tree to be desired to make one wise, she took of the fruit thereof and did eat. Now hereby it appeareth, that Eve, before the Fall, was by the same and beaten away of

allurements inveigled, whereby her posterity hath been deluded ever since; that is, those three delivered by St. John, The lust of the flesh, the lust of the eye, and the pride of life: Where indeed they seemed as weakly to fail, as their debilitated posterity, ever after. Whereof notwithstanding, some in their imperfection, have resisted more powerful temptations; and in many moralities condemned the facility of their seductions.

Adam whence (probably) induced to eat. Whether Cain intended to kill Abel.

Again, they might, for ought we know, be still deceived in the unbelief of their Mortality, even after they had eat of the Fruit: For, Eve observing no immediate execution of the Curse, she delivered the Fruit unto Adam: who, after the tast thereof, perceiving himself still to live, might yet remain in doubt, whether he had incurred Death; which perhaps he did not indubitably believe, until he was after convicted in the visible example of Abel. For he that would not believe the Menace of God at first, it may be doubted whether, before an ocular example, he believed the Curse at last. And therefore they are not without all reason, who have disputed the Fact of Cain: that is, although he purposed to do mischief, whether he intended to kill his Brother; or designed that, whereof he had not beheld an example in his own kind. There might be somewhat in it, that he would not have done, or desired undone, when he brake forth as desperately, as before he had done uncivilly, My iniquity is greater than can be forgiven me.

The Thalmudist's Allegories upon the History of Adam and Eve's Fall.

Some nicities I confess there are which extenuate, but many more that aggravate this Delusion; which exceeding the bounds of this Discourse, and perhaps our Satisfaction, we shall at present pass over. And therefore whether the Sin of our First Parents were the greatest of any since; whether the transgression of Eve seducing, did not exceed that of Adam seduced; or whether the resistibility of his Reason, did not equivalence the facility of her Seduction; we shall refer it to the Schoolman; Whether there was not in Eve as great injustice in deceiving her husband, as imprudence in being deceived her self; especially, if foretasting the Fruit, her eyes were opened before his, and she knew the effect of it, before he tasted of it; we leave it unto the Moralist. Whether the whole relation be not Allegorical, that is, whether the temptation of the Man by the Woman, be not the seduction of the rational and higher parts by the inferiour and feminine faculties; or whether the Tree in the midst of the Garden, were not that part in the Center of the body, in which was afterward the appointment of Circumcision in Males, we leave it unto the Thalmudist. Whether there were any Policy in the Devil to tempt them before the Conjunction, or whether the Issue before tentation, might in justice have suffered with those after, we leave it unto the Lawyer. Whether Adam foreknew the advent of Christ, or the reparation of his Error by his Saviour; how the execution of the Curse should have been ordered, if, after Eve had eaten, Adam had yet refused. Whether if they had tasted the Tree of life, before that of Good and Evil, they had yet suffered the

curse of Mortality: or whether the efficacy of the one had not overpowered the penalty of the other, we leave it unto God. For he alone can truly determine these, and all things else; Who as he hath proposed the World unto our disputation, so hath he reserved many things unto his own resolution; whose determination we cannot hope from flesh, but must with reverence suspend unto that great Day, whose justice shall either condemn our curiosities, or resolve our disquisitions.

Lastly, Man was not only deceivable in his Integrity, but the Angels of light in all their Clarity. He that said, He would be like the highest did erre, if in some way he conceived himself so already: but in attempting so high an effect from himself, he misunderstood the nature of God, and held a false apprehension of his own; whereby vainly attempting not only insolencies, but impossibilities, he deceived himself as low as Hell. In brief, there is nothing infallible but God, who cannot possibly erre. For things are really true as they correspond unto his conception; and have so much verity as they hold of conformity unto that Intellect, in whose Idea they had their first determinations. And therefore being the Rule, he cannot be Irregular; nor, being Truth it self, conceaveably admit the impossible society of Error.

## CHAPTER II

### **A further Illustration of the same.**

Being thus deluded before the Fall, it is no wonder if their conceptions were deceitful, and could scarce speak without an Error after. For, what is very remarkable (and no man that I know hath yet observed) in the relations of Scripture before the Flood, there is but one speech delivered by Man, wherein there is not an erroneous conception; and, strictly examined, most hainously injurious unto truth. The pen of Moses is brief in the account before the Flood, and the speeches recorded are but six. The first is that of Adam, when upon the expostulation of God, he replied; I heard thy voice in the Garden, and because I was naked I hid my self. In which reply, there was included a very gross Mistake, and, if with pertinacity maintained, a high and capital Error. For thinking by this retirement to obscure himself from God, he infringed the omniscieny and essential Ubiquity of his Maker, Who as he created all things, so is he beyond and in them all, not only in power, as under his subjection, or in his presence, as being in his cognition; but in his very Essence, as being the soul of their causalities, and the essential cause of their existencies. Certainly, his posterity at this distance and after so perpetuated an impairment, cannot but condemn the poverty of his conception, that thought to obscure himself from his Creator in the shade of the Garden, who had beheld him before in the darkness of his Chaos, and the great obscurity of Nothing; that thought to fly from God, which could not fly himself; or imagined that one tree should conceal his nakedness from Gods eye, as another had revealed it unto his own. Those tormented Spirits that wish the mountains to cover them, have fallen upon desires of minor absurdity, and chosen ways of less improbable concealment. Though this be also as ridiculous unto reason, as fruitless unto their desires; for he that laid the foundations of the Earth, cannot be excluded the secrecy of the Mountains; nor can there any thing escape the perspicacity of those eyes which were before light, and in whose opticks there is no opacity. This is the consolation of all good men, unto whom his Ubiquity affordeth continual comfort and security: And this is the affliction of Hell, unto whom it affordeth despair, and remediless calamity. For those restless Spirits that fly the face of the Almighty, being deprived the fruition of his eye, would also avoid the extent of his hand; which being impossible, their sufferings are desperate, and their afflictions without evasion; until they can get out of Trismegistus his Circle, that is, to extend their wings above the Universe, and pitch beyond Ubiquity.

The Second is that Speech of Adam unto God; The woman whom thou gavest me to be with me, she gave me of the Tree, and I did eat. This indeed was an unsatisfactory reply, and therein was involved a very impious Error, as implying God the Author of sin, and accusing his Maker of his transgression. As if he had said, If thou hadst not given me a woman, I had not been deceived: Thou promisedst to make her a help, but she hath proved destruction unto me: Had I remained alone, I had not sinned; but thou gavest

me a Consort, and so I became seduced. This was a bold and open accusation of God, making the fountain of good, the contriver of evil, and the forbiddor of the crime an abettor of the fact prohibited. Surely, his mercy was great that did not revenge the impeachment of his justice; And his goodness to be admired, that it refuted not his argument in the punishment of his excusation, and only pursued the first transgression without a penalty of this the second.

The third was that of Eve; The Serpent beguiled me, and I did eat. In which reply, there was not only a very feeble excuse, but an erroneous translating her own offence upon another; Extenuating her sin from that which was an aggravation, that is, to excuse the Fact at all, much more upon the suggestion of a beast, which was before in the strictest terms prohibited by her God. For although we now do hope the mercies of God will consider our degenerated integrities unto some minoration of our offences; yet had not the sincerity of our first parents so colourable expectations, unto whom the commandment was but single, and their integrities best able to resist the motions of its transgression. And therefore so heinous conceptions have risen hereof, that some have seemed more angry therewith, than God himself: Being so exasperated with the offence, as to call in question their salvation, and to dispute the eternal punishment of their Maker. Assuredly with better reason may posterity accuse them than they the Serpent or one another; and the displeasure of the Pelagians must needs be irreconcilable, who peremptorily maintaining they can fulfil the whole Law, will insatisfactorily condemn the nonobservation of one.

The Devill knew not our Saviour to be God when he tempted him.

The fourth, was that speech of Cain upon the demand of God, Where is thy brother? and he said, I know not. In which Negation, beside the open impudence, there was implied a notable Error; for returning a lie unto his Maker, and presuming in this manner to put off the Searcher of hearts, he denied the omniscieny of God, whereunto there is nothing concealable. The answer of Satan in the case of Job, had more of truth, wisdom, and Reverence, this; Whence comest thou Satan? and he said, From compassing of the Earth. For though an enemy of God, and hater of all Truth, his wisdom will hardly permit him to falsifie with the Allmighty. For well understanding the Omniscience of his nature, he is not so ready to deceive himself, as to falsifie unto him whose cognition is no way deludable. And therefore when in the tentation of Christ he played upon the fallacy, and thought to deceive the Author of Truth, the Method of this proceeding arose from the uncertainty of his Divinity; whereof had he remained assured, he had continued silent; nor would his discretion attempt so unsucceedable a temptation. And so again at the last day, when our offences shall be drawn into accompt, the subtilty of that Inquisitor shall not present unto God a bundle of calumnies or confutable accusations, but will discreetly offer up unto his Omniscieny, a true and undeniable list of our transgressions.

The fifth is another reply of Cain upon the denouncement of his curse, My iniquity is greater then can be forgiven: For so it is expressed in some Translations. The assertion was not only desperate, but the conceit erroneous, overthrowing that glorious Attribute of God, his Mercy, and conceiving the sin of murder unpardonable. Which how great soever, is not above the repentance of man; but far below the mercies of God, and was (as some conceive) expiated in that punishment he suffered temporally for it. There are but two examples of this error in holy Scripture, and they both for Murder, and both as it were of the same person; for Christ was mystically slain in Abel, and therefore Cain had some influence on his death as well as Judas; but the sin had a different effect on Cain, from that it had on Judas; and most that since have fallen into it. For they like Judas desire death, and not unfrequently pursue it: Cain on the contrary grew afraid thereof, and obtained a securement from it. Assuredly, if his despair continued, there was punishment enough in life, and Justice sufficient in the mercy of his protection. For the life of the desperate equals the anxieties of death; who in uncessant inquietudes but act the life of the damned, and anticipate the desolations of Hell. 'Tis indeed a sin in man, but a punishment only in Devils, who offend not God but afflict themselves, in the appointed despair of his mercies. And as to be without hope is the affliction of the damned, so is it the happiness of the blessed; who having all their expectations present, are not distracted with futurities: So is it also their felicity to have no Faith; for enjoying the beatifical vision, there is nothing unto them inevident; and in the fruition of the object of Faith, they have received the full evacuation of it.

Cain, as the Rabbins think, was the man slain by Lamech, Gen. , .

The last speech was that of Lamech, I have slain a man to my wound, and a young man in my hurt: If Cain be avenged seven fold, truly Lamech seventy and seven fold. Now herein there seems to be a very erroneous Illation: from the Indulgence of God unto Cain, concluding an immunity unto himself; that is, a regular protection from a single example, and an exemption from punishment in a fact that naturally deserved it. The Error of this offender was contrary to that of Cain, whom the Rabbins conceive that Lamech at this time killed. He despaired in Gods mercy in the same Fact, where this presumed of it; he by a decollation of all hope annihilated his mercy, this by an immoderancy thereof destroyed his Justice. Though the sin were less, the Error was as great; For as it is untrue, that his mercy will not forgive offenders, or his benignity cooperate to their conversions; So is it also of no less falsity to affirm His justice will not exact account of sinners, or punish such as continue in their transgressions.

Thus may we perceive, how weakly our fathers did Erre before the Floud, how continually and upon common discourse they fell upon Errors after; it is therefore no wonder we have been erroneous ever since. And being now at greatest distance from the beginning of Error, are almost lost in its dissemination, whose waies are boundless, and confess no circumscription.



### **CHAPTER III**

#### **Of the second cause of Popular Errors; the erroneous disposition of the People.**

Having thus declared the infallible nature of Man even from his first production, we have beheld the general cause of Error. But as for popular Errors, they are more neerly founded upon an erroneous inclination of the people; as being the most deceptable part of Mankind and ready with open armes to receive the encroachments of Error. Which condition of theirs although deducible from many Grounds, yet shall we evidence it but from a few, and such as most neerly and undeniably declare their natures.

How unequal discerners of truth they are, and openly exposed unto Error, will first appear from their unqualified intellectuals, unable to umpire the difficulty of its dissensions. For Error, to speak largely, is a false judgment of things, or, an assent unto falsity. Now whether the object whereunto they deliver up their assent be true or false, they are incompetent judges.

For the assured truth of things is derived from the principles of knowledge, and causes which determine their verities. Whereof their uncultivated understandings, scarce holding any theory, they are but bad discerners of verity; and in the numerous track of Error, but casually do hit the point and unity of truth.

Arguments of sensitive quality most prevailing upon vulgar capacities.

Their understanding is so feeble in the discernment of falsities, and averting the Errors of reason, that it submitteth unto the fallacies of sense, and is unable to rectifie the Error of its sensations. Thus the greater part of Mankind having but one eye of Sense and Reason, conceive the Earth far bigger than the Sun, the fixed Stars lesser than the Moon, their figures plain, and their spaces from Earth equidistant. For thus their Sense informeth them, and herein their reason cannot Rectifie them; and therefore hopelesly continuing in mistakes, they live and die in their absurdities; passing their days in perverted apprehensions, and conceptions of the World, derogatory unto God, and the wisdom of the Creation.

Again, being so illiterate in the point of intellect, and their sense so incorrected, they are farther indisposed ever to attain unto truth; as commonly proceeding in those wayes, which have most reference unto sense, and wherein there lyeth most notable and popular delusion.

For being unable to wield the intellectuall arms of reason, they are fain to betake themselves unto wasters, and the blunter weapons of truth: affecting the gross and sensible ways of Doctrine, and such as will not consist with strict and subtile Reason.

Fable. Thus unto them a piece of Rhetorick is a sufficient argument of Logick; an Apologue of Esop, beyond a Syllogism in Barbara; parables than propositions, and proverbs more powerful than demonstrations. And therefore are they led rather by Example, than Precept; receiving perswasions from visible inducements, before electual instructions. And therefore also they judge of human actions by the event; for being uncapable of operable circumstances, or rightly to judge the prudentiality of affairs, they only gaze upon the visible success, and therefore condemn or cry up the whole progression. And so from this ground in the Lecture of holy Scripture, their apprehensions are commonly confined unto the literal sense of the Text, from whence have ensued the gross and duller sort of Heresies. For not attaining the deuteroscopia, and second intention of the words, they are faine to omit the Superconsequencies, Coherencies, Figures, or Tropologies; and are not sometime perswaded by fire beyond their literalities. And therefore also things invisible, but into intellectual discernments, to humour the grossness of their comprehensions, have been degraded from their proper forms, and God Himself dishonoured into manual expressions. And so likewise being unprovided, or unsufficient for higher speculations, they will alwayes betake themselves unto sensible representations, and can hardly be restrained the dulness of Idolatry: A sin or folly not only derogatory unto God but men; overthrowing their Reason, as well as his Divinity. In brief, a reciprocation, or rather, an inversion of the Creation, making God one way, as he made us another; that is, after our Image, as he made us after His own.

Moreover, their understanding thus weak in it self, and perverted by sensible delusions, is yet farther impaired by the dominion of their appetite; that is, the irrational and brutal part of the soul, which lording it over the sovereign faculty, interrupts the actions of that noble part, and choaks those tender sparks, which Adam hath left them of reason. And therefore they do not only swarm with Errors, but vices depending thereon. Thus they commonly affect no man any further than he deserts his reason, or complies with their aberrancies. Hence they imbrace not vertue for it self, but its reward; and the argument from pleasure or Utility is far more powerful, than that from vertuous Honesty: which Mahomet and his contrivers well understood, when he set out the felicity of his Heaven, by the contentments of flesh, and the delights of sense, slightly passing over the accomplishment of the Soul, and the beatitude of that part which Earth and visibilities too weakly affect. But the wisdom of our Saviour, and the simplicity of his truth proceeded another way; defying the popular provisions of happiness from sensible expectations; placing his felicity in things removed from sense, and the intellectual enjoyment of God. And therefore the doctrine of the one was never afraid of Universities, or endeavoured the banishment of learning, like the other. And though Galen doth sometimes nibble at Moses, and, beside the Apostate Christian, Julian. some Heathens have questioned his Philosophical part, or treaty of the Creation: Yet is there surely no reasonable Pagan, that will not admire the rational and well grounded

precepts of Christ; whose life, as it was conformable unto his Doctrine, so was that unto the highest rules of Reason; and must therefore flourish in the advancement of learning, and the perfection of parts best able to comprehend it.

Again, Their individual imperfections being great, they are moreover enlarged by their aggregation; and being erroneous in their single numbers, once huddled together, they will be Error it self. For being a confusion of knaves and fools, and a farraginous concurrence of all conditions, tempers, sexes, and ages; it is but natural if their determinations be monstrous, and many wayes inconsistent with Truth. And therefore wise men have alwaies applauded their own judgment, in the contradiction of that of the people; and their soberest adversaries, have ever afforded them the stile of fools and mad men; and, to speak impartially, their actions have made good these Epithets. *Non sani esse hominis, non sanus juret Orestes.* Had Orestes been Judge, he would not have acquitted that Lystrian rabble of madness, who, upon a visible miracle, falling into so high a conceit of Paul and Barnabas, that they termed the one Jupiter, the other Mercurius; that they brought Oxen and Garlands, and were hardly restrained from sacrificing unto them; did notwithstanding suddenly after fall upon Paul, and having stoned him drew him for dead out of the City. It might have hazarded the sides of Democritus, had he been present at that tumult of Demetrius; when the people flocking together in great numbers, some crying one thing, and some another, and the assembly was confused, and the most part knew not wherefore they were come together; notwithstanding, all with one voice for the space of two hours cried out, *Great is Diana of the Ephesians.* It had overcome the patience of Job, as it did the meekness of Moses, and would surely have mastered any, but the longanimity, and lasting sufferance of God; had they beheld the Mutiny in the wilderness, when, after ten great Miracles in Egypt, and some in the same place, they melted down their stoln earrings into a Calf, and monstrously cried out; *These are thy Gods, O Israel, that brought thee out of the land of Egypt.* It much accuseth the impatience of Peter, who could not endure the staves of the multitude, and is the greatest example of lenity in our Saviour, when he desired of God forgiveness unto those, who having one day brought him into the City in triumph, did presently after, act all dishonour upon him, and nothing could be heard but, *Crucifige,* in their Courts. Certainly he that considereth these things in God's peculiar people will easily discern how little of truth there is in the wayes of the Multitude; and though sometimes they are flattered with that Aphorism, will hardly believe, *The voice of the people to be the voice of God.*

Lastly, being thus divided from truth in themselves, they are yet farther removed by advenient deception. For true it is (and I hope I shall not offend their vulgarities,) if I say, they are daily mocked into Error by subtler devisors, and have been expressly deluded by all professions and ages. Thus the Priests of Elder time, have put upon them many incredible conceits, not only deluding their apprehensions with Ariolation,

Southsaying, and such oblique Idolatries, but winning their credulities unto the literal and down right adoration of Cats, Lizzards, and Beetles. And thus also in some Christian Churches, wherein is presumed an irreprovable truth, if all be true that is suspected, or half what is related; there have not wanted many strange deceptions, and some thereof are still confessed by the name of Pious Frauds. Thus Theudas an Impostor was able to lead away Four thousand into the Wilderness. and the delusions of Mahomet almost the fourth part of Mankind. Thus all Heresies, how gross soever, have found a welcome with the people. For thus, many of the Jews were wrought into belief that Herod was the Messiah; and David George of Leyden and Arden, were not without a party amongst the people, who maintained the same opinion of themselves almost in our days.

The Author's Censure upon Judgment by Urine.

Physitians (many at least that make profession thereof) beside divers less discoverable wayes of fraud, have made them believe, there is the book of fate, or the power of Aarons breastplate, in Urins. And therefore hereunto they have recourse, as unto the Oracle of life, the great determinator of Virginitie, Conception, Fertility, and the Inscrutable infirmities of the whole Body. For as though there were a seminality in Urine, or that, like the Seed, it carried with it the Idea of every part, they foolishly conceive, we visibly behold therein the Anatomy of every particle, and can thereby indigitate their Diseases: And running into any demands, expect from us a sudden resolution in things, whereon the Devil of Delphos would demurr; and we know hath taken respite of some dayes to answer easier questions.

Places in Venice and Paris, where Mountebanks play their pranks.

Saltimbancoes, Quacksalvers, and Charlatans, deceive them in lower degrees. Were Esop alive, the Piazza and PontNeuf could not but speak their fallacies; mean while there are too many, whose cries cannot conceal their mischief. For their Impostures are full of cruelty, and worse than any other; deluding not only unto pecuniary defraudations, but the irreparable deceit of death.

Astrologers, which pretend to be of Cabala with the Starrs (such I mean as abuse that worthy Enquiry) have not been wanting in their deceptions; who having won their belief unto principles whereof they make great doubt themselves, have made them believe that arbitrary events below, have necessary causes, above; whereupon their credulities assent unto any Prognosticks; and daily swallow the Predictions of men, which, considering the independency of their causes, and contingency in their Events, are only in the prescience of God.

Fortunetellers, Juglers, Geomancers, and the like incantory Impostors, though commonly men of Inferiour rank, and from whom without Illumination they can expect no more than from themselves, do daily and professedly delude them. Unto whom (what is deplorable in Men and Christians) too many applying themselves, betwixt jest and earnest, betray the cause of Truth, and sensibly make up the legionary body of Error.

The people of Rome, why never suffered to know the right name of their City.

Statists and Politicians, unto whom *Ragione di Stato*, is the first Considerable, as though it were their business to deceive the people, as a Maxim, do hold, that truth is to be concealed from them; unto whom although they reveal the visible design, yet do they commonly conceal the capital intention. And therefore have they ever been the instruments of great designes, yet seldom understood the true intention of any, accomplishing the drifts of wiser heads, as inanimate and ignorant Agents, the general design of the World; who though in some Latitude of sense, and in a natural cognition perform their proper actions, yet do they unknowingly concurr unto higher ends, and blindly advance the great intention of Nature. Now how far they may be kept in ignorance a greater example there is in the people of Rome; who never knew the true and proper name of their own City. For, beside that common appellation received by the Citizens, it had a proper and secret name concealed from them: *Cujus alterum nomen discere secretis Ceremoniarum nefas habetur*, saith Plinie; lest the name thereof being discovered unto their enemies, their Penates and Patronal God might be called forth by charms and incantations. For according unto the tradition of Magitians, the tutelary Spirits will not remove at common appellations, but at the proper names of things whereunto they are Protectors.

Thus having been deceived by themselves, and continually deluded by others, they must needs be stuffed with Errors, and even overrun with these inferiour falsities; whereunto whosoever shall resign their reasons, either from the Root of deceit in themselves, or inability to resist such trivial deceptions from others, although their condition and fortunes may place them many Spheres above the multitude; yet are they still within the line of Vulgarity, and Democratical enemies of truth.

## CHAPTER IV

Of the nearer and more Immediate Causes of popular Errors, both in the wiser and common sort, Misapprehension, Fallacy, or false Deduction, Credulity, Supinity, Adherence unto Antiquity, Tradition and Authority.

The belief of Centaures whence occasioned.

The first is a mistake, or a misconception of things, either in their first apprehensions, or secondary relations. So Eve mistook the Commandment, either from the immediate injunction of God, or from the secondary narration of her Husband. So might the Disciples mistake our Saviour, in his answer unto Peter concerning the death of John, as is delivered, John . Peter seeing John, said unto Jesus, Lord, and what shall this man do? Jesus saith, If I will, that he tarry till I come, what is that unto thee? Then went this saying abroad among the brethren, that that Disciple should not die. Thus began the conceit and opinion of the Centaures: that is, in the mistake of the first beholders, as is declared by Servius; when some young Thessalians on horseback were beheld afar off, while their horses watered, that is, while their heads were depressed, they were conceived by the first Spectators, to be but one animal; and answerable hereunto have their pictures been drawn ever since.

Equivocation and Amphibologie, how they differ.

And, as simple mistakes commonly beget fallacies, so men rest not in false apprehensions, without absurd and inconsequent deductions; from fallacious foundations, and misapprehended mediums, erecting conclusions no way inferrible from their premises. Now the fallacies whereby men deceive others, and are deceived themselves, the Ancients have divided into Verbal and Real. Of the Verbal, and such as conclude from mistakes of the Word, although there be no less than six, yet are there but two thereof worthy our notation, and unto which the rest may be referred; that is the fallacy of Equivocation and Amphibology which conclude from the ambiguity of some one word, or the ambiguous Syntaxis of many put together. From this fallacy arose that calamitous Error of the Jews, misapprehending the Prophecies of their Messias, and expounding them alwayes unto literal and temporal expectations. By this way many Errors crept in and perverted the Doctrine of Pythagoras, whilst men received his Precepts in a different sense from his intention; converting Metaphors into proprieties, and receiving as literal expressions, obscure and involved truths. Pythagoras, his Allegorical precepts moralized. Thus when he enjoyned his Disciples, an abstinence from Beans, many conceived they were with severity debarred the use of that pulse; which notwithstanding could not be his meaning; for as Aristoxenus, who wrote his life averreth, he delighted much in that kind of food himself. But herein, as Plutarch observeth, he had no other intention than to dissuade men from Magistracy, or

undertaking the publick offices of state; for by beans was the Magistrate elected in some parts of Greece; and, after his daies, we read in Thucydides, of the Council of the bean in Athens. πᾶν δεῖλοι κυμῶν ἄπο χειρας ἔχεσθε. The same word also in Greek doth signifie a Testicle, and hath been thought by some an injunction only of Continency, as Aul. Gellius hath expounded, and as Empedocles may also be interpreted: that is, Testiculis miseri dextras subducite; and might be the original intention of Pythagoras; as having a notable hint hereof in Beans, from the natural signature of the venereal organs of both Sexes. Again, his injunction is, not to harbour Swallows in our Houses: Whose advice notwithstanding we do not contemn, who daily admit and cherish them: For herein a caution is only implied, not to entertain ungrateful and thankless persons, which like the Swallow are no way commodious unto us; but having made use of our habitations, and served their own turns, forsake us. So he commands to deface the Print of a Cauldron in the ashes, after it hath boiled. Which strictly to observe were condemnable superstition: But hereby he covertly adviseth us not to persevere in anger; but after our choler hath boiled, to retain no impression thereof. In the like sense are to be received, when he adviseth his Disciples to give the right hand but to few, to put no viands in a Chamberpot, not to pass over a Balance, not to rake up fire with a Sword, or piss against the Sun. Which ænigmatical deliveries comprehend useful verities, but being mistaken by literal Expositors at the first, they have been misunderstood by most since, and may be occasion of Error to Verbal capacities for ever.

This fallacy in the first delusion Satan put upon Eve, and his whole tentation might be the same continued; so when he said, Ye shall not die, that was, in his equivocation, ye shall not incurr a present death, or a destruction immediately ensuing your transgression. Your eyes shall be opened; that is, not to the enlargement of your knowledge, but discovery of your shame and proper confusion; You shall know good and evil; that is, you shall have knowledge of good by its privation, but cognisance of evil by sense and visible experience. And the same fallacy or way of deceit, so well succeeding in Paradise, he continued in his Oracles through all the World. Which had not men more warily understood, they might have performed many acts inconsistent with his intention. Brutus might have made haste with Tarquine to have kissed his own Mother. The Athenians might have built them wooden Walls, or doubled the Altar at Delphos.

The circle of this fallacy is very large; and herein may be comprised all Ironical mistakes, for intended expressions receiving inverted significations; all deductions from Metaphors, Parables, Allegories, unto real and rigid interpretations. De hæresibus. Whereby have risen not only popular Errors in Philosophy, but vulgar and senseless Heresies in Divinity; as will be evident unto any that shall examine their foundations, as they stand related by Epiphanius, Austin, or Prateolus.

Other wayes there are of deceit; which consist not in false apprehension of Words, that is, Verbal expressions or sentential significations, but fraudulent deductions, or

inconsequent illations, from a false conception of things. Of these extradictionary and real fallacies, Aristotle and Logicians make in number six, but we observe that men are most commonly deceived by four thereof: those are, *Petitio principii*, *A dicto secundum quid ad dictum simpliciter*, *A non causa pro causa*; And, *fallacia consequentis*.

The first is, *Petitio principii*. Which fallacy is committed, when a question is made a medium, or we assume a medium as granted, whereof we remain as unsatisfied as of the question. Briefly, where that is assumed as a Principle to prove another thing, which is not conceded as true it self. By this fallacy was Eve deceived, when she took for granted, a false assertion of the Devil; Ye shall not surely die; for God doth know that in the day ye shall eat thereof, your eyes shall be opened, and you shall be as Gods. Which was but a bare affirmation of Satan, without proof or probable inducement, contrary unto the command of God, and former belief of her self. And this was the Logick of the Jews when they accused our Saviour unto Pilate; who demanding a reasonable impeachment, or the allegation of some crime worthy of Condemnation; they only replied, If he had not been worthy of Death, we would not have brought Him before thee. Wherein there was neither accusation of the person, nor satisfaction of the Judge; who well understood, a bare accusation was not presumption of guilt, and the clamours of the people no accusation at all. The same Fallacy is sometime used in the dispute, between Job and his friends; they often taking that for granted which afterward he disproveth.

The second is, *A dicto secundum quid ad dictum simpliciter*, when from that which is but true in a qualified sense, an unconditional and absolute verity is inferred; transferring the special consideration of things unto their general acceptions, or concluding from their strict acception, unto that without all limitation. This fallacy men commit when they argue from a particular to a general; as when we conclude the vices or qualities of a few, upon a whole Nation. Or from a part unto the whole. Thus the Devil argues with our Saviour: and by this, he would perswade Him he might be secure, if he cast himself from the Pinnacle: For, said he, it is written, He shall give his Angels charge concerning thee, and in their hands they shall bear thee up, lest at any time thou dash thy foot against a stone. Psal. . But this illation was fallacious, leaving one part of the Text, He shall keep thee in all thy wayes; that is, in the wayes of righteousness, and not of rash attempts: so he urged a part for the whole, and inferred more in the conclusion, than was contained in the premises. By the same fallacy we proceed, when we conclude from the sign unto the thing signified. By this incroachment, Idolatry first crept in, men converting the symbolical use of Idols into their proper Worship, and receiving the representation of things as the substance and thing it self. So the Statue of Belus at first erected in his memory, was in aftertimes adored as a Divinity. The Original of Idolatry. And so also in the Sacrament of the Eucharist, the Bread and Wine which were but the signals or visible signs, were made the things signified, and worshipped as the Body of Christ. And hereby generally men are deceived that take things spoken in some Latitude



without any at all. Hereby the Jews were deceived concerning the commandment of the Sabbath, accusing our Saviour for healing the sick, and his Disciples for plucking the ears of Corn upon that day. And by this deplorable mistake they were deceived unto destruction, upon the assault of Pompey the great, made upon that day; by whose superstitious observation they could not defend themselves, or perform any labour whatever.

The Alcoran endures neither Wine nor Universities.

The third is, A non causa pro causa, when that is pretended for a cause which is not, or not in that sense which is inferred. Upon this consequence the law of Mahomet forbids the use of Wine; and his Successors abolished Universities. By this also many Christians have condemned literature, misunderstanding the counsel of Saint Paul, who adviseth no further than to beware of Philosophy. On this Foundation were built the conclusions of Southsayers in their Augurial, and Tripudiary divinations; collecting presages from voice or food of Birds, and conjoyning Events unto causes of no connection. Hereupon also are grounded the gross mistakes, in the cure of many diseases: not only from the last medicine, and sympathetical Receipts, but Amulets, Charms, and all incantatory applications; deriving effects not only from inconcurring causes, but things devoid of all efficiency whatever.

The fourth is, the Fallacy of the Consequent; which if strictly taken, may be a fallacious illation in reference unto antecedency, or consequence; as to conclude from the position of the antecedent to the position of the consequent, or from the remotion of the consequent to the remotion of the antecedent. This is usually committed, when in connexed Propositions the Terms adhere contingently. This is frequent in Oratory illations; and thus the Pharisees, because He conversed with Publicans and Sinners, accused the holiness of Christ. But if this Fallacy be largely taken, it is committed in any vicious illation, offending the rules of good consequence; and so it may be very large, and comprehend all false illations against the settled Laws of Logick: But the most usual inconsequencies are from particulars, from negatives, and from affirmative conclusions in the second figure, wherein indeed offences are most frequent, and their discoveries not difficult.

## CHAPTER V

### Of Credulity and Supinity.

A third cause of common Errors is the Credulity of men, that is, an easie assent to what is obtruded, or a believing at first ear, what is delivered by others. This is a weakness in the understanding, without examination assenting unto things, which from their Natures and Causes do carry no perswasion; whereby men often swallow falsities for truths, dubiosities for certainties, feasibilities for possibilities, and things impossible as possibilities themselves. Which, though the weakness of the Intellect, and most discoverable in vulgar heads; yet hath it sometime fallen upon wiser brains, and greater advancers of Truth. Thus many wise Athenians so far forgot their Philosophy, and the nature of humane production, that they descended unto belief, that the original of their Nation was from the Earth, and had no other beginning than the seminality and womb of their great Mother. Thus is it not without wonder, how those learned Arabicks so tamely delivered up their belief unto the absurdities of the Alcoran. How the noble Geber, Avicenna, and Almanzor, should rest satisfied in the nature and causes of Earthquakes, delivered from the doctrine of their Prophet; that is, from the motion of a great Bull, upon whose horns all the earth is poised. How their faiths could decline so low, as to concede their generations in Heaven, to be made by the smell of a Citron, or that the felicity of their Paradise should consist in a Jubile of copulation, that is, a coition of one act prolonged unto fifty years. Thus is it almost beyond wonder, how the belief of reasonable creatures, should ever submit unto Idolatry: and the credulity of those men scarce credible (without presumption of a second Fall) who could believe a Deity in the work of their own hands. For although in that ancient and diffused adoration of Idols, unto the Priests and subtiler heads, the worship perhaps might be symbolical, and as those Images some way related unto their Deities; yet was the Idolatry direct and downright in the People; whose credulity is illimitable, who may be made believe that any thing is God; and may be made believe there is no God at all.

Obstinate and irrational Scepticism, justly censured.

And as Credulity is the cause of Error, so Incredulity oftentimes of not enjoying truth; and that not only an obstinate incredulity, whereby we will not acknowledge assent unto what is reasonably inferred, but any Academical reservation in matters of easie truth, or rather sceptical infidelity against the evidence of reason and sense. For these are conceptions befalling wise men, as absurd as the apprehensions of fools, and the credulity of the people which promiscuously swallow any thing. For this is not only derogatory unto the wisdom of God, who hath proposed the World unto our knowledge, and thereby the notion of Himself; but also detractory unto the intellect, and sense of man expressly disposed for that inquisition. And therefore, *hoc tantum scio, quod nihil scio*, is not to be received in an absolute sense, but is comparatively expressed unto the

number of things whereof our knowledge is ignorant. Nor will it acquit the insatisfaction of those which quarrel with all things, or dispute of matters, concerning whose verities we have conviction from reason, or decision from the inerrable and requisite conditions of sense. And therefore if any affirm, the earth doth move, and will not believe with us, it standeth still; because he hath probable reasons for it, and I no infallible sense, nor reason against it, I will not quarrel with his assertion. But if, like Zeno, he shall walk about, and yet deny there is any motion in Nature, surely that man was constituted for Anticera, and were a fit companion for those, who having a conceit they are dead, cannot be convicted into the society of the living.

The fourth is a Supinity, or neglect of Enquiry, even of matters whereof we doubt; rather believing, than going to see; or doubting with ease and gratis, than believing with difficulty or purchase. Whereby, either from a temperamental inactivity, we are unready to put in execution the suggestions or dictates of reason; or by a content and acquiescence in every species of truth, we embrace the shadow thereof, or so much as may palliate its just and substantial acquirements. Had our foreFathers sat down in these resolutions, or had their curiosities been sedentary, who pursued the knowledge of things through all the corners of nature, the face of truth had been obscure unto us, whose lustre in some part their industries have revealed.

Certainly the sweat of their labours was not salt unto them, and they took delight in the dust of their endeavours. For questionless, in Knowledge there is no slender difficulty; and Truth, which wise men say doth lye in a Well, is not recoverable by exantlation. It were some extenuation of the Curse, if in sudore vultus tui were confinable unto corporal exercitations, and there still remained a Paradise, or unthorny place of knowledge. But now our understandings being eclipsed, as well as our tempers infirmed, we must betake our selves to wayes of reparation, and depend upon the illumination of our endeavours. For, thus we may in some measure repair our primary ruines, and build our selves Men again. And though the attempts of some have been precipitous, and their Enquiries so audacious, as to come within command of the flaming swords, and lost themselves in attempts above humanity; yet have the Enquiries of most defected by the way, and tired within the sober circumference of Knowledge.

And this is the reason, why some have transcribed any thing; and although they cannot but doubt thereof, yet neither make Experiment by sense, or Enquiry by reason; but live in doubts of things, whose satisfaction is in their own power; which is indeed the inexcusable part of our ignorance, and may perhaps fill up the charge of the last day. For, not obeying the dictates of Reason, and neglecting the cries of Truth, we fail not only in the trust of our undertakings, but in the intention of man it self. Which although more venial in ordinary constitutions, and such as are not framed beyond the capacity of beaten notions, yet will inexcusably condemn some men, who having received excellent endowments, have yet sate down by the way, and frustrated the intention of their

liabilities. For certainly, as some men have sinned in the principles of humanity, and must answer, for not being men, so others offend, if they be not more. *Magis extra vitia, quam cum virtutibus*, would commend those: These are not excusable without an Excellency. For, great constitutions, and such as are constellated unto knowledge, do nothing till they outdo all; they come short of themselves, if they go not beyond others; and must not sit down under the degree of Worthies. God expects no lustre from the minor Stars; but if the Sun should not illuminate all, it were a sin in Nature. *Ultimus bonorum*, will not excuse every man, nor is it sufficient for all to hold the common level: *Mens* names should not only distinguish them: A man should be something, that men are not, and individual in somewhat beside his proper Name. Thus while it exceeds not the bounds of reason and modesty, we cannot condemn singularity, *Nos numerus sumus*, is the Motto of the multitude, and for that reason are they Fools. For things as they recede from unity, the more they approach to imperfection, and Deformity; for they hold their perfection in their Simplicities, and as they nearest approach unto God.

Universities why many times full of Scholars, and empty of Learning. The natural genius or inclination, have much to be regarded in the choice of a Profession.

Now as there are many great Wits to be condemned, who have neglected the increment of Arts, and the sedulous pursuit of knowledge; so are there not a few very much to be pitied, whose industry being not attended with natural parts, they have sweat to little purpose, and rolled the stone in vain. Which chiefly proceedeth from natural incapacity, and genial indisposition, at least, to those particulars whereunto they apply their endeavours. And this is one reason why, though Universities be full of men, they are oftentimes empty of learning: Why, as there are some men do much without learning, so others but little with it, and few that attain to any measure of it. For many heads that undertake it, were never squared, nor timber'd for it. There are not only particular men, but whole Nations indisposed for learning; whereunto is required, not only education, but a pregnant Minerva, and teeming Constitution. For the Wisdom of God hath divided the Genius of men according to the different affairs of the World: and varied their inclination according to the variety of Actions to be performed therein. Which they who consider not, rudely rushing upon professions and ways of life, unequal to their natures; dishonour, not only themselves and their Functions, but pervert the harmony of the whole World. For, if the World went on as God hath ordained it, and were every one employed in points concordant to their Natures, Professions; Arts and Commonwealths would rise up of themselves; nor needed we a Lanthorn to find a man in Athens.

## CHAPTER VI

### Of adherence unto Antiquity.

Immoderate respect unto Antiquity, a general cause of Error.

But the mortallest enemy unto Knowledge, and that which hath done the greatest execution upon truth, hath been a peremptory adhesion unto Authority, and more especially, the establishing of our belief upon the dictates of Antiquity. For (as every capacity may observe) most men of Ages present, so superstitiously do look on Ages past, that the Authorities of the one, exceed the reasons of the other: Whose persons indeed being far removed from our times, their works, which seldom with us pass uncontroled, either by contemporaries, or immediate successors, are now become out of the distance of Envy: and the farther removed from present times, are conceived to approach the nearer unto truth it self. Now hereby methinks we manifestly delude our selves, and widely walk out of the track of Truth.

For first, Men hereby impose a Thralldom on their Times, which the ingenuity of no Age should endure, or indeed, the presumption of any did ever yet enjoyn. Thus Hippocrates about years ago, conceived it no injustice, either to examine or refute the Doctrines of his Predecessors: Galen the like, and Aristotle the most of any. Yet did not any of these conceive themselves infallible, or set down their dictates as verities irrefragable, but when they deliver their own Inventions, or reject other mens Opinions, they proceed with Judgment and Ingenuity; establishing their assertion, not only with great solidity, but submitting them also unto the correction of future discovery.

Secondly, Men that adore times past, consider not that those times were once present; that is, as our own are at this instant, and we our selves unto those to come, as they unto us at present, as we relye on them, even so will those on us, and magnifie us hereafter, who at present condemn our selves. Which very absurdity is daily committed amongst us, even in the esteem and censure of our own times. And to speak impartially, old Men, from whom we should expect the greatest example of Wisdom, do most exceed in this point of folly; commending the days of their youth, which they scarce remember, at least well understood not; extolling those times their younger years have heard their Fathers condemn, and condemning those times the gray heads of their posterity shall commend. And thus is it the humour of many heads, to extol the days of their Forefathers, and declaim against the wickedness of times present. Which notwithstanding they cannot handsomly do, without the borrowed help and Satyrs of times past; condemning the vices of their own times, by the expressions of vices in times which they commend; which cannot but argue the community of vice in both. Horace therefore, Juvenal, and Persius were no Prophets, although their lines did seem to indigitate and point at our times. There is a certain list of vices committed in all Ages, and declaimed against by all

Authors, which will last as long as humane nature; which digested into common places, may serve for any Theme, and never be out of date until Doomsday.

Thirdly, The Testimonies of Antiquity and such as pass oraculously amongst us, were not, if we consider them, always so exact, as to examine the doctrine they delivered. For some, and those the acutest of them, have left unto us many things of falsity; controlable, not only by critical and collective reason, but common and Country observation.

Hereof there want not many examples in Aristotle, through all his Book of Animals; we shall instance onely in three of his Problems, and all contained under one Section. The first enquireth, why a Man doth cough, but not an Oxe or Cow; whereas, notwithstanding the contrary is often observed by Husbandmen, and stands confirmed by those who have expressly treated *De Re Rustica*, and have also delivered divers remedies for it. Why Juments, as Horses, Oxen, and Asses, have no eructation or belching, whereas indeed the contrary is often observed, and also delivered by Columella. And thirdly, Why Man alone hath gray hairs? whereas it cannot escape the eyes, and ordinary observation of all men, as Horses, Dogs, and Foxes, wax gray with age in our Countries; and in the colder Regions, many other Animals without it. And though favourable constructions may somewhat extenuate the rigour of these concessions, yet will scarce any palliate that in the fourth of his *Meteors*, that Salt is easiest dissolvable in cold water: Nor that of *Diascorides*, that Quicksilver is best preserved in Vessels of Tin and Lead.

Other Authors write often dubiously even in matters wherein is expected a strict and definite truth; extenuating their affirmations, with *aiunt*, *ferunt*, *fortasse*: as *Diascorides*, *Galen*, *Aristotle*, and many more. Others by hearsay; taking upon trust most they have delivered, whose Volumes are nicer Collections, drawn from the mouths or leaves of other Authors; as may be observed in *Plinie*, *Elian*, *Athenæus*, and many more. Not a few transcriptively, subscribing their Names unto other mens endeavours, and meerly transcribing almost all they have written. The Latines transcribing the Greeks, the Greeks and Latines, each other.

The Antiquity, and some notable instances of Plagiarism, that is, of transcribing or filching Authors.

Thus hath Justine borrowed all from *Trogus Pompeius*, and *Julius Solinus*, in a manner transcribed *Plinie*. Thus have *Lucian* and *Apuleius* served *Lucius Pratensis*: men both living in the same time, and both transcribing the same Author, in those famous Books, entituled *Lucius* by the one, and *Aureus Asinus* by the other. In the same measure hath *Simocrates* in his *Tract De Nilo*, dealt with *Diodorus Siculus*, as may be observed in that work annexed unto *Herodotus*, and translated by *Jungermannus*. Thus *Eratosthenes*

wholly translated Timotheus de Insulis, not reserving the very Preface. The same doth Strabo report of Eudorus, and Ariston, in a Treatise entituled De Nilo. Clemens Alexandrinus hath observed many examples hereof among the Greeks; and Pliny speaketh very plainly in his Preface, that conferring his Authors, and comparing their works together, he generally found those that went before verbatim transcribed, by those that followed after, and their Originals never so much as mentioned. His Metamorphosis. To omit how much the wittiest piece of Ovid is beholden unto Parthenius Chius; even the magnified Virgil hath borrowed, almost in all his Works; his Eclogues from Theocritus, his Georgicks from Hesiod and Aratus, his Æneads from Homer, the second Book whereof containing the exploit of Sinon and the Trojan Horse (as Macrobius observeth) he hath verbatim derived from Pisander. Our own Profession is not excusable herein. Thus Oribasius, Ætius, and Ægineta, have in a manner transcribed Galen. But Marcellus Empericus, who hath left a famous Work De Medicamentis, hath word for word transcribed all Scribonius Largus, De Compositione Medicamentorum, and not left out his very Peroration. Thus may we perceive the Ancients were but men, even like our selves. The practice of transcription in our days, was no Monster in theirs: Plagiarie had not its Nativity with Printing, but began in times when thefts were difficult, and the paucity of Books scarce wanted that Invention.

Nor did they only make large use of other Authors, but often without mention of their names. Aristotle, who seems to have borrowed many things from Hippocrates, in the most favourable construction, makes mention but once of him, and that by the by, and without reference unto his present Doctrine. In his Politicks. Virgil, so much beholding unto Homer, hath not his name in all his Works: and Plinie, who seems to borrow many Authors out of Dioscorides, hath taken no notice of him. I wish men were not still content to plume themselves with others Feathers. Fear of discovery, not single ingenuity affords Quotations rather than Transcriptions; wherein notwithstanding the Plagiarisme of many makes little consideration, whereof though great Authors may complain, small ones cannot but take notice.

Fourthly, While we so eagerly adhere unto Antiquity, and the accounts of elder times, we are to consider the fabulous condition thereof. An ancient Author who writ *Περὶ ἀπίστων*, sive de incredibilibus, whereof some part is yet extant. And that we shall not deny, if we call to mind the Mendacity of Greece, from whom we have received most relations, and that a considerable part of ancient Times, was by the Greeks themselves termed *μυθικόν*, that is, made up or stuffed out with Fables. And surely the fabulous inclination of those days, was greater then any since; which swarmed so with Fables, and from such slender grounds, took hints for fictions, poysoning the World ever after; wherein how far they exceeded, may be exemplified from Palephatus, in his Book of Fabulous Narrations. The Fable of Orpheus his Harp, etc. whence occasioned. That Fable of Orpheus who by the melody of his Musick, made Woods and Trees to follow

him, was raised upon a slender foundation; for there were a crew of mad women, retired unto a Mountain from whence being pacified by his Musick, they descended with boughs in their hands, which unto the fabulosity of those times proved a sufficient ground to celebrate unto all posterity the Magick of Orpheus Harp, and its power to attract the senseless Trees about it. That Medea the famous Sorceress could renew youth, and make old men young again, was nothing else, but that from the knowledge of Simples she had a Receipt to make white hair black, and reduce old heads, into the tincture of youth again. The Fable of Gerion and Cerberus with three heads, was this: Gerion was of the City Tricarinia, that is, of three heads, and Cerberus of the same place was one of his Dogs, which running into a Cave upon pursuit of his Masters Oxen, Hercules perforce drew him out of that place, from whence the conceits of those days affirmed no less, then that Hercules descended into Hell, and brought up Cerberus into the habitation of the living. Upon the like grounds was raised the figment of Briareus, who dwelling in a City called Hecatonchiria, the fancies of those times assigned him an hundred hands. 'Twas ground enough to fansie wings unto Dædalus, in that he stole out of a Window from Minos, and sailed away with his son Icarus: who steering his course wisely, escaped; but his son carrying too high a sail was drowned. That Niobe weeping over her children, was turned into a Stone, was nothing else, but that during her life she erected over their Sepultures a Marble Tomb of her own. When Acteon had undone himself with Dogs, and the prodigal attendants of hunting, they made a solemn story how he was devoured by his Hounds. And upon the like grounds was raised the Anthropophagie of Diomedes his horses. Eating of Mans flesh. Upon as slender foundation was built the Fable of the Minotaure; for one Taurus a servant of Minos gat his Mistris Pasiphae with child, from whence the Infant was named Minotaurus. Now this unto the fabulosity of those times was thought sufficient to accuse Pasiphae of Beastiality, or admitting conjunction with a Bull; and in succeeding ages gave a hint of depravity unto Domitian to act the Fable into reality. In like manner, as Diodorus plainly delivereth, the famous Fable of Charon had its Nativity; who being no other but the common Ferryman of Egypt, that wafted over the dead bodies from Memphis, was made by the Greeks to be the Ferryman of Hell, and solemn stories raised after of him. Lastly, we shall not need to enlarge, if that be true which grounded the generation of Castor and Helen out of an Egg, because they were born and brought up in an upper room, according unto the Word ὤον, which with the Lacedemonians had also that signification.

Fifthly, We applaud many things delivered by the Ancients, which are in themselves but ordinary, and come short of our own Conceptions. Thus we usually extol, and our Orations cannot escape the sayings of the wise men of Greece. Nosce teipsum, of Thales: Nosce tempus, of Pittacus: Nihil nimis, of Cleobulus; which notwithstanding to speak indifferently, are but vulgar precepts in Morality, carrying with them nothing above the line, or beyond the extemporary sententiousness of common conceits with us. Thus we



magnifie the Apothegms or reputed replies of Wisdom, whereof many are to be seen in Laertius, more in Lycosthenes, not a few in the second Book of Macrobius, in the salts of Cicero, Augustus, and the Comical wits of those times: in most whereof there is not much to admire, and are methinks exceeded, not only in the replies of wise men, but the passages of society, and urbanities of our times. And thus we extol their Adages, or Proverbs; and Erasmus hath taken great pains to make collections of them, whereof notwithstanding, the greater part will, I believe, unto indifferent Judges be esteemd no extraordinaries: and may be parallel'd, if not exceeded, by those of more unlearned Nations, and many of our own.

A pedantical vanity to quote Authors in matters of common sense or of familiar acknowledgement.

Sixthly, We urge Authorities in points that need not, and introduce the testimony of ancient Writers, to confirm things evidently believed, and whereto no reasonable hearer but would assent without them; such as are, *Nemo mortalium omnibus horis sapit. Virtute nil præstantius, nil pulchrius. Omnia vincit amor. Præclarum quiddam veritas.* All which, although things known and vulgar, are frequently urged by many men, and though trivial verities in our mouths, yet, noted from Plato, Ovid, or Cicero, they become reputed elegancies. For many hundred to instance but in one we meet with while we are writing. Antonius Guevara that elegant Spaniard, in his Book entituled, *The Dial of Princes*, beginneth his Epistle thus. Apolonius Thyaneus, disputing with the Scholars of Hiarchas, said, that among all the affections of nature, nothing was more natural, then the desire all have to preserve life. Which being a confessed Truth, and a verity acknowledged by all, it was a superfluous affectation to derive its Authority from Apolonius, or seek a confirmation thereof as far as India, and the learned Scholars of Hiarchas. Which whether it be not all one to strengthen common Dignities and Principles known by themselves, with the Authority of Mathematicians; or think a man should believe, the whole is greater then its parts, rather upon the Authority of Euclide, then if it were propounded alone; I leave unto the second and wiser cogitations of all men. 'Tis sure a Practice that savours much of Pedantry; a reserve of Puerility we have not shaken off from School; where being seasoned with Minor sentences, by a neglect of higher Enquiries, they prescribe upon our riper ears, and are never worn out but with our Memories.

Some remarkable mistakes among the Ancients.

Lastly, While we so devoutly adhere unto Antiquity in some things, we do not consider we have deserted them in several others. For they indeed have not onely been imperfect, in the conceit of some things, but either ignorant or erroneous in many more. They understood not the motion of the eighth sphear from West to East, and so conceived the longitude of the Stars invariable. They conceived the torrid Zone uninhabitable, and so

made frustrate the goodliest part of the Earth. But we now know 'tis very well empeopled, and the habitation thereof esteemed so happy, that some have made it the proper seat of Paradise; and been so far from judging it uninhabitable, that they have made it the first habitation of all. Many of the Ancients denied the Antipodes, and some unto the penalty of contrary affirmations; but the experience of our enlarged navigations, can now assert them beyond all dubitation. Having thus totally relinquisht them in some things, it may not be presumptuous, to examine them in others; but surely most unreasonable to adhere to them in all, as though they were infallible, or could not err in any way.

## CHAPTER VII

### Of Authority.

Nor is onely a resolved prostration unto Antiquity a powerful enemy unto knowledge, but any confident adherence unto Authority, or resignation of our judgements upon the testimony of Age or Author whatsoever.

Authority (simply) but a mean argument especially.

For first, to speak generally an argument from Authority to wiser examinations, is but a weaker kind of proof; it being but a topical probation, and as we term it, an inartificial argument, depending upon a naked asseveration: wherein neither declaring the causes, affections or adjuncts of what we believe, it carrieth not with it the reasonable inducements of knowledge. And therefore, *Contra negantem principia, Ipse dixit*, or *Oportet discentem credere*, although Postulates very accommodable unto Junior indoctrinations; yet are their Authorities but temporary, and not to be imbraced beyond the minority of our intellectuals. For our advanced beliefs are not to be built upon dictates, but having received the probable inducements of truth, we become emancipated from testimonial engagements, and are to erect upon the surer base of reason.

Secondly, Unto reasonable perpensions it hath no place in some Sciences, small in others, and suffereth many restrictions, even where it is most admitted. In the Mathematicks. It is of no validity in the Mathematicks, especially the mother part thereof, Arithmetick and Geometry. For these Sciences concluding from dignities and principles known by themselves: receive not satisfaction from probable reasons, much less from bare and peremptory asseverations. And therefore if all Athens should decree, that in every Triangle, two sides, which soever be taken, are greater then the side remaining, or that in rectangle triangles the square which is made of the side that subtendeth the right angle, is equal to the squares which are made of the sides containing the right angle: although there be a certain truth therein, Geometricians notwithstanding would not receive satisfaction without demonstration thereof. 'Tis true, by the vulgarity of Philosophers, there are many points believed without probation; nor if a man affirm from Ptolomy, that the Sun is bigger then the Earth, shall he probably meet with any contradiction: whereunto notwithstanding Astronomers will not assent without some convincing argument or demonstrative proof thereof. And therefore certainly of all men a Philosopher should be no swearer; for an oath which is the end of controversies in Law, cannot determine any here; nor are the deepest Sacraments or desperate imprecations of any force to perswade, where reason only, and necessary mediums must induce.

In Natural Philosophy more generally pursued amongst us, it carrieth but slender consideration; And Physick. for that also proceeding from settled Principles, therein is expected a satisfaction from scientificall progressions, and such as beget a sure rational belief. For if Authority might have made out the assertions of Philosophy, we might have held that Snow was black, that the Sea was but the sweat of the Earth, and many of the like absurdities. Then was Aristotle injurious to fall upon Melissus, to reject the assertions of Anaxagoras, Anaximander, and Empedocles; then were we also ungrateful unto himself; from whom our Junior endeavours embracing many things on his authority, our mature and secondary enquiries, are forced to quit those receptions, and to adhere unto the nearer account of Reason. And although it be not unusual, even in Philosophical Tractates to make enumeration of Authors, yet are there reasons usually introduced, and to ingenious Readers do carry the stroke in the perswasion. And surely if we account it reasonable among our selves, and not injurious unto rational Authors, no farther to abet their Opinions then as they are supported by solid Reasons: certainly with more excusable reservation may we shrink at their bare testimonies; whose argument is but precarious, and subsists upon the charity of our assentments.

In Morality, Rhetorick, Law and History, there is I confess a frequent and allowable use of testimony; and yet herein I perceive, it is not unlimitable, but admitteth many restrictions. Thus in Law both Civil and Divine: that is onely esteemed a legal testimony, which receives comprobatation from the mouths of at least two witnesses; and that not only for prevention of calumny, but assurance against mistake; whereas notwithstanding the solid reason of one man, is as sufficient as the clamor of a whole Nation; and with imprejudicate apprehensions begets as firm a belief as the authority or aggregated testimony of many hundreds. For reason being the very root of our natures, and the principles thereof common unto all, what is against the Laws of true reason, or the unerring understanding of any one, if rightly apprehended; must be disclaimed by all Nations, and rejected even by mankind.

Again, A testimony is of small validity if deduced from men out of their own profession; so if Lactantius affirm the Figure of the Earth is plain, or Austin deny there are Antipodes; though venerable Fathers of the Church, and ever to be honoured, yet will not their Authorities prove sufficient to ground a belief thereon. Whereas notwithstanding the solid reason or confirmed experience of any man, is very approvable in what profession soever. So Raymund Sebund a Physitian of Tholouze, besides his learned Dialogues De Natura Humana, hath written a natural Theologie; demonstrating therein the Attributes of God, and attempting the like in most points of Religion. So Hugo Grotius a Civilian, did write an excellent Tract of the verity of Christian Religion. Wherein most rationally delivering themselves, their works will be embraced by most that understand them, and their reasons enforce belief even from prejudicate Readers. Neither indeed have the Authorities of men been ever so awful; but

that by some they have been rejected, even in their own professions. Thus Aristotle affirming the birth of the Infant or time of its gestation, extendeth sometimes unto the eleventh Month, but Hippocrates, averring that it exceedeth not the tenth: Adrian the Emperour in a solemn process, determined for Aristotle; but Justinian many years after, took in with Hippocrates and reversed the Decree of the other. Thus have Councils, not only condemned private men, but the Decrees and Acts of one another. So Galen after all his veneration of Hippocrates, in some things hath fallen from him. Avicen in many from Galen; and others succeeding from him. And although the singularity of Paracelsus be intolerable, who sparing onely Hippocrates, hath reviled not onely the Authors, but almost all the learning that went before him; yet is it not much less injurious unto knowledge obstinately and convincibly to side with any one. Which humour unhappily possessing many, they have by prejudice withdrawn themselves into parties, and contemning the sovereignty of truth, seditiously abetted the private divisions of error.

Moreover a testimony in points Historical, and where it is of unavoidable use, is of no illation in the negative, nor is it of consequence that Herodotus writing nothing of Rome, there was therefore no such City in his time; or because Dioscorides hath made no mention of Unicorns horn, there is therefore no such thing in Nature. Indeed, intending an accurate enumeration of Medical materials, the omission hereof affords some probability, it was not used by the Ancients, but will not conclude the nonexistence thereof. For so may we annihilate many Simples unknown to his enquiries, as Senna, Rhubarb, Bezoar, Ambregris, and divers others. Whereas indeed the reason of man hath not such restraint; concluding not onely affirmatively but negatively; not onely affirming there is no magnitude beyond the last heavens, but also denying there is any vacuity within them. Although it be confessed, the affirmative hath the prerogative illation, and Barbara engrosseth the powerful demonstration.

Lastly, The strange relations made by Authors, may sufficiently discourage our adherence unto Authority; and which if we believe we must be apt to swallow any thing. Thus Basil will tell us, the Serpent went erect like Man, and that that Beast could speak before the Fall. Tostatus would make us believe that Nilus encreaseth every new Moon. Leonardo Fioravanti an Italian Physitian, beside many other secrets, assumeth unto himself the discovery of one concerning Pellitory of the Wall; that is, that it never groweth in the sight of the North star. *Doue si possa vedere la stella Tramontana*, wherein how wide he is from truth, is easily discoverable unto every one, who hath but Astronomy enough to know that Star. Franciscus Sanctius in a laudable Comment upon Alciats Emblems, affirmeth, and that from experience, a Nightingale hath no tongue. *Avem Philomelam lingua carere pro certo affirmare possum, nisi me oculi fallunt*. Which if any man for a while shall believe upon his experience, he may at his leisure refute it by his own. What fool almost would believe, at least, what wise man would relie upon that Antidote delivered by Pierius in his Hieroglyphicks against the sting of a

Scorpion? that is, to sit upon an Ass with ones face toward his tail; for so the pain leaveth the Man, and passeth into the Beast. It were methinks but an uncomfortable receipt for a Quartane Ague (and yet as good perhaps as many others used) to have recourse unto the Recipe of Sammonicus; that is, to lay the fourth Book of Homers Iliads under ones head, according to the precept of that Physitian and Poet, Mæoniæ Iliados quartum suppone trementi. An eye medicine. There are surely few that have belief to swallow, or hope enough to experiment the Collyrium of Albertus; which promiseth a strange effect, and such as Thieves would count inestimable, that is, to make one see in the dark: yet thus much, according unto his receipt, will the right eye of an Hedgehog boiled in oyl, and preserved in a brazen vessel effect. As strange it is, and unto vicious inclinations were worth a nights lodging with Lais, what is delivered in Kiranides; Ten thousand drachms. that the left stone of a Weesel, wrapt up in the skin of a she Mule, is able to secure incontinency from conception.

These with swarms of others have men delivered in their Writings, whose verities are onely supported by their authorities: But being neither consonant unto reason, nor correspondent unto experiment, their affirmations are unto us no axioms: We esteem thereof as things unsaid, and account them but in the list of nothing. I wish herein the Chymists had been more sparing: who overmagnifying their preparations, inveigle the curiosity of many, and delude the security of most. For if experiments would answer their encomiums, the Stone and Quartane Agues were not opprobrious unto Physitians: we might contemn that first and most uncomfortable Aphorism of Hippocrates, *Ars longa vita brevis*. for surely that Art were soon attained, that hath so general remedies; and life could not be short, were there such to prolong it.

## CHAPTER VIII

### A brief enumeration of Authors.

Now for as much as we have discoursed of Authority, and there is scarce any tradition or popular error but stands also delivered by some good Author; we shall endeavour a short discovery of such, as for the major part have given authority hereto: who though excellent and useful Authors, yet being either transcriptive, or following common relations, their accounts are not to be swallowed at large, or entertained without all circumspection. In whom the ipse dixit, although it be no powerful argument in any, is yet less authentick then in many other, because they deliver not their own experiences, but others affirmations, and write from others, as later pens from them.

The Authors judgement, or a character given of some eminent Authors.

. The first in order, as also in time shall be Herodotus of Halicarnassus, an excellent and very elegant Historian; whose Books of History were so well received in his own days, and at their rehearsal in the Olympick games, they obtained the names of the nine Muses; and continued in such esteem unto descending Ages, that Cicero termed him, Historiarum parens. And Dionysius his Countryman, in an Epistle to Pompey, after an express comparison, affords him the better of Thucydides; all which notwithstanding, he hath received from some, the stile of Mendaciorum pater. His Authority was much infringed by Plutarch, who being offended with him, as Polybius had been with Philarcus for speaking too coldly of his Countrymen, hath left a particular Tract, De malignitate Herodoti. But in this latter Century, Camerarius and Stephanus have stepped in, and by their witty Apologies, effectually endeavoured to frustrate the Arguments of Plutarch, or any other. Now in this Author, as may be observed in our ensuing discourse, and is better discernable in the perusal of himself, there are many things fabulously delivered, and not to be accepted as truths: whereby nevertheless if any man be deceived, the Author is not so culpable as the Believer. For he indeed imitating the Father Poet, whose life he hath also written, and as Thucydides observeth, as well intending the delight as benefit of his Reader, hath besprinkled his work with many fabulosities; whereby if any man be led into error, he mistaketh the intention of the Author, who plainly confesseth he writeth many things by hearsay, and forgetteth a very considerable caution of his; that is, *Ego quæ fando cognovi, exponere narratione mea debeo omnia: credere autem esse vera omnia, non debeo.*

. In the second place is Ctesias: the Cnidian, Physitian unto Artaxerxes King of Persia, his Books are often recited by ancient Writers, and by the industry of Stephanus and Rhodomanus, there are extant some fragments thereof in our days; he wrote the History of Persia, and many narrations of India. In the first, as having a fair opportunity to know the truth, and as Diodorus affirmeth the perusal of Persian Records, his testimony is

acceptable. In his Indian Relations, wherein are contained strange and incredible accounts, he is surely to be read with suspension. These were they which weakned his authority with former ages; for as we may observe, he is seldom mentioned, without a derogatory Parenthesis in any Author. Aristotle besides the frequent undervaluing of his authority, in his Books of Animals gives him the lie no less then twice, concerning the seed of Elephants. Strabo in his eleventh Book hath left a harder censure of him. Equidem facilius Hesiodo & Homero, aliquis fidem adhibuerit, itémque Tragicis Poetis, quam Ctesiae, Herodoto, Hellanico & eorum similibus. But Lucian hath spoken more plainer then any. Scripsit Ctesias de Indorum regione, deque iis quæ apud illos sunt, ea quæ nec ipse vidit, neque ex ullius sermone audivit. Yet were his relations taken up by some succeeding Writers, and many thereof revived by our Countryman, Sir John Mandevil, Knight, and Doctor in Physick; who after thirty years peregrination died at Liege, and was there honourably interred. He left a Book of his Travels, which hath been honoured with the translation of many Languages, and now continued above three hundred years; herein he often attesteth the fabulous relations of Ctesias, and seems to confirm the refuted accounts of Antiquity. All which may still be received in some acceptions of morality, and to a pregnant invention, may afford commendable mythologie; but in a natural and proper exposition, it containeth impossibilities, and things inconsistent with truth.

. There is a Book De mirandis auditionibus, ascribed unto Aristotle; another De mirabilibus narrationibus, written long after by Antigonus, another also of the same title by Plegon Trallianus, translated by Xilander, and with the Annotations of Meursius, all whereof make good the promise of their titles, and may be read with caution. Which if any man shall likewise observe in the Lecture of Philostratus, concerning the life of Apollonius, and even in some passages of the sober and learned Plutarchus; or not only in ancient Writers, but shall carry a wary eye on Paulus Venetus, Jovius, Olaus Magnus, Nierembergius, and many other: I think his circumspection is laudable, and he may thereby decline occasion of Error.

A like opinion there is now of Elder.

Dioscorides Anazarbeus, he wrote many Books in Physick, but six thereof De Materia Medica, have found the greatest esteem: he is an Author of good antiquity and use, preferred by Galen before Cratevas, Pamphilus, and all that attempted the like description before him; yet all he delivereth therein is not to be conceived Oraculous. For beside that, following the wars under Anthony, the course of his life would not permit a punctual Examen in all; there are many things concerning the nature of Simples, traditionally delivered, and to which I believe he gave no assent himself. It had been an excellent Receit, and in his time when Saddles were scarce in fashion of very great use, if that were true which he delivers, that Vitex, or Agnus Castus held only in the hand, preserveth the rider from galling. It were a strange effect, and Whores would



forsake the experiment of Savine, if that were a truth which he delivereth of Brake or female Fearn, that onely treading over it, it causeth a sudden abortion. It were to be wished true, and women would idolize him, could that be made out which he recordeth of Phyllon, Mercury, and other vegetables, that the juice of the male Plant drunk, or the leaves but applied unto the genitals, determines their conceptions unto males. In these relations although he be more sparing, his predecessors were very numerous; and Galen hereof most sharply accuseth Pamphilus. Many of the like nature we meet sometimes in Oribasius, Ætius, Trallianus, Serapion, Evax, and Marcellus, whereof some containing no colour of verity, we may at first sight reject them; others which seem to carry some face of truth, we may reduce unto experiment. And herein we shall rather perform good offices unto truth, then any disservice unto their relators, who have well deserved of succeeding Ages; from whom having received the conceptions of former Times, we have the readier hint of their conformity with ours, and may accordingly explore and sift their verities.

Plinius Natural History collected out of several Authors.

Plinius Secundus of Verona; a man of great Eloquence, and industry indefatigable, as may appear by his writings, especially those now extant, and which are never like to perish, but even with learning it self; that is, his Natural History. He was the greatest Collector or Rhapsodist of the Latines, and as Suetonius observeth, he collected this piece out of two thousand Latine and Greek Authors. Now what is very strange, there is scarce a popular error passant in our days, which is not either directly expressed, or diductively contained in this Work; which being in the hands of most men, hath proved a powerful occasion of their propagation. Wherein notwithstanding the credulity of the Reader, is more condemnable than the curiosity of the Author: for commonly he nameth the Authors from whom he received those accounts, and writes but as he reads, as in his Preface to Vespasian he acknowledgeth.

Claudius Ælianus, who flourished not long after in the reign of Trajan, unto whom he dedicated his Tacticks; an elegant and miscellaneous Author, he hath left two Books which are in the hands of every one, his History of Animals, and his Varia Historia. Wherein are contained many things suspicious, not a few false, some impossible; he is much beholding unto Ctesias, and in many uncertainties writes more confidently then Pliny.

Julius Solinus, who lived also about his time: He left a Work entituled Polyhistor, containing great variety of matter, and is with most in good request at this day. But to speak freely what cannot be concealed, it is but Pliny varied, or a transcription of his Natural History: nor is it without all wonder it hath continued so long, but is now likely, and deserves indeed to live for ever; not onely for the elegancy of the Text, but the

excellency of the Comment, lately performed by Salmasius, under the name of Plinian Exercitations.

Athenæs, a delectable Author, very various, and justly stiled by Casaubon, Græcorum Plinius. There is extant of his, a famous Piece, under the name of Deipnosophista, or Coena Sapientum, containing the Discourse of many learned men, at a Feast provided by Laurentius. It is a laborious Collection out of many Authors, and some whereof are mentioned no where else. It containeth strange and singular relations, not without some spice or sprinkling of all Learning. The Author was probably a better Grammarian then Philosopher, dealing but hardly with Aristotle and Plato, and betrayeth himself much in his Chapter De Curiositate Aristotelis. In brief, he is an Author of excellent use, and may with discretion be read unto great advantage: and hath therefore well deserved the Comments of Casaubon and Dalecampius. But being miscellaneous in many things, he is to be received with suspition; for such as amass all relations, must erre in some, and may without offence be unbelieved in many.

That write Hexameters, or long verses.

We will not omit the works of Nicander, a Poet of good antiquity: that is, his Theriaca, and Alexipharmaca, Translated and Commented by Gorræus: for therein are contained several Traditions, and popular Conceits of venemous Beasts; which only deducted, the Work is to be embraced, as containing the first description of poysons and their antidotes, whereof Dioscorides, Pliny, and Galen, have made especial use in elder times; and Ardoynus, Grevinus, and others, in times more near our own. We might perhaps let pass Oppianus, that famous Cilician Poet. There are extant of his in Greek, four Books of Cynegeticks or Venation, five of Halieuticks or Piscation, commented and published by Ritterhusius; wherein describing Beasts of venery and Fishes, he hath indeed but sparingly inserted the vulgar conceptions thereof. So that abating the annual mutation of Sexes in the Hyæna, the single Sex of the Rhinoceros, the Antipathy between two Drums, of a Lamb and a Wolfes skin, the infirmity of Cubs, the venation of Centaures, the copulation of the Murena and the Viper, with some few others, he may be read with great delight and profit. It is not without some wonder his Elegant Lines are so neglected. Surely hereby we reject one of the best Epick Poets, and much condemn the Judgement of Antoninus, whose apprehensions so honoured his Poems, that as some report, for every verse, he assigned him a Stater of Gold.

More warily are we to receive the relations of Philes, who in Greek Iambicks delivered the proprieties of Animals, for herein he hath amassed the vulgar accounts recorded by the Ancients, and hath therein especially followed Ælian. And likewise Johannes Tzetzes, a Grammarian, who besides a Comment upon Hesiod and Homer, hath left us Chiliads de Varia Historia; wherein delivering the accounts of Ctesias, Herodotus, and most of the Ancients, he is to be embraced with caution, and as a transcriptive Relator.

We cannot without partiality omit all caution even of holy Writers, and such whose names are venerable unto all posterity: not to meddle at all with miraculous Authors, or any Legendary relators, we are not without circumspection to receive some Books even of authentick and renowned Fathers. So are we to read the leaves of Basil and Ambrose, in their Books entituled Hexameron, or The Description of the Creation; Wherein delivering particular accounts of all the Creatures, they have left us relations sutable to those of Ælian, Plinie, and other Natural Writers; whose authorities herein they followed, and from whom most probably they desumed their Narrations. And the like hath been committed by Epiphanius, in his Physiologie: that is, a Book he hath left concerning the Nature of Animals. With no less caution must we look on Isidor Bishop of Sevil; who having left in twenty Books, an accurate work De Originibus, hath to the Etymologie of Words, superadded their received Natures; wherein most generally he consents with common Opinions and Authors which have delivered them.

Albertus Bishop of Ratisbone, for his great Learning and latitude of Knowledge, sirnamed Magnus. Besides Divinity, he hath written many Tracts in Philosophy; what we are chiefly to receive with caution, are his Natural Tractates, more especially those of Minerals, Vegetables, and Animals, which are indeed chiefly Collections out of Aristotle, Ælian, and Pliny, and respectively contain many of our popular Errors. A man who hath much advanced these Opinions by the authority of his Name, and delivered most Conceits, with strict Enquiry into few. In the same Classis may well be placed Vincentius Belluacensis, or rather he from whom he collected his Speculum naturale, that is, Guilielmus de Conchis; and also Hortus Sanitatis, and Bartholomeus Glanvil, sirnamed Anglicus, who writ De proprietatibus Rerum. Hither also may be referred Kiranides, which is a Collection out of Harpocraton the Greek, and sundry Arabick Writers; delivering not onely the Natural but Magical propriety of things; a Work as full of Vanity as Variety; containing many relations, whose Invention is as difficult as their Beliefs, and their Experiments sometime as hard as either.

We had almost forgot Jeronimus Cardanus that famous Physician of Milan, a great Enquirer of Truth, but too greedy a Receiver of it. He hath left many excellent Discourses, Medical, Natural, and Astrological; the most suspicious are those two he wrote by admonition in a dream, that is De Subtilitate & Varietate Rerum. Assuredly this learned man hath taken many things upon trust, and although examined some, hath let slip many others. He is of singular use unto a prudent Reader; but unto him that onely desireth Hoties, or to replenish his head with varieties; like many others before related, either in the Original or confirmation, he may become no small occasion of Error.

Lastly, Authors are also suspicious, not greedily to be swallowed, who pretend to write of Secrets, to deliver Antipathies, Sympathies, and the occult abstrusities of things; in the list whereof may be accounted, Alexis Pedimontanus, Antonius Mizaldus, Trinum

Magicum, and many others. Not omitting that famous Philosopher of Naples, Baptista Porta; in whose Works, although there be contained many excellent things, and verified upon his own Experience; yet are there many also receptary, and such as will not endure the test. Who although he hath delivered many strange Relations in his Phytognomia, and his Villa; yet hath he more remarkably expressed himself in his Natural Magick, and the miraculous effects of Nature. Which containing various and delectable subjects, withall promising wondrous and easie effects, they are entertained by Readers at all hands; whereof the major part sit down in his authority, and thereby omit not onely the certainty of Truth, but the pleasure of its Experiment.

Thus have we made a brief enumeration of these Learned Men; not willing any to decline their Works (without which it is not easie to attain any measure of general Knowledge,) but to apply themselves with caution thereunto. And seeing the lapses of these worthy Pens, to cast a wary eye on those diminutive, and pamphlet Treaties daily published amongst us. Pieces maintaining rather Typography than Verity, Authors presumably writing by Common Places, wherein for many years promiscuously amassing all that makes for their subject, they break forth at last in trite and fruitless Rhapsodies; doing thereby not only open injury unto Learning, but committing a secret treachery upon truth. For their relations falling upon credulous Readers, they meet with prepared beliefs; whose supinities had rather assent unto all, then adventure the trial of any.

Thus, I say, must these Authors be read, and thus must we be read our selves; for discoursing of matters dubious, and many convertible truths; we cannot without arrogancy entreat a credulity, or implore any farther assent, then the probability of our Reasons, and verity of experiments induce.

## CHAPTER IX

Of the Same.

There are beside these Authors and such as have positively promoted errors, divers other which are in some way accessory; whose verities although they do not directly assert, yet do they obliquely concur unto their beliefs. In which account are many holy Writers, Preachers, Moralists, Rhetoricians, Orators and Poets; for they depending upon Invention, deduce their mediums from all things whatsoever; and playing much upon the simile, or illustrative argumentation: to induce their Enthymemes unto the people, they took up popular conceits, and from traditions unjustifiable or really false, illustrate matters of undeniable truth. Wherein although their intention be sincere, and that

course not much condemnable; yet doth it notoriously strengthen common Errors, and authorise Opinions injurious unto truth.

Expressions of holy Scripture fitted many times rather to popular and common apprehension, then to the exact Nature of things.

Thus have some Divines drawn into argument the Fable of the Phœnix, made use of that of the Salamander, Pelican, Basilisk, and divers relations of Plinie; deducing from thence most worthy morals, and even upon our Saviour. Now although this be not prejudicial unto wiser Judgments, who are but weakly moved with such arguments, yet it is oft times occasion of Error unto vulgar heads, who expect in the Fable as equal a truth as in the Moral, and conceive that infallible Philosophy, which is in any sense delivered by Divinity. But wiser discerners do well understand, that every Art hath its own circle; that the effects of things are best examined, by sciences wherein are delivered their causes; that strict and definitive expressions, are alway required in Philosophy, but a loose and popular delivery will serve oftentimes in Divinity. As may be observed even in holy Scripture, which often omitteth the exact account of things; describing them rather to our apprehensions, then leaving doubts in vulgar minds, upon their unknown and Philosophical descriptions. Thus it termeth the Sun and the Moon the two great lights of Heaven. Now if any shall from hence conclude, the Moon is second in magnitude unto the Sun, he must excuse my belief; and it cannot be strange, if herein I rather adhere unto the demonstration of Ptolomy, then the popular description of Moses. Thus is it said, Chron. . . That Solomon made a molten Sea of ten Cubits from brim to brim round in compass, and five Cubits the height thereof, and a line of thirty Cubits did compass it round about. Now in this description, the circumference is made just treble unto the Diameter: that is, as . to . or . to . But Archimedes In his Cyclometria. demonstrates, that the proportion of the Diameter unto the circumference, is as . unto almost . which will occasion a sensible difference, that is almost a Cubit. Now if herein I adhere unto Archimedes who speaketh exactly, rather then the sacred Text which speaketh largely; I hope I shall not offend Divinity: I am sure I shall have reason and experience of every circle to support me.

Thus Moral Writers, Rhetoricians and Orators make use of several relations which will not consist with verity. Aristotle in his Ethicks takes up the conceit of the Bever, and the divulsion of his Testicles. The tradition of the Bear, the Viper, and divers others are frequent amongst Orators. All which although unto the illiterate and undiscerning hearers may seem a confirmation of their realities; yet is this no reasonable establishment unto others, who will not depend hereon otherwise then common Apologues: which being of impossible falsities, do notwithstanding include wholesome moralities, and such as expiate the trespass of their absurdities.

The Hieroglyphical doctrine of the Ægyptians (which in their four hundred years cohabitation some conjecture they learned from the Hebrews) hath much advanced many popular conceits. For using an Alphabet of things, and not of words, through the image and pictures thereof, they endeavoured to speak their hidden conceits in the letters and language of Nature. In pursuit whereof, although in many things, they exceeded not their true and real apprehensions; yet in some other they either framing the story, or taking up the tradition, conducive unto their intentions, obliquely confirmed many falsities; which as authentick and conceded truths did after pass unto the Greeks, from them unto other Nations, and are still retained by symbolical Writers, Emblematists, Herald's, and others. Whereof some are strictly maintained for truths, as naturally making good their artificial representations; others symbolically intended, are literally received, and swallowed in the first sense, without all gust of the second. Whereby we pervert the profound and mysterious knowledge of Ægypt; containing the Arcana's of Greek Antiquities, the Key of many obscurities and ancient learning extant. Famous herein in former Ages were Heraiscus, Cheremon, Epius, especially Orus Apollo Niliacus: who lived in the reign of Theodosius, and in Ægyptian language left two Books of Hieroglyphicks, translated into Greek by Philippus, and a large collection of all made after by Pierius. But no man is likely to profound the Ocean of that Doctrine, beyond that eminent example of industrious Learning, Kircherus.

Painters who are the visible representers of things, and such as by the learned sense of the eye endeavour to inform the understanding, are not inculpable herein, who either describing Naturals as they are, or actions as they have been, have oftentimes erred in their delineations. Which being the Books that all can read, are fruitful advancers of these conceptions, especially in common and popular apprehensions: who being unable for farther enquiry, must rest in the draught and letter of their descriptions.

Lastly, Poets and Poetical Writers have in this point exceeded others, trimly advancing the Ægyptian notions of Harpies, Phoenix, Gryphins and many more. Now however to make use of Fictions, Apologues, and Fables, be not unwarrantable, and the intent of these inventions might point at laudable ends; yet do they afford our junior capacities a frequent occasion of error, settling impressions in our tender memories, which our advanced judgments generally neglect to expunge. This way the vain and idle fictions of the Gentiles did first insinuate into the heads of Christians; and thus are they continued even unto our days. Our first and literary apprehensions being commonly instructed in Authors which handle nothing else; wherewith our memories being stuffed, our inventions become pedantick, and cannot avoid their allusions; driving at these as at the highest elegancies, which are but the frigidities of wit, and become not the genius of manly ingenuities. It were therefore no loss like that of Galens Library, if these had found the same fate; and would in some way requite the neglect of solid Authors, if they were less pursued. For were a pregnant wit educated in ignorance hereof, receiving only

impressions from realities; upon such solid foundations, it must surely raise more substantial superstructions, and fall upon very many excellent strains, which have been jused off by their intrusions.

## CHAPTER X

### Of the last and common Promoter of false

Opinions, the endeavours of Satan.

The Devils method of propagating Error in the World.

But beside the infirmities of humane Nature, the seed of Error within our selves, and the several ways of delusion from each other, there is an invisible Agent, and secret promoter without us, whose activity is undiscerned, and plays in the dark upon us; and that is the first contriver of Error, and professed opposer of Truth, the Devil. For though permitted unto his proper principles, Adam perhaps would have sinned without the suggestion of Satan: and from the transgressive infirmities of himself might have erred alone, as well as the Angels before him: And although also there were no Devil at all, yet there is now in our Natures a confessed sufficiency unto corruption, and the frailty of our own Oeconomie, were able to betray us out of Truth, yet wants there not another Agent, who taking advantage hereof proceedeth to obscure the diviner part, and efface all tract of its traduction. To attempt a particular of all his wiles, is too bold an Arithmetick for man: what most considerably concerneth his popular and practised ways of delusion, he first deceiveth mankind in five main points concerning God and himself.

And first his endeavours have ever been, and they cease not yet to instill a belief in the mind of Man, there is no God at all. And this he principally endeavours to establish in a direct and literal apprehension; that is, that there is no such reality existent, that the necessity of his entity dependeth upon ours, and is but a Political Chymera; that the natural truth of God is an artificial erection of Man, and the Creator himself but a subtile invention of the Creature. Where he succeeds not thus high, he labours to introduce a secondary and deductive Atheism; that although men concede there is a God, yet should they deny his providence. And therefore assertions have flown about, that he intendeth only the care of the species or common natures, but letteth loose the guard of individuals, and single existencies therein: that he looks not below the Moon, but hath designed the regiment of sublunary affairs unto inferiour deputations. To promote which apprehensions, or empuzzel their due conceptions, he casteth in the notions of fate, destiny, fortune, chance, and necessity; terms commonly misconceived by vulgar heads, and their propriety sometime perverted by the wisest. Whereby extinguishing in minds the compensation of vertue and vice, the hope and fear of Heaven or Hell; they comply in their actions unto the drift of his delusions, and live like creatures without the capacity of either.



Now hereby he not onely undermineth the Base of Religion, and destroyeth the principle preambulous unto all belief; but puts upon us the remotest Error from Truth. For Atheism is the greatest falsity, and to affirm there is no God, the highest lie in Nature. And therefore strictly taken, some men will say his labour is in vain; For many there are, who cannot conceive there was ever any absolute Atheist; or such as could determine there was no God, without all check from himself, or contradiction from his other opinions. And therefore those few so called by elder times, might be the best of Pagans; suffering that name rather in relation to the gods of the Gentiles, then the true Creator of all. A conceit that cannot befal his greatest enemy, or him that would induce the same in us; who hath a sensible apprehension hereof, for he believeth with trembling. To speak yet more strictly and conformably unto some Opinions, no creature can wish thus much; nor can the Will which hath a power to run into velleities, and wishes of impossibilities, have any *utinam* of this. For to desire there were no God, were plainly to unwish their own being; which must needs be annihilated in the substraction of that essence which substantially supporteth them, and restrains them from regression into nothing. And if as some contend, no creature can desire his own annihilation, that Nothing is not appetible, and not to be at all, is worse then to be in the miserablist condition of something; the Devil himself could not embrace that motion, nor would the enemy of God be freed by such a Redemption.

But coldly thriving in this design, as being repulsed by the principles of humanity, and the dictates of that production, which cannot deny its original, he fetcheth a wider circle; and when he cannot make men conceive there is no God at all, he endeavours to make them believe there is not one, but many: wherein he hath been so successful with common heads, that he hath led their belief thorow the Works of Nature.

Areopagus the severe Court of Athens.

Now in this latter attempt, the subtilty of his circumvention, hath indirectly obtained the former. For although to opinion there be many gods, may seem an excess in Religion, and such as cannot at all consist with Atheism, yet doth it deductively and upon inference include the same, for Unity is the inseparable and essential attribute of Deity; and if there be more then one God, it is no Atheism to say there is no God at all. And herein though Socrates only suffered, yet were Plato and Aristotle guilty of the same Truth; who demonstratively understanding the simplicity of perfection, and the indivisible condition of the first causator, it was not in the power of Earth, or Areopagy of Hell to work them from it. For holding an Apodictical knowledge, and assured science of its verity, to perswade their apprehensions unto a plurality of gods in the world, were to make Euclide believe there were more than one Center in a Circle, or one right Angle in a Triangle; which were indeed a fruitless attempt, and inferreth absurdities beyond the evasion of Hell. For though Mechanick and vulgar heads ascend not unto such comprehensions, who live not commonly unto half the advantage of their principles; yet

did they not escape the eye of wiser Minerva's, and such as made good the genealogie of Jupiters brains; who although they had divers stiles for God, yet under many appellations acknowledged one divinity: rather conceiving thereby the evidence or acts of his power in several ways and places, then a multiplication of Essence, or real distraction of unity in any one.

Again, To render our errors more monstrous (and what unto miracle sets forth the patience of God,) he hath endeavoured to make the world believe, that he was God himself; and failing of his first attempt to be but like the highest in Heaven, he hath obtained with men to be the same on Earth. And hath accordingly assumed the annexes of Divinity, and the prerogatives of the Creator, drawing into practice the operation of miracles, and the prescience of things to come. Thus hath he in a specious way wrought cures upon the sick: played over the wondrous acts of Prophets, and counterfeited many miracles of Christ and his Apostles. Thus hath he openly contended with God, and to this effect his insolency was not ashamed to play a solemn prize with Moses; wherein although his performance were very specious, and beyond the common apprehension of any power below a Deity; yet was it not such as could make good his Omnipotency. For he was wholly confounded in the conversion of dust into lice. An act Philosophy can scarce deny to be above the power of Nature, nor upon a requisite predisposition beyond the efficacy of the Sun. Wherein notwithstanding the head of the old Serpent was confessedly too weak for Moses hand, and the arm of his Magicians too short for the finger of God.

The Authors opinion, touching Necromancy and apparitions of the spirits of men departed.

Thus hath he also made men believe that he can raise the dead, that he hath the key of life and death, and a prerogative above that principle which makes no regression from privations. The Stoicks that opinioned the souls of wise men dwelt about the Moon, and those of fools wandered about the Earth, advantaged the conceit of this effect; wherein the Epicureans, who held that death was nothing, nor nothing after death, must contradict their principles to be deceived. Nor could the Pythagoreans or such as maintained the transmigration of souls give easie admittance hereto: for holding that separated souls successively supplied other bodies, they could hardly allow the raising of souls from other worlds, which at the same time, they conceived conjoynd unto bodies in this. More inconsistent with these Opinions, is the Error of Christians, who holding the dead do rest in the Lord, do yet believe they are at the lure of the Devil; that he who is in bonds himself commandeth the fetters of the dead, and dwelling in the bottomless lake, the blessed from Abrahams bosome, that can believe the real resurrection of Samuel: or that there is any thing but delusion in the practice of Necromancy and popular raising of Ghosts.

How the Devil works his pretended revelations or predictions.

He hath moreover endeavoured the opinion of Deity, by the delusion of Dreams, and the discovery of things to come in sleep, above the prescience of our waked senses. In this expectation he perswaded the credulity of elder times to take up their lodging before his temple, in skins of their own sacrifices: till his reservedness had contrived answers, whose accomplishments were in his power, or not beyond his presagement. Which way, although it had pleased Almighty God, sometimes to reveal himself, yet was the proceeding very different. For the revelations of Heaven are conveyed by new impressions, and the immediate illumination of the soul, whereas the deceiving spirit, by concitation of humours, produceth his conceited phantasms, or by compounding the species already residing, doth make up words which mentally speak his intentions.

But above all he most advanced his Deity in the solemn practice of Oracles, wherein in several parts of the World, he publicly professed his Divinity; but how short they flew of that spirit, whose omniscience, they would resemble, their weakness sufficiently declared. What jugling there was therein, the Orator Demosthenes. plainly confessed, who being good at the same game himself, could say that Pythia Philippised. Who can but laugh at the carriage of Ammon unto Alexander, who addressing unto him as a god, was made to believe, he was a god himself? How openly did he betray his Indivinity unto Cræsus, who being ruined by his Amphibology, and expostulating with him for so ungrateful a deceit, received no higher answer then the excuse of his impotency upon the contradiction of fate, and the settled law of powers beyond his power to controle! What more then sublunary directions, or such as might proceed from the Oracle of humane Reason, was in his advice unto the Spartans in the time of a great Plague; when for the cessation thereof, he wisht them to have recourse unto a Fawn, that is in open terms, unto one Nebrus, a good Physitian of those days? Nebros, in Greek, a Fawn. From no diviner a spirit came his reply unto Caracalla, who requiring a remedy for his Gout, received no other counsel then to refrain cold drink; which was but a dietetical caution, and such as without a journey unto Æsculapius, culinary prescription and kitchen Aphorisms might have afforded at home. Nor surely if any truth there were therein, of more then natural activity was his counsel unto Democritus; when for the Falling sickness he commended the Maggot in a Goats head. For many things secret are true; sympathies and antipathies are safely authentick unto us, who ignorant of their causes may yet acknowledge their effects. Beside, being a natural Magician he may perform many acts in ways above our knowledge, though not transcending our natural power, when our knowledge shall direct it. Part hereof hath been discovered by himself, and some by humane indagation: which though magnified as fresh inventions unto us, are stale unto his cognition. I hardly believe he hath from elder times unknown the verticity of the Loadstone; surely his perspicacity discerned it to respect the North, when ours beheld it indeterminately. Many secrets there are in Nature of difficult discovery

unto man, of easie knowledge unto Satan; whereof some his vain glory cannot conceal, others his envy will not discover.

Again, Such is the mysterie of his delusion, that although he labour to make us believe that he is God, and supremest nature whatsoever, yet would he also perswade our beliefs, that he is less then Angels or men; and his condition not onely subjected unto rational powers, but the actions of things which have no efficacy on our selves. Thus hath he inveigled no small part of the world into a credulity of artificial Magick: That there is an Art, which without compact commandeth the powers of Hell; whence some have delivered the polity of spirits, and left an account even to their Provincial Dominions: that they stand in awe of Charms, Spels, and Conjurations; that he is afraid of letters and characters, of notes and dashes, which set together do signifie nothing, not only in the dictionary of man, but the subtiler vocabulary of Satan. That there is any power in Bitumen, Pitch, or Brimstone, to purifie the air from his uncleanness; St. Johns Wort, so called by Magicians. that any vertue there is in Hipericon to make good the name of fuga Dæmonis, any such Magick as is ascribed unto the Root Baaras by Josephus, or Cynospastus by Ælianus, it is not easie to believe; nor is it naturally made out what is delivered of Tobias, that by the fume of a Fishes liver, he put to flight Asmodeus. That they are afraid of the pentangle of Solomon, though so set forth with the body of man, as to touch and point out the five places wherein our Saviour was wounded, I know not how to assent. triangles intersected and made of five lines. If perhaps he hath fled from holy Water, if he cares not to hear the sound of Tetragrammaton Implying Jehovah, which in Hebrew consisteth of four letters., if his eye delight not in the sign of the Cross; and that sometimes he will seem to be charmed with words of holy Scripture, and to flie from the letter and dead verballity, who must onely start at the life and animated interiors thereof: It may be feared they are but Parthian flights, Ambuscado retreats, and elusory tergiversations: Whereby to confirm our credulities, he will comply with the opinion of such powers, which in themselves have no activities. Whereof having once begot in our minds an assured dependence, he makes us relie on powers which he but precariously obeys; and to desert those true and only charms which Hell cannot withstand.

Lastly, To lead us farther into darkness, and quite to lose us in this maze of Error, he would make men believe there is no such creature as himself: and that he is not onely subject unto inferiour creatures, but in the rank of nothing. Insinuating into mens minds there is no Devil at all, and contriveth accordingly, many ways to conceal or indubitate his existency. Wherein beside that he annihilates the blessed Angels and Spirits in the rank of his Creation; he begets a security of himself, and a careless eye unto the last remunerations. And therefore hereto he inveigleth, not only Sadduces and such as retain unto the Church of God: but is also content that Epicurus, Democritus, or any Heathen should hold the same. And to this effect he maketh men believe that

apparitions, and such as confirm his existence are either deceptions of sight, or melancholly depravements of phansie. Thus when he had not onely appeared but spake unto Brutus; Cassius the Epicurian was ready at hand to perswade him, it was but a mistake in his weary imagination, and that indeed there were no such realities in nature. Thus he endeavours to propagate the unbelief of Witches, whose concession infers his coexistency; by this means also he advanceth the opinion of total death, and staggereth the immortality of the soul; for, such as deny there are spirits subsistent without bodies, will with more difficulty affirm the separated existence of their own.

Now to induce and bring about these falsities, he hath laboured to destroy the evidence of Truth, that is the revealed verity and written Word of God. To which intent he hath obtained with some to repudiate the Books of Moses, others those of the Prophets, and some both: to deny the Gospel and authentick Histories of Christ; to reject that of John, and to receive that of Judas; to disallow all, and erect another of Thomas. And when neither their corruption by Valentinus and Arrius, their mutilation by Marcion, Manes, and Ebion could satisfie his design, he attempted the ruine and total destruction thereof; as he sedulously endeavoured, by the power and subtilty of Julian, Maximinus, and Dioclesian.

But the longevity of that piece, which hath so long escaped the common fate, and the providence of that Spirit which ever waketh over it, may at last discourage such attempts; and if not make doubtful its Mortality, at least indubitably declare; this is a stone too big for Saturns mouth, and a bit indeed Oblivion cannot swallow.

And thus how strangely he possesseth us with Errors may clearly be observed, deluding us into contradictory and inconsistent falsities; whilst he would make us believe, That there is no God. That there are many. That he himself is God. That he is less then Angels or Men. That he is nothing at all.

Nor hath he onely by these wiles depraved the conception of the Creator, but with such Riddles hath also entangled the Nature of our Redeemer. Some denying his Humanity, and that he was one of the Angels, as Ebion; that the Father and Son were but one person, as Sabellius. That his body was phantastical, as Manes, Basilides, Priscillian, Jovinianus; that he only passed through Mary, as Utyches and Valentinus. Some denying his Divinity; that he was begotten of humane principles, and the seminal Son of Joseph; as Carpocras, Symmachus, Photinus: that he was Seth the Son of Adam, as the Sethians: that he was less then Angels, as Cherinthus: that he was inferiour unto Melchisedec, as Theodotus: that he was not God, but God dwelt in him, as Nicholaus: and some embroyled them both. So did they which converted the Trinity into a Quaternity, and affirmed two persons in Christ, as Paulus Samosatenus: that held he was Man without a Soul, and that the Word performed that office in him, as Apollinaris: that he was both Son and Father, as Montanus: that Jesus suffered, but Christ remained

impatible, as Cherinthus. Thus he endeavours to entangle Truths: And when he cannot possibly destroy its substance, he cunningly confounds its apprehensions; that from the inconsistent and contrary determinations thereof, consecretary impieties, and hopeful conclusions may arise, there's no such thing at all.

Footnotes

Demonstrative.

Divination by the dead.

## CHAPTER XI

### A further Illustration.

Now although these ways of delusions most Christians have escaped, yet are there many other whereunto we are daily betrayed, and these we meet with in obvious occurrents of the world, wherein he induceth us, to ascribe effects unto causes of no cognation; and distorting the order and theory of causes perpendicular to their effects, he draws them aside unto things whereto they run parallel, and in their proper motions would never meet together.

Thus doth he sometime delude us in the conceits of Stars and Meteors, beside their allowable actions ascribing effects thereunto of independent causations. Thus hath he also made the ignorant sort believe that natural effects immediately and commonly proceed from supernatural powers: and these he usually drives from Heaven, his own principality the Air, and Meteors therein; which being of themselves the effects of natural and created causes, and such as upon a due conjunction of actives and passives, without a miracle must arise unto what they appear; are always looked on by ignorant spectators as supernatural spectacles, and made the causes or signs of most succeeding contingencies. To behold a Rainbow in the night, is no prodigy unto a Philosopher. Then Eclipses of Sun or Moon, nothing is more natural. Yet with what superstition they have been beheld since the Tragedy of Nicias and his Army, many examples declare.

True it is, and we will not deny, that although these being natural productions from second and settled causes, we need not alway look upon them as the immediate hand of God, or of his ministring Spirits; yet do they sometimes admit a respect therein; and even in their naturals, the indifferency of their existencies contemporised unto our actions, admits a further consideration.

That two or three Suns or Moons appear in any mans life or reign, it is not worth the wonder. But that the same should fall out at a remarkable time, or point of some decisive action; that the contingency of the appearance should be confirmed unto that time; that those two should make but one line in the Book of Fate, and stand together in the great Ephemerides of God; beside the Philosophical assignment of the cause, it may admit a Christian apprehension in the signality.

But above all he deceiveth us, when we ascribe the effects of things unto evident and seeming causalities, which arise from the secret and undiscerned action of himself. Thus hath he deluded many Nations in his Augurial and Extispicious inventions, from casual and uncontrived contingencies divining events succeeding. Which Tuscan superstition seizing upon Rome, hath since possessed all Europe. When Augustus found two galls in his sacrifice, the credulity of the City concluded a hope of peace with Anthony; and the

conjunction of persons in choler with each other. Because Brutus and Cassius met a Blackmore, and Pompey had on a dark or sad coloured garment at Pharsalia; these were presages of their overthrow. Which notwithstanding are scarce Rhetorical sequels; concluding Metaphors from realities, and from conceptions metaphorical inferring realities again.

Now these divinations concerning events, being in his power to force, contrive, prevent, or further, they must generally fall out conformably unto his predictions. When Gracchus was slain, the same day the Chickens refused to come out of the Coop: and Claudius Pulcher underwent the like success, when he contemned the Tripudiary Augurations: They died not because the Pullets would not feed: but because the Devil foresaw their death, he contrived that abstinence in them. So was there no natural dependence of the event. An unexpected way of delusion, and whereby he more easily led away the incircumspection of their belief. Which fallacy he might excellently have acted before the death of Saul; for that being within his power to foretell, was not beyond his ability to foreshew: and might have contrived signs thereof through all the creatures, which visibly confirmed by the event, had proved authentick unto those times, and advanced the Art ever after.

The danger and delusion that is in cures by Charms, Amulets, Ligatures, Characters, etc.

He deludeth us also by Philters, Ligatures, Charms, ungrounded Amulets, Characters, and many superstitious ways in the cure of common diseases: seconding herein the expectation of men with events of his own contriving. Which while some unwilling to fall directly upon Magick, impute unto the power of imagination, or the efficacy of hidden causes, he obtains a bloody advantage: for thereby he begets not only a false opinion, but such as leadeth the open way of destruction. In maladies admitting natural reliefs, making men rely on remedies, neither of real operation in themselves, nor more then seeming efficacy in his concurrence. Which whensoever he pleaseth to withdraw, they stand naked unto the mischief of their diseases: and revenge the contempt of the medicines of the Earth which God hath created for them. And therefore when neither miracle is expected, nor connection of cause unto effect from natural grounds concluded; however it be sometime successful, it cannot be safe to rely on such practises, and desert the known and authentick provisions of God. In which rank of remedies, if nothing in our knowledge or their proper power be able to relieve us, we must with patience submit unto that restraint, and expect the will of the Restrainer.

Now in these effects although he seems oftentimes to imitate, yet doth he concur unto their productions in a different way from that spirit which sometime in natural means produceth effects above Nature. For whether he worketh by causes which have relation or none unto the effect, he maketh it out by secret and undiscerned ways of Nature. So when Caius the blind, in the reign of Antoninus, was commanded to pass from the right



side of the Altar unto the left, to lay five fingers of one hand thereon, and five of the other upon his eyes; although the cure succeeded and all the people wondered, there was not any thing in the action which did produce it, nor any thing in his power that could enable it thereunto. So for the same infirmity, when Aper was counselled by him to make a Collyrium or ocular medicine with the blood of a white Cock and Honey, and apply it to his eyes for three days: When Julian for his spitting of blood, was cured by Honey and Pine nuts taken from his Altar: When Lucius for the pain in his side, applied thereto the ashes from his Altar with wine; although the remedies were somewhat rational, and not without a natural vertue unto such intentions, yet need we not believe that by their proper faculties they produced these effects.

But the effects of powers Divine flow from another operation; who either proceeding by visible means or not, unto visible effects, is able to conjoin them by his cooperation. And therefore those sensible ways which seem of indifferent natures, are not idle ceremonies, but may be causes by his command, and arise unto productions beyond their regular activities. If Nahaman the Syrian had washed in Jordan without the command of the Prophet, I believe he had been cleansed by them no more then by the waters of Damascus. I doubt if any beside Elisha had cast in Salt, the waters of Jericho had not been made wholesome. I know that a decoction of wild gourd or Colocynthis (though somewhat qualified) will not from every hand be dulcified unto aliment by an addition of flower or meal. There was some natural vertue in the Plaister of figs applied unto Ezechias; we find that gall is very mundificative, and was a proper medicine to clear the eyes of Tobit: which carrying in themselves some action of their own, they were additionally promoted by that power, which can extend their natures unto the production of effects beyond their created efficiencies. And thus may he operate also from causes of no power unto their visible effects; for he that hath determined their actions unto certain effects, hath not so emptied his own, but that he can make them effectual unto any other.

Again, Although his delusions run highest in points of practice, whose errors draw on offensive or penal enormities, yet doth he also deal in points of speculation, and things whose knowledge terminates in themselves. Whose cognition although it seems indifferent, and therefore its aberration directly to condemn no man; yet doth he hereby preparatively dispose us unto errors, and deductively deject us into destructive conclusions.

That the Sun, Moon, and Stars are living creatures, endued with soul and life, seems an innocent Error, and an harmless digression from truth; yet hereby he confirmed their Idolatry, and made it more plausibly embraced. For wisely mistrusting that reasonable spirits would never firmly be lost in the adoration of things inanimate, and in the lowest form of Nature; he begat an opinion that they were living creatures, and could not decay for ever.

That spirits are corporeal, seems at first view a conceit derogative unto himself, and such as he should rather labour to overthrow; yet hereby he establisheth the Doctrine of Lustrations, Amulets and Charms, as we have declared before.

That there are two principles of all things, one good, and another evil; from the one proceeding vertue, love, light, and unity; from the other, division, discord, darkness, and deformity, was the speculation of Pythagoras, Empedocles, and many ancient Philosophers, and was no more then Oromasdes and Arimanius of Zoroaster. Yet hereby he obtained the advantage of Adoration, and as the terrible principle became more dreadful then his Maker; and therefore not willing to let it fall, he furthered the conceit in succeeding Ages, and raised the faction of Manes to maintain it.

That the feminine sex have no generative emission, affording no seminal Principles of conception; was Aristotles Opinion of old, maintained still by some, and will be countenanced by him forever. For hereby he disparageth the fruit of the Virgin, frustrateth the fundamental Prophetie, nor can the seed of the Woman then break the head of the Serpent.

Nor doth he only sport in speculative Errors, which are of consequent impieties; but the unquietness of his malice hunts after simple lapses, and such whose falsities do only condemn our understandings. Thus if Xenophanes will say there is another world in the Moon; If Heraclitus with his adherents will hold the Sun is no bigger then it appeareth; If Anaxagoras affirm that Snow is black; If any other opinion there are no Antipodes, or that Stars do fall, he shall not want herein the applause or advocacy of Satan. For maligning the tranquility of truth, he delighteth to trouble its streams; and being a professed enemy unto God (who is truth it self) he promoteth any Error as derogatory to his nature; and revengeth himself in every deformity from truth. If therefore at any time he speak or practise truth, it is upon design, and a subtile inversion of the precept of God, to do good that evil may come of it. And therefore sometime we meet with wholesome doctrines from Hell; Nosce teipsum, the Motto of Delphos, was a good precept in morality: That a just man is beloved of the gods, an uncontrollable verity. 'Twas a good deed, though not well done, which he wrought by Vespasian, when by the touch of his foot he restored a lame man, and by the stroak of his hand another that was blind, but the intention hereof drived at his own advantage; for hereby he not only confirmed the opinion of his power with the people, but his integrity with Princes; in whose power he knew it lay to overthrow his Oracles, and silence the practice of his delusions.

How spirits understand one another.

But of such a diffused nature, and so large is the Empire of Truth, that it hath place within the walls of Hell, and the Devils themselves are daily forced to practise it; not

only as being true themselves in a Metaphysical verity, that is, as having their essence conformable unto the Intellect of their Maker, but making use of Moral and Logical verities; that is, whether in the conformity of words unto things, or things unto their own conceptions, they practise truth in common among themselves. For although without speech they intuitively conceive each other, yet do their apprehensions proceed through realities; and they conceive each other by species, which carry the true and proper notions of things conceived. And so also in Moral verities, although they deceive us, they lie unto each other; as well understanding that all community is continued by Truth, and that of Hell cannot consist without it.

To come yet nearer the point, and draw into a sharper angle; They do not only speak and practise truth, but may be said wellwishers hereunto, and in some sense do really desire its enlargement. For many things which in themselves are false, they do desire were true; He cannot but wish he were as he professeth, that he had the knowledge of future events; were it in his power, the Jews should be in the right, and the Messiah yet to come. Could his desires effect it, the opinion of Aristotle should be true, the world should have no end, but be as immortal as himself. For thereby he might evade the accomplishment of those afflictions, he now but gradually endureth; for comparatively unto those flames, he is but yet in Balneo, then begins his Ignis Rotæ, and terrible fire, which will determine his disputed subtilty, and even hazard his immortality.

How the Devils fell.

But to speak strictly, he is in these wishes no promoter of verity, but if considered some ways injurious unto truth; for (besides that if things were true, which now are false, it were but an exchange of their natures, and things must then be false, which now are true) the settled and determined order of the world would be perverted, and that course of things disturbed, which seemed best unto the immutable contriver. For whilst they murmur against the present disposure of things, regulating determined realities unto their private optations, they rest not in their established natures; but unwishing their unalterable verities, do tacitely desire in them a deformity from the primitive Rule, and the Idea of that mind that formed all things best. And thus he offended truth even in his first attempt; For not content with his created nature, and thinking it too low, to be the highest creature of God, he offended the Ordainer, not only in the attempt, but in the wish and simple volition thereof.

## THE SECOND BOOK

Of sundry popular Tenets concerning  
Mineral, and vegetable bodies, generally  
held for truth; which examined, prove  
either false, or dubious.

### CHAPTER I

#### Of Crystal.

Hereof the common Opinion hath been, and still remaineth amongst us, that Crystal is nothing else but Ice or Snow concreted, and by duration of time, congealed beyond liquation. Of which assertion, if prescription of time, and numerosity of Assertors, were a sufficient demonstration, we might sit down herein, as an unquestionable truth; nor should there need ulterior disquisition. For few Opinions there are which have found so many friends, or been so popularly received, through all Professions and Ages. Pliny is positive in this Opinion: *Crystallus sit gelu vehementius concreto*: the same is followed by Seneca, elegantly described by Claudian, not denied by Scaliger, some way affirmed by Albertus, Brasavolus, and directly by many others. The venerable Fathers of the Church have also assented hereto; As Basil in his Hexameron, Isidore in his Etymologies, and not only Austin a Latine Father, but Gregory the Great, and Jerome upon occasion of that term expressed in the first of Ezekiel.

That Crystal is not Ice or Snow congealed.

All which notwithstanding, upon a strict enquiry, we find the matter controvertible, and with much more reason denied then is as yet affirmed. For though many have passed it over with easie affirmatives, yet are there also many Authors that deny it, and the exactest Mineralogists have rejected it. Diodorus in his eleventh Book denieth it, (if Crystal be there taken in its proper acception, as Rhodiginus hath used it, and not for a Diamond, as Salmatius hath expounded it) for in that place he affirmeth; *Crystallum esse lapidem ex aqua pura concretum, non tamen frigore sed divini caloris vi*. Solinus who transcribed Pliny, and therefore in almost all subscribed unto him, hath in this point dissented from him. Putant quidam glaciem coire, et in Crystallum corporari, sed frustra. Mathiolus in his Comment upon Dioscorides, hath with confidence rejected it. The same hath been performed by Agricola de natura fossilium; by Cardan, Boëtius de Boot, Cæsius Bernardus, Sennertus, and many more.

Now besides Authority against it, there may be many reasons deduced from their several differences which seem to overthrow it. And first, a difference is probable in their concretion. For if Crystal be a stone (as in the number thereof it is confessedly received,) it is not immediately concreted by the efficacy of cold, but rather by a Mineral spirit, and lapidifical principles of its own, and therefore while it lay in solutis principiis, and remained in a fluid Body, it was a subject very unapt for proper congelation; for Mineral spirits do generally resist and scarce submit thereto. So we observe that many waters and springs will never freeze, and many parts in Rivers and Lakes, where there are Mineral eruptions, will still persist without congelations, as we also observe in Aqua fortis, or any Mineral solution, either of Vitriol, Alum, Saltpetre, Ammoniac, or Tartar, which although to some degree exhaled, and placed in cold Conservatories, will Crystallize and shoot into white and glaciuous bodies; yet is not this a congelation primarily effected by cold, but an intrinsecal induration from themselves; and a retreat into their proper solidities, which were absorbed by the liquor, and lost in a full imbibition thereof before. And so also when wood and many other bodies do putrifie, either by the Sea, other waters, or earths abounding in such spirits; we do not usually ascribe their induration to cold, but rather unto salinous spirits, concretive juices, and causes circumjacent, which do assimilate all bodies not indisposed for their impressions.

But Ice is water congealed by the frigidity of the air, whereby it acquireth no new form, but rather a consistence or determination of its diffuency, and amitteth not its essence, but condition of fluidity. Neither doth there any thing properly congeliate but water, or watery humidity; for the determination of quicksilver is properly fixation, that of milk coagulation, and that of oyl and unctuous bodies, only incrassation; And therefore Aristotle makes a trial of the fertility of humane seed, from the experiment of congelation; for that (saith he) which is not watery and impropolifical will not congeliate; which perhaps must not be taken strictly, but in the germ and spirited particles: For Eggs I observe will freeze, in the albuginous part thereof. And upon this ground Paracelsus in his Archidoxis, extracteth the magistery of wine; after four moneths digestion in horsedung, exposing it unto the extremity of cold; whereby the aqueous parts will freeze, but the Spirit retire and be found congealed in the Center.

How to make Ice at any time of the year.

But whether this congelation be simply made by cold, or also by cooperation of any nitrous coagulum, or spirit of Salt the principle of concretion; whereby we observe that ice may be made with Salt and Snow by the fire side; as is also observable from Ice made by Saltpetre and water, duly mixed and strongly agitated at any time of the year, were a very considerable enquiry. For thereby we might clear the generation of Snow, Hail, and hoary Frosts, the piercing qualities of some winds, the coldness of Caverns, and some Cells. We might more sensibly conceive how Saltpetre fixeth the flying spirits of

Minerals in Chymical Preparations, and how by this congealing quality it becomes an useful medicine in Fevers.

Again, The difference of their concretion is collectible from their dissolution; which being many ways performable in Ice, is few ways effected in Crystal. Now the causes of liquation are contrary to those of concretion; and as the Atoms and indivisible parcels are united, so are they in an opposite way disjoyned. That which is concreted by exsiccation or expression of humidity, will be resolved by humectation, as Earth, Dirt, and Clay; that which is coagulated by a fiery siccity, will suffer colliquation from an aqueous humidity, as Salt and Sugar, which are easily dissoluble in water, but not without difficulty in oyl, and well rectified spirits of Wine. That which is concreted by cold, will dissolve by a moist heat, if it consist of watery parts, as Gums, Arabick, Tragacanth, Ammoniac and others; in an airy heat or oyl, as all resinous bodies, Turpentine, Pitch, and Frankincense; in both, as gummy resinous bodies, Mastick, Camphire and Storax; in neither, as neutrals and bodies anomalous hereto, as Bdellium, Myrrhe, and others. Some by a violent dry heat, as Metals; which although corrodible by waters, yet will they not suffer a liquation from the powerfulest heat, communicable unto that element. Some will dissolve by this heat although their ingredients be earthy, as Glass, The original ingredients of Glass. whose materials are fine Sand, and the ashes of Chali or Fearn; and so will Salt run with fire, although it be concreted by heat. And this way may be effected a liquation in Crystal, but not without some difficulty; that is, calcination or reducing it by Art into a subtle powder; by which way and a vitreous commixture, Glasses are sometime made hereof, and it becomes the chiefest ground for artificial and factitious gemms. But the same way of solution is common also unto many Stones; and not onely Beryls and Cornelians, but Flints and Pebbles, are subject unto fusion, and will run like Glass in fire.

But Ice will dissolve in any way of heat, for it will dissolve with fire, it will colligate in water, or warm oyl; nor doth it only submit unto an actual heat, but not endure the potential calidity of many waters. For it will presently dissolve in cold Aqua fortis, sp. of Vitriol, Salt, or Tartar, nor will it long continue its fixation in spirits of Wine, as may be observed in Ice injected therein.

Again, The concretion of Ice will not endure a dry attrition without liquation; for if it be rubbed long with a cloth, it melteth. But Crystal will calefie unto electricity, that is, a power to attract straws or light bodies, and convert the needle freely placed. Which is a declarement of very different parts, wherein we shall not inlarge, as having discoursed concerning such bodies in the Chap. of Electricks.

They are differenced by supernatation or floating upon water; for Crystal will sink in water, as carrying in its own bulk a greater ponderosity then the space in any water it doth occupy; and will therefore only swim in molten Metal and Quicksilver. But Ice will swim in water of what thinness soever; and though it sink in oyl, will float in spirits of Wine or Aqua vitæ. And therefore it may swim in water, not only as being water it self, and in its proper place, but perhaps as weighing somewhat less then the water it possesseth. And therefore as it will not sink unto the bottom, so will it neither float above like lighter bodies, but being near in weight, lie superficially or almost horizontally unto it. And therefore also an Ice or congelation of Salt or Sugar, although it descend not unto the bottom, yet will it abate, and decline below the surface in thin water, but very sensibly in spirits of Wine. For Ice although it seemeth as transparent and compact as Crystal, yet is it short in either; for its atoms are not concreted into continuity, which doth diminish its translucency; it is also full of spumes and bubbles, which may abate its gravity. And therefore waters frozen in Pans, and open Glasses, after their dissolution do commonly leave a froth and spume upon them, which are caused by the airy parts diffused in the congealable mixture which uniting themselves and finding no passage at the surface, do elevate the mass, and make the liquor take up a greater place then before: as may be observed in Glasses filled with water, which being frozen, will seem to swell above the brim. So that if in this condensation any one affirmeth there is also some rarefaction, experience may assert it.

They are distinguished in substance of parts and the accidents thereof, that is, in colour and figure; for Ice is a similiary body, and homogeneous concretion, whose material is properly water, and but accidentally exceeding the simplicity of that element. But the body of Crystal is mixed; its ingredients many, and sensibly containeth those principles into which mixt bodies are reduced. For beside the spirit and mercurial principle it containeth a sulphur or inflamable part, and that in no small quantity; for besides its Electrck attraction, which is made by a sulphureous effluvium, it will strike fire upon percussion like many other stones, and upon collision with Steel actively send forth its sparks, not much inferiourly unto a flint. Now such bodies as strike fire have sulphureous or ignitable parts within them, and those strike best, which abound most in them. For these scintillations are not the accension of the air, upon the collision of two hard bodies, but rather the inflamable effluencies or vitrified sparks discharged from the bodies collided. For Diamonds, Marbles, Heliotropes and Agaths, though hard bodies, will not readily strike fire with a steel, much less with one another: Nor a Flint so readily with a Steel, if they both be very wet, for then the sparks are sometimes quenched in their eruption.

It containeth also a salt, and that in some plenty, which may occasion its fragility, as is also observable in Coral. This by the Art of Chymistry is separable, unto the operations whereof it is liable, with other concretions, as calcination, reverberation, sublimation,

distillation: And in the preparation of Crystal, Paracelsus de Præparationibus. hath made a rule for that of Gemms. Briefly, it consisteth of parts so far from an Ice dissolution, that powerful menstruums are made for its emollition; whereby it may receive the tincture of Minerals, and so resemble Gemms, as Boetius hath declared in the distillation of Urine; spirits of Wine and Turpentine; and is not only triturable, and reducible into powder, by contrition, but will subsist in a violent fire, and endure a vitrification. Whereby are testified its earthly and fixed parts. The Physical causes of liquation or melting of Mettals, etc. For vitrification is the last work of fire, and a fusion of the Salt and Earth, which are the fixed elements of the composition, wherein the fusible Salt draws the Earth and infusible part into one continuum, and therefore ashes will not run from whence the Salt is drawn, as bone ashes prepared for the Test of Metals. Common fusion in Metals is also made by a violent heat, acting upon the volatile and fixed, the dry and humid parts of those bodies; which notwithstanding are so united, that upon attenuation from heat, the humid parts will not fly away, but draw the fixed ones into fluor with them. Ordinary liquation in wax and oily bodies is made by a gentler heat, where the oyl and salt, the fixed and fluid principles will not easily separate. All which, whether by vitrification, fusion or liquation, being forced into fluent consistencies, do naturally regress into their former solidities. Whereas the melting of Ice is a simple resolution, or return from solid to fluid parts, wherein it naturally resteth.

As for colour, although Crystal in his pellucid body seems to have none at all, yet in its reduction into powder, it hath a vail and shadow of blew; and in its courser pieces, is of a sadder hue then the powder of Venice glass; and this complexion it will maintain although it long endure the fire. Which notwithstanding needs not move us unto wonder; for vitrified and pellucid bodies, are of a clearer complexion in their continuities, then in their powders and Atomical divisions. So Stibium or glass of Antimony, appears somewhat red in glass, but in its powder yellow; so painted glass of a sanguine red will not ascend in powder above a murrey.

As for the figure of Crystal (which is very strange, and forced Pliny to despair of resolution) it is for the most part hexagonal or six cornered; being built upon a confused matter, from whence as it were from a root angular figures arise, even as in the Amethyst and Basaltes. Which regular figuration hath made some opinion, it hath not its determination from circumscription, or as conforming unto contiguities, but rather from a seminal root, and formative principle of its own, even as we observe in several other concretions. So the stones which are sometime found in the gall of a man, are most triangular and pyramidal, although the figure of that part seems not to cooperate thereto. So the Asteria or lapis stellaris; hath on it the figure of a Star, so Lapis Judaicus hath circular lines in length all down its body, and equidistant, as though they had been turned by Art. In Stonepits and chalkmines. Which seemeth to be Echinites decima Aldrovandi. Musæi Metallici, lib. . Rather Echinometrites, as best resembling the



Echinometra found commonly on our Seashore. So that we call a Fayrie stone, and is often found in gravel pits amongst us, being of an hemispherical figure, hath five double lines rising from the center of its basis, which if no accretion distract them, do commonly concur, and meet in the pole thereof. The figures are regular in many other stones, as in the Belemnites, Lapis Anguinus, Cornu Ammonis, and many more; as by those which have not the experience hereof may be observed in their figures expressed by Mineralogists. But Ice receiveth its figure according unto the surface wherein it concreteth, or the circumambieny which conformeth it. So it is plain upon the surface of water, but round in Hayl (which is also a glaciation,) and figured in its guttulous descent from the air, and so growing greater or lesser according unto the accretion or pluvius aggelation about the mother and fundamental Atomes thereof; which seems to be some feathery particle of Snow; although Snow it self be sexangular, or at least of a starry and manypointed figure.

They are also differenced in the places of their generation; for though Crystal be found in cold countries, and where Ice remaineth long, and the air exceedeth in cold, yet is it also found in regions, where Ice is seldom seen or soon dissolved; as Pliny and Agricola relate of Cyprus, Caramania and an Island in the Red sea; Wherein the Sculptor found a piece of pure Crystal. It hath been also found in the veins of Minerals, sometimes agglutinated unto lead, sometimes in Rocks, opacous stones, and the marble face of Octavius Duke of Parma. It hath also constant veins; as beside others, that of mount Salvino about the Territory of Bergamo; from whence if part be taken, in no long tract of time out of the same place, as from its mineral matrix, others are observed to arise. Which made the learned Cerautus to conclude, Videant hi an sit glacies, an vero corpus fossile. Mus. Calceolar. It is also found in the veins of Minerals, in rocks, and sometime in common earth. But as for Ice, it will not readily concrete but in the approachment of the air, as we have made trial in glasses of water, covered an inch with oyl, which will not easily freeze in hard frosts of our climate. For water commonly concreteth first in its surface, and so conglociates downward; and so will it do although it be exposed in the coldest metal of lead, which well accordeth with that expression of Job, The waters are hid as with a stone, and the face of the deep is frozen. Chap. . But whether water which hath been boiled or heated, doth sooner receive this congelation, as commonly is delivered, we rest in the experiment of Cabeus, who hath rejected the same in his excellent discourse of Meteors.

They have contrary qualities elemental, and uses medicinal; for Ice is cold and moist, of the quality of water; but Crystal is cold and dry, according to the condition of earth. The use of Ice is condemned by most Physicians, that of Crystal commended by many. For although Dioscorides and Galen have left no mention thereof, yet hath Mathiolus, Agricola, and many commended it in dysenteries and fluxes; all for the increase of milk, most Chymists for the Stone, and some, as Brassavolus and Boetius, as an antidote

against poyson. Which occult and specifical operations are not expectable from Ice; for being but water congealed, it can never make good such qualities; nor will it reasonably admit of secret proprieties, which are the affections of forms, and compositions at distance from their elements.

What Crystal is.

Having thus declared what Crystal is not, it may afford some satisfaction to manifest what it is. To deliver therefore what with the judgement of approved Authors, and best reason consisteth, It is a Mineral body in the difference of stones, and reduced by some unto that subdivision, which comprehendeth gemms, transparent and resembling Glass or Ice, made of a lentous percolation of earth, drawn from the most pure and limpid juice thereof, owing unto the coldness of the earth some concurrence or coadjuvancy, but not immediate determination and efficiency, which are wrought by the hand of its concreative spirit, the seeds of petrification and Gorgon of it self. As sensible Philosophers conceive of the generation of Diamonds, Iris, Berils. Not making them of frozen icecles, or from meer aqueous and glaciabie substances, condensing them by frosts into solidities, vainly to be expected even from Polary congelations: but from thin and finest earths, so well tempered and resolved, that transparency is not hindred; and containing lapidifical spirits, able to make good their solidities against the opposition and activity of outward contraries, and so leave a sensible difference between the bonds of glaciation, which in the mountains of Ice about the Northern Seas, are easily dissolved by ordinary heat of the Sun, and between the finer ligatures of petrification, whereby not only the harder concretions of Diamonds and Saphirs, but the softer veins of Crystal remain indissolvable in scorching Territories, and the Negro land of Congor.

And therefore I fear we commonly consider subterraneities, not in contemplations sufficiently respective unto the Creation. For though Moses have left no mention of Minerals, nor made any other description then sute unto the apparent and visible Creation, yet is there unquestionably, a very large Classis of Creatures in the Earth, far above the condition of elementarity. And although not in a distinct and indisputable way of vivency, or answering in all points the properties or affections of Plants, yet in inferiour and descending constitutions, they do like these contain specifical distinctions, and are determined by seminalities, that is, created and defined seeds committed unto the Earth from the beginning. Wherein although they attain not the indubitable requisites of Animation, yet have they a near affinity thereto. And though we want a proper name and expressive appellation, yet are they not to be closed up in the general name of concretions; or lightly passed over as only Elementary and Subterraneous mixtions.

Exact continuity of parts a cause of transparency in things, and why.

The principle and most gemmary affection is its Tralucency: as for irradiancy or sparkling which is found in many gemms, it is not discoverable in this, for it cometh short of their compactness and durity: and therefore requireth not the Emery, as the Saphir, Granate, and Topaz, but will receive impression from Steel, in a manner like the Turchois. As for its diaphanity or perspicuity, it enjoyeth that most eminently; and the reason thereof is its continuity; as having its earthy and salinous parts so exactly resolved, that its body is left imporous and not discreted by atomical terminations. For, that continuity of parts is the cause of perspicuity, it is made perspicuous by two ways of experiment. That is, either in effecting transparency in those bodies which were not so before, or at least far short of the additional degree: So Snow becomes transparent upon liquation, so Horns and Bodies resolvable into continued parts or gelly. The like is observable in oyled paper, wherein the interstitial divisions being continued by the accession of oyl, it becometh more transparent, and admits the visible rayes with less umbrosity. Or else the same is effected by rendring those bodies opacous, which were before pellucid and perspicuous.

So Glass which was before diaphanous, being by powder reduced into multiplicity of superficies, becomes an opacous body, and will not transmit the light. So it is in Crystal powdered, and so it is also before; for if it be made hot in a crucible, and presently projected upon water, it will grow dim, and abate its diaphanity; for the water entering the body, begets a division of parts, and a termination of Atoms united before unto continuity.

The ground of this Opinion might be, first the conclusions of some men from experience; for as much as Crystal is found sometimes in rocks, and in some places not much unlike the stirious or stillicidious dependencies of Ice. Which notwithstanding may happen either in places which have been forsaken or left bare by the earth, or may be petrifications, or Mineral indurations, like other gemms, proceeding from percolations of the earth disposed unto such concretions.

The second and most common ground is from the name Crystallus, whereby in Greek both Ice and Crystal are expressed; which many not duly considering, have from their community of name, conceived a community of nature; and what was ascribed unto the one, not unfitly appliable unto the other. But this is a fallacy of Æquivocation, from a society in name inferring an Identity in nature. By this fallacy was he deceived that drank Aqua fortis for strong water. By this are they deluded, who conceive sperma Cœti which is found about the head, to be the spawn of the Whale: Or take sanguis draconis (which is the gumme of a tree,) to be the blood of a Dragon. By the same Logick we may infer, the Crystalline humour of the eye, or rather the Crystalline heaven above, to be of the substance of Crystal here below; Or that God sendeth down Crystal, because it is

delivered in the vulgar translation, Psal. . Mittit Crystallum suum sicut Buccellas. Agreement in name. Which translation although it literally express the Septuagint; yet is there no more meant thereby, than what our translation in plain English expresseth; that is, he casteth forth his Ice like morsels, or what Tremellius and Junius as clearly deliver, Deficit gelu suum sicut frusta, coram frigore ejus quis consistet? which proper and latine expressions, had they been observed in ancient translations, elder Expositors had not been misguided by the Synonymy; nor had they afforded occasion unto Austin, the Gloss, Lyranus, and many others, to have taken up the common conceit, and spoke of this Text conformably unto the opinion rejected.

## CHAPTER II

### Concerning the Loadstone.

Of things particularly spoken thereof, evidently or probably true. Of things generally believed, or particularly delivered, manifestly or probably false. In the first of the Magnetical vertue of the Earth, of the four motions of the stone, that is, its Verticity or Direction, its Attraction or Coition, its Declination, its Variation, and also of its Antiquity. In the second a rejection of sundry opinions and relations thereof, Natural, Medical, Historical, Magical.

How the earth is a Magnetical body.

And first we conceive the earth to be a Magnetical body. A Magnetical body, we term not onely that which hath a power attractive, but that which seated in a convenient medium, naturally disposeth it self to one invariable and fixed situation. And such a Magnetical vertue we conceive to be in the Globe of the Earth, whereby as unto its natural points and proper terms, it disposeth it self unto the poles; being so framed, constituted, and ordered unto these points, that those parts which are now at the poles, would not naturally abide under the Æquator, nor Greenland remain in the place of Magellanica. And if the whole earth were violently removed, yet would it not foregoe its primitive points, nor pitch in the East or West, but return unto its polary position again. For though by compactness or gravity it may acquire the lowest place, and become the center of the universe, yet that it makes good that point, not varying at all by the accession of bodies upon, or secession thereof from its surface, perturbing the equilibration of either Hemisphere (whereby the altitude of the stars might vary) or that it strictly maintains the North and Southern points; that neither upon the motions of the heavens, air, and winds without, large eruptions and division of parts within, its polary parts should never incline or veer unto the Equator (whereby the latitude of places should also vary) it cannot so well be salved from gravity as a Magnetical verticity. The foundation of the Earths stability. This is probably, that foundation the wisdom of the Creator hath laid unto the earth; in this sense we may more nearly apprehend, and sensibly make out the expressions of holy Scripture Psal. ., as Firmavit orbem terræ qui non commovebitur, he hath made the round world so sure that it cannot be moved: as when it is said by Job, Extendit Aquilonem super vacuo, &c. Job . He stretcheth forth the North upon the empty place, and hangeth the earth upon nothing. And this is the most probable answer unto that great question. Whereupon are the foundations of the Earth fastened, or who laid the corner stone thereof? Had they been acquainted with this principle, Anaxagoras, Socrates, and Democritus, had better made out the ground of this stability; Xenophanes had not been fain to say the Earth had no bottom; and Thales Milesius to make it swim in water.

The magnetical vertue of the Earth diffused extra se and communicated to bodies adjacent.

Nor is the vigour of this great body included only in its self, or circumferenced by its surface, but diffused at indeterminate distances through the air, water, and all bodies circumjacent. Exciting and impregnating Magnetical bodies within its surface or without it, and performing in a secret and invisible way what we evidently behold effected by the Loadstone. For these effluxions penetrate all bodies, and like the species of visible objects are ever ready in the medium, and lay hold on all bodies proportionate or capable of their action, those bodies likewise being of a congenerous nature, do readily receive the impressions of their motor; and if not fettered by their gravity, conform themselves to situations, wherein they best unite unto their Animator. And this will sufficiently appear from the observations that are to follow, which can no better way be made out then by this we speak of, the Magnetical vigour of the Earth. Now whether these effluviums do flye by striated Atoms and winding particles as Renatus des Cartes conceiveth; or glide by streams attracted from either Pole and Hemisphere of the Earth unto the Equator, as Sir Kenelm Digby excellently declareth, it takes not away this vertue of the Earth, but more distinctly sets down the gests and progress thereof, and are conceits of eminent use to salve Magnetical Phenomena's. Apparencies observations. And as in Astronomy those hypotheses though never so strange are best esteemed which best do salve apparencies; so surely in Philosophy those principles (though seeming monstrous) may with advantage be embraced, which best confirm experiment, and afford the readiest reason of observation. The doctrine of effluxions acknowledged by the Author. And truly the doctrine of effluxions, their penetrating natures, their invisible paths, and unsuspected effects, are very considerable; for besides this Magnetical one of the Earth, several effusions there may be from divers other bodies, which invisibly act their parts at any time, and perhaps through any medium; a part of Philosophy but yet in discovery, and will, I fear, prove the last leaf to be turned over in the Book of Nature.

First, Therefore it is true, and confirmable by every experiment, that Steel and good Iron never excited by the Loadstone, discover in themselves a verticity; that is, a directive or polary faculty, whereby, conveniently placed, Point to the North. they do Septentrionate at one extreame, and Australize at another. Point to the South. This is manifestable in long and thin plates of Steel perforated in the middle and equilibrated; or by an easier way in long wires equiponderate with untwisted Silk and soft Wax; for in this manner pendulous, they will conform themselves Meridionally, directing one extreame unto the North, another to the South. The same is also manifest in Steel wires thrust through little sphears or globes of Cork and floated on the water, or in naked Needles gently let fall thereon; for so disposed they will not rest, until they have found out the Meridian, and as near as they can lye parallel unto the Axis of the Earth: Sometimes the eye, sometimes the point Northward in divers Needles, but the same point always in most:

Conforming themselves unto the whole Earth, in the same manner as they do unto every Loadstone. For if a Needle untoucht be hanged above a Loadstone, it will convert into a parallel position thereto; for in this situation it can best receive its verticity and be excited proportionably at both extrems. Now this direction proceeds not primitively from themselves, but is derivative and contracted from the Magnetical effluxions of the Earth; which they have winded in their hammering and formation; or else by long continuance in one position, as we shall declare hereafter.

It is likewise true what is delivered of Irons heated in the fire, that they contract a verticity in their refrigeration; for heated red hot and cooled in the Meridian from North to South, they presently contract a polary power, and being poised in air or water, convert that part unto the North which respected that point in its refrigeration, so that if they had no sensible verticity before, it may be acquired by this way; or if they had any, it might be exchanged by contrary position in the cooling. For by the fire they omit not onely many drossie and scorious parts, but whatsoever they had received either from the Earth or Loadstone; and so being naked and despoiled of all verticity, the Magnetical Atomes invade their bodies with more effect and agility.

Neither is it only true what Gilbertus first observed, that Irons refrigerated North and South acquire a Directive faculty; but if they be cooled upright and perpendicularly, they will also obtain the same. That part which is cooled toward the North on this side the Equator, converting it self unto the North, and attracting the South point of the Needle: the other and highest extreame respecting the South, and attracting the Northern, according unto Laws Magnetical: For (what must be observed) contrary Poles or faces attract each other, as the North the South; and the like decline each other, as the North the North. Now on this side of the Equator, that extreame which is next the Earth is animated unto the North, and the contrary unto the South; so that in coition it applies it self quite oppositely, the coition or attraction being contrary to the Verticity or Direction. Contrary, If we speak according unto common use, yet alike, if we conceive the vertue of the North Pole to diffuse it self and open at the South, and the South at the North again.

This polarity from refrigeration upon extremity and in defect of a Loadstone might serve to invigorate and touch a Needle any where; and this, allowing variation, is also the readiest way at any season to discover the North or South; Some conceive that the figure of the Tree or Spredaeagle in the root of Brake or Fern stands North and South, but not truly. and surely far more certain then what is affirmed of the grains and circles in trees, or the figure in the root of Fern. For if we erect a red hot wire until it cool, then hang it up with wax and untwisted Silk, where the lower end and that which cooled next the earth doth rest, that is the Northern point; and this we affirm will still be true whether it be cooled in the air or extinguished in water, oyl of Vitriol, Aqua fortis, or Quicksilver. And this is also evidenced in culinary utensils and Irons that often feel the force of fire,

as Tongs, Fireshovels, Prongs, and Andirons; all which acquire a Magnetical and polary condition, and being suspended, convert their lower extrems unto the North; with the same attracting the Southern point of the Needle. For easier experiment, if we place a Needle touched at the foot of Tongs or Andirons, it will obvert or turn aside its lillie or North point, and conform its cuspis or South extream unto the Andiron. The like verticity though more obscurely is also contracted by Bricks and Tiles, as we have made trial in some taken out of the backs of chimneys. Now to contract this Direction, there needs not a total ignition, nor is it necessary the Irons should be red hot all over. For if a wire be heated only at one end, according as that end is cooled upward or downward, it respectively acquires a verticity, as we have declared in wires totally candent. Nor is it absolutely requisite they should be cooled perpendicularly, or strictly lie in the Meridian; for whether they be refrigerated inclinarily or somewhat Æquinoxially, that is toward the Eastern or Western points; though in a lesser degree, they discover some verticity.

Nor is this onely true in Irons, but in the Loadstone it self. For if a Loadstone be made red hot, it loseth the magnetical vigour it had before in it self, and acquires another from the Earth in its refrigeration; for that part which cooleth toward the Earth will acquire the respect of the North, and attract the Southern point or cuspis of the Needle. The experiment hereof we made in a Loadstone of a parallelogram or long square figure; wherein onely inverting the extrems, as it came out of the fire, we altered the poles or faces thereof at pleasure.

It is also true what is delivered of the Direction and coition of Irons, that they contract a verticity by long and continued position: that is, not onely being placed from North to South, and lying in the Meridian, but respecting the Zenith and perpendicular unto the Center of the Earth; as is manifest in bars of windows, casements, hinges and the like. For if we present the Needle unto their lower extrems, it wheels about and turns its Southern point unto them. The same condition in long time do Bricks contract which are placed in walls, and therefore it may be a fallible way to find out the Meridian by placing the Needle on a wall; for some Bricks therein by a long and continued position, are often magnetically enabled to distract the polarity of the Needle. And therefore those Irons which are said to have been converted into Loadstones; whether they were real conversions, or onely attractive augmentations, might be much promoted by this position: as the Iron cross of an hundred weight upon the Church of St. John in Ariminum, De miner. l. . or that Loadston'd Iron of Cæsar Moderatus, set down by Aldrovandus.

Lastly, Irons do manifest a verticity not only upon refrigeration and constant situation, but (what is wonderful and advanceth the magnetical Hypothesis) they evidence the same by meer position according as they are inverted, and their extrems disposed respectively unto the Earth. For if an Iron or Steel not firmly excited, be held



perpendicularly or inclinatorily unto the Needle, the lower end thereof will attract the cuspis or Southern point; but if the same extream be inverted and held under the Needle, it will then attract the lilly or Northern point; for by inversion it changeth its direction acquired before, and receiveth a new and Southern polarity from the Earth, as being the upper extream. Now if an Iron be touched before, it varieth not in this manner; for then it admits not this magnetical impression, as being already informed by the Loadstone, and polarily determined by its preaction.

And from these grounds may we best determine why the Northern Pole of the Loadstone attracteth a greater weight than the Southern on this side the Æquator; why the stone is best preserved in a natural and polary situation; and why as Gilbertus observeth, it respecteth that Pole out of the Earth, which it regarded in its Mineral bed and subterraneous position.

It is likewise true and wonderful what is delivered of the Inclination or Declination of the Loadstone; that is, the descent of the Needle below the plain of the Horizon. For long Needles which stood before upon their axis, parallel unto the Horizon, being vigorously excited, incline and bend downward, depressing the North extream below the Horizon. That is the North on this, the South on the other side of the Equator; and at the very Line or middle circle stand without deflexion. And this is evidenced not onely from observations of the Needle in several parts of the earth, but sundry experiments in any part thereof, as in a long Steel wire, equilibrated or evenly ballanced in the air; for excited by a vigorous Loadstone it will somewhat depress its animated extream, and intersect the horizontal circumference. It is also manifest in a Needle pierced through a Globe of Cork so cut away and pared by degrees, that it will swim under water, yet sink not unto the bottom, which may be well effected; for if the Cork be a thought too light to sink under the surface, the body of the water may be attenuated with spirits of wine; if too heavy, it may be incrassated with salt; and if by chance too much be added, it may again be thinned by a proportionable addition of fresh water. If then the Needle be taken out, actively touched and put in again, it will depress and bow down its Northern head toward the bottom, and advance its Southern extremity toward the brim. This way invented by Gilbertus may seem of difficulty; the same with less labour may be observed in a needled sphere of Cork equally contiguous unto the surface of the water; for if the Needle be not exactly equiponderant, that end which is a thought too light, if touched becometh even; that Needle also which will but just swim under the water, if forcibly touched will sink deeper, and sometime unto the bottom. If likewise that inclinatory vertue be destroyed by a touch from the contrary Pole, that end which before was elevated will then decline, and this perhaps might be observed in some scales exactly ballanced, and in such Needles which for their bulk can hardly be supported by the water. For if they be powerfully excited and equally let fall, they commonly sink down and break the water at that extream whereat they were septentrionally excited: and by

this way it is conceived there may be some fraud in the weighing of precious commodities, and such as carry a value in quartergrains; by placing a powerful Loadstone above or below, according as we intend to depress or elevate one extream.

Now if these Magnetical emissions be onely qualities, and the gravity of bodies incline them onely unto the earth; surely that which alone moveth other bodies to descent, carrieth not the stroak in this, but rather the Magnetical alliciency of the Earth; unto which with alacrity it applieth it self, and in the very same way unto the whole Earth, as it doth unto a single Loadstone. For if an untouched Needle be at a distance suspended over a Loadstone, it will not hang parallel, but decline at the North extream, and at that part will first salute its Director. Again, what is also wonderful, this inclination is not invariable; for just under the line the Needle lieth parallel with the Horizon, but sailing North or South it beginneth to incline, and encreaseth according as it approacheth unto either Pole; and would at last endeavour to erect it self. And this is no more then what it doth upon the Loadstone, and that more plainly upon the Terrella or spherical magnet Cosmographically set out with circles of the Globe. For at the Equator thereof, the Needle will stand rectangularly; but approaching Northward toward the Tropick it will regard the stone obliquely, and when it attaineth the Pole, directly; and if its bulk be no impediment, erect it self and stand perpendicularly thereon. And therefore upon strict observation of this inclination in several latitudes and due records preserved, instruments are made whereby without the help of Sun or Star, the latitude of the place may be discovered; and yet it appears the observations of men have not as yet been so just and equal as is desirable; for of those Tables of declination which I have perused, there are not any two that punctually agree; though some have been thought exactly calculated, especially that which Ridley received from Mr. Briggs, in our time Geometry Professor in Oxford.

What the variation of the Compass is.

It is also probable what is delivered concerning the variation of the Compass that is the cause and ground thereof, for the manner as being confirmed by observation we shall not at all dispute. The variation of the Compass is an Arch of the Horizon intercepted between the true and Magnetical Meridian; or more plainly, a deflexion and siding East and West from the true Meridian. The true Meridian is a major Circle passing through the Poles of the World, and the Zenith or Vertex of any place, exactly dividing the East from the West. Now on this line the Needle exactly lieth not, but diverts and varieth its point, that is, the North point on this side the Equator, the South on the other; sometimes on the East, sometime toward the West, and in some few places varieth not at all. First, therefore it is observed that betwixt the Shore of Ireland, France, Spain, Guiny, and the Azores, the North point varieth toward the East, and that in some variety; at London it varieth eleven degrees, at Antwerp nine, at Rome but five: at some parts of the Azores it deflecteth not, but lieth in the true Meridian; on the other side of

the Azores, and this side of the Equator, the North point of the Needle wheeleth to the West; so that in the latitude of near the shore, the variation is about eleven degrees; but on the other side the Equator, it is quite otherwise: for about Capio Frio in Brasilia, the South point varieth twelve degrees unto the West, and about the mouth of the Straits of Magellan five or six; but elongating from the coast of Brasilia toward the shore of Africa it varieth Eastward, and arriving at Capo de las Agullas, it resteth in the Meridian, and looketh neither way.

The cause of the variation of the Compass.

Now the cause of this variation was thought by Gilbertus to be the inequality of the Earth, variously disposed, and indifferently intermixed with the Sea: withal the different disposeure of its Magnetical vigor in the eminencies and stronger parts thereof. For the Needle naturally endeavours to conform unto the Meridian, but being distracted, driveth that way where the greater and powerfuller part of the Earth is placed. Which may be illustrated from what hath been delivered and may be conceived by any that understands the generalities of Geography. For whereas on this side the Meridian, or the Isles of Azores, where the first Meridian is placed, the Needle varieth Eastward; it may be occasioned by that vast Tract of Earth, that is, of Europe, Asia, and Africa, seated toward the East, and disposing the Needle that way. For arriving at some part of the Azores, or Islands of Saint Michael, which have a middle situation between these Continents, and that vast and almost answerable Tract of America, it seemeth equally distracted by both; and diverting unto neither, doth parallel and place it self upon the true Meridian. But sailing farther, it veers its Lilly to the West, and regardeth that quarter wherein the Land is nearer or greater; and in the same latitude as it approacheth the shore augmenteth its variation. And therefore as some observe, if Columbus or whosoever first discovered America, had apprehended the cause of this variation, having passed more then half the way, he might have been confirmed in the discovery, and assuredly foretold there lay a vast and mighty continent toward the West. The reason I confess and inference is good, but the instance perhaps not so. For Columbus knew not the variation of the compass, whereof Sebastian Cabot first took notice, who after made discovery in the Northern part of that continent. And it happened indeed that part of America was first discovered, which was on this side farthest distant, that is, Jamaica, Cuba, and the Isles in the Bay of Mexico. And from this variation do some new discoverers deduce a probability in the attempts of the Northern passage toward the Indies.

Now because where the greater continents are joyned, the action and effluence is also greater; therefore those Needles do suffer the greatest variation which are in Countries which most do feel that action. And therefore hath Rome far less variation then London; for on the West side of Rome are seated the great continents of France, Spain, Germany, which take off the exuperance, and in some way ballance the vigor of the Eastern parts.

But unto England there is almost no Earth West, but the whole extent of Europe and Asia lieth Eastward; and therefore at London it varieth eleven degrees, that is almost one Rhomb. Thus also by reason of the great continent of Brasilia, Peru, and Chili, the Needle deflecteth toward the Land twelve degrees; but at the straits of Magellan where the Land is narrowed, and the Sea on the other side, it varieth but five or six. And so likewise, because the Cape de las Agullas hath Sea on both sides near it, and other Land remote, and as it were æquidistant from it, therefore at that point the Needle conforms unto the true Meridian, and is not distracted by the vicinity of Adjacencies. This is the general and great cause of variation. But if in certain Creeks and Vallies the Needle prove irregular, and vary beyond expectation, it may be imputed unto some vigorous part of the Earth, or Magnetical eminence not far distant. And this was the invention of D. Gilbert, not many years past, a Physician in London. And therefore although some assume the invention of its direction, and other have had the glory of the Card; yet in the experiments, grounds, and causes thereof, England produced the Father Philosopher, and discovered more in it then Columbus or Americus did ever by it.

Unto this in great part true the reason of Kircherus may be added: That this variation proceedeth not only from terrestrious eminencies, and magnetical veins of the Earth, laterally respecting the Needle, but the different coagmentation of the Earth disposed unto the Poles, lying under the Sea and Waters, which affect the Needle with great or lesser variation, according to the vigour or imbecility of these subterraneous lines, or the entire or broken compagination of the magnetical fabrick under it. As is observable from several Loadstones placed at the bottom of any water, for a Loadstone or Needle upon the surface, will variously conform it self, according to the vigour or faintness of the Loadstones under it.

Thus also a reason may be alledged for the variation of the variation, and why, according to observation, the variation of the Needle hath after some years been found to vary in some places. For this may proceed from mutations of the earth, by subterraneous fires, fumes, mineral spirits, or otherwise; which altering the constitution of the magnetical parts, in process of time, doth vary the variation over the place.

It is also probable what is conceived of its Antiquity, that the knowledge of its polary power and direction unto the North was unknown unto the Ancients; and though Levinus Lemnius, and Cælius Colcagninus, are of another belief, is justly placed with new inventions by Pancirollus. For their Achilles and strongest argument is an expression in Plautus, a very Ancient author, and contemporary unto Ennius. *Hic ventus jam secundus est, cape modo versoriam*. Now this versoriam they construe to be the compass, which notwithstanding according unto Pineda, who hath discussed the point, Turnebus, Cabeus, and divers others, is better interpreted the rope that helps to turn the Ship, or as we say, doth make it tack about; the Compass declaring rather the Ship is turned, then conferring unto its conversion. As for the long expeditions and sundry

voyages of elder times, which might confirm the Antiquity of this invention, it is not improbable they were performed by the help of Stars; and so might the Phœnicæan navigators, and also Uliſſes ſail about the Mediterranean, by the flight of Birds, or keeping near the ſhore; and ſo might Hanno coaſt about Africa; or by the help of Oars, as is expreſſed in the voyage of Jonah. And whereas it is contended that this verticity was not unknown unto Solomon, in whom is preſumed an univerſality of knowledge; it will as forcibly follow, he knew the Art of Typography, Powder and Guns, or had the Philoſophers Stone, yet ſent unto Ophir for Gold. It is not to be denied, that beſide his Political wiſdom, his knowledge in Philoſophy was very large; and perhaps from his works therein, the ancient Philoſophers, eſpecially Ariſtotle, who had the aſſiſtance of Alexanders acquirements, collected great obſervables. Yet if he knew the uſe of the Compaſſ, his Ships were ſurely very ſlow, that made a three years voyage from Eziongeber in the red Sea unto Ophir; which is ſuppoſed to be Taprobana or Malaca in the Indies, not many moneths ſail; and ſince in the ſame or leſſer time, Drake and Candish performed their voyage about the Earth.

And as the knowledge of its verticity is not ſo old as ſome conceive, ſo it is more ancient then moſt believe; nor had its diſcovery with Guns, Printing, or as many think, ſome years before the diſcovery of America. For it was not unknown unto Petrus Peregrinus a Frenchman, who two hundred years ſince left a Tract of the Magnet, and a perpetual motion to be made thereby, preſerved by Gaſſerus. Paulus Venetus, and about five hundred years paſt Albertus Magnus make mention hereof, and quote for it a Book of Ariſtotle, De Lapide; which Book although we find in the Catalogue of Laertius, yet with Cabeus we may rather judge it to be the work of ſome Arabick Writer, not many years before the days of Albertus.

Laſtly, It is likewise true what ſome have delivered of Crocus Martis, that is, Steel corroded with Vinegar, Sulphur, or otherwiſe, and after reverberated by fire. For the Loadſtone will not at all attract it, nor will it adhere, but lye therein like Sand. This to be underſtood of Crocus Martis well reverberated, and into a violet colour: for common chalybs præparatus, or corroded and powdered Steel, the Loadſtone attracts like ordinary filings of Iron; and many times moſt of that which paſſeth for Crocus Martis. So that this way may ſerve as a teſt of its preparation; after which it becometh a very good medicine in fluxes. The like may be affirmed of flakes of Iron that are ruſty and begin to tend unto Earth; for their cognation then expieth, and the Loadſtone will not regard them.

And therefore this may ſerve as a trial of good Steel. The Loadſtone taking up a greater maſs of that which is moſt pure, it may alſo decide the conversion of Wood into Iron, as is pretended from ſome Waters: and the common conversion of Iron into Copper by the mediation of blew Coperose, for the Loadſtone will not attract it. Although it may be queſtioned, whether in this operation, the Iron or Coperose be tranſmuted, as may be

doubted from the cognation of Coperose with Copper; and the quantity of Iron remaining after the conversion. And the same may be useful to some discovery concerning Vitriol or Coperose of Mars, by some called Salt of Steel, made by the spirits of Vitriol or Sulphur. For the corroded powder of Steel will after ablution be actively attracted by the Loadstone, and also remaineth in little diminished quantity. And therefore whether those shooting Salts partake but little of Steel, and be not rather the vitriolous spirits fixed into Salt by the effluvium or odor of Steel, is not without good question.

### CHAPTER III

#### **Concerning the Loadstone, therein of sundry common Opinions, and received several relations: Natural, Historical, Medical, Magical.**

And first not only a simple Heterodox, but a very hard Paradox, it will seem, and of great absurdity unto obstinate ears, if we say, attraction is unjustly appropriated unto the Loadstone, and that perhaps we speak not properly, when we say vulgarly and appropriately the Loadstone draweth Iron; and yet herein we should not want experiment and great authority. The words of Renatus des Cartes in his Principles of Philosophy are very plain. *Præterea magnes trahet ferrum, sive potius magnes & ferrum ad invicem accedunt, neque enim ulla ibi tractio est.* The same is solemnly determined by Cabeus. *Nec magnes trahit proprie ferrum, nec ferrum ad se magnetem provocat, sed ambo pari conatu ad invicem confluunt.* Concordant hereto is the assertion of Doctor Ridley, Physitian unto the Emperour of Russia, in his Tract of Magnetical Bodies, defining Magnetical attraction to be a natural incitation and disposition conforming unto contiguity, an union of one Magnetical Body with another, and no violent haling of the weak unto the stronger. And this is also the doctrine of Gilbertus, by whom this motion is termed Coition, and that not made by any faculty attractive of one, but a Syndrome and concourse of each; a Coition alway of their vigours, and also of their bodies, if bulk or impediment prevent not. And therefore those contrary actions which flow from opposite Poles or Faces, are not so properly expulsion and attraction, as Sequela and Fuga, a mutual flight and following. Consonant whereto are also the determination of Helmontius, Kircherus, and Licetus.

Attraction reciprocal betwixt the Loadstone and Iron.

The same is also confirmed by experiment; for if a piece of Iron be fastened in the side of a bowl or bason water, a Loadstone swimming freely in a Boot of Cork, will presently make unto it. So if a Steel or Knife untouched, be offered toward the Needle that is touched, the Needle nimbly moveth toward it, and conformeth unto union with the Steel that moveth not. Again, If a Loadstone be finely filed, the Atoms or dust thereof will adhere unto Iron that was never touched, even as the powder of Iron doth also unto the Loadstone. And lastly, if in two Skiffs of Cork, a Loadstone and Steel be placed within the Orb of their activities, the one doth not move the other standing still, but both hoise sail and steer unto each other. So that if the Loadstone attract, the Steel hath also its attraction; for in this action the Alliciency is reciprocal, which joyntly felt, they mutually approach and run into each others arms.

And therefore surely more moderate expressions become this action, then what the Ancients have used, which some have delivered in the most violent terms of their language; so Austin calls it, *Mirabilem ferri raptorem*: Hippocrates *λίθος τὸν σίδηρον*

ἀρπάζει, Lapis qui ferrum rapit. Galen disputing against Epicurus useth the term ἔλκειν, but this also is too violent: among the Ancients Aristotle spake most warily, ὅστις τὸν σίδηρον κινεῖ, Lapis qui ferrum movet: and in some tolerable acception do run the expressions of Aquinas, Scaliger and Cusanus.

Many relations are made, and great expectations are raised from the Magnes Carneus, or a Loadstone, that hath a faculty to attract not only iron but flesh; but this upon enquiry, and as Cabeus also observed, is nothing else but a weak and inanimate kind of Loadstone, veined here and there with a few magnetical and ferreous lines; but consisting of a bolary and clammy substance, whereby it adheres like Hæmatites, or Terra Lemnia, unto the Lips. And this is that stone which is to be understood, when Physitians joyn it with Ætites, or the Eagle stone, and promise therein a vertue against abortion.

There is sometime a mistake concerning the variation of the Compass, and therein one point is taken for another. For beyond that Equator some men account its variation by the diversion of the Northern point, whereas beyond that Circle the Southern point is Sovereign, and the North submits his prehemineny. For in the Southern coast either of America or Africa, the Southern point deflects and varieth toward the Land, as being disposed and spirited that way by the Meridional and proper Hemisphere. And therefore on that side of the Earth the varying point is best accounted by the South. And therefore also the writings of some, and Maps of others, are to be enquired, that make the Needle decline unto the East twelve degrees at Capo Frio, and six at the straits of Magellan; accounting hereby one point for another, and preferring the North in the Liberties and Province of the South.

That Garlick hinders not the attraction of the Loadstone.

But certainly false it is what is commonly affirmed and believed, that Garlick doth hinder the attraction of the Loadstone, which is notwithstanding delivered by grave and worthy Writers, by Pliny, Solinus, Ptolemy, Plutarch, Albertus, Mathiolus, Rueus, Langius, and many more. An effect as strange as that of Homers Moly, and the Garlick that Mercury bestowed upon Ulysses. But that it is evidently false, many experiments declare. For an Iron wire heated red hot and quenched in the juice of Garlick, doth notwithstanding contract a verticity from the Earth, and attracteth the Southern point of the Needle. If also the tooth of a Loadstone be covered or stuck in Garlick, it will notwithstanding attract; and Needles excited and fixed in Garlick until they begin to rust, do yet retain their attractive and polary respects.

Nor yet the Adamant or Diamond.



Of the same stamp is that which is obtruded upon us by Authors ancient and modern, that an Adamant or Diamond prevents or suspends the attraction of the Loadstone: as is in open terms delivered by Pliny. *Adamas dissidet cum Magnete lapide, ut juxta positus ferrum non patiaturs abstrahi, aut si admotus magnes, apprehenderit, rapiat atque auferat.* For if a Diamond be placed between a Needle and a Loadstone, there will nevertheless ensue a Coition even over the body of the Diamond. And an easie matter it is to touch or excite a Needle through a Diamond, by placing it at the tooth of a Loadstone; and therefore the relation is false, or our estimation of these gemms untrue; nor are they Diamonds which carry that name amongst us.

De generatione rerum.

It is not suddenly to be received what Paracelsus affirmeth, that if a Loadstone be anointed with Mercurial oyl, or onely put into Quicksilver, it omitteth its attraction for ever. For we have found that Loadstones and touched Needles which have laid long time in Quicksilver have not amitted their attraction. And we also find that red hot Needles or wires extinguished in Quicksilver, do yet acquire a verticity according to the Laws of position in extinction. Of greater repugnancy unto reason is that which he delivers concerning its graduation, that heated in fire and often extinguished in oyl of Mars or Iron, it acquires an ability to extract or draw forth a nail fastened in a wall; for, as we have declared before, the vigor of the Loadstone is destroyed by fire, nor will it be reimpregnated by any other Magnete then the Earth.

Nor is it to be made out what seemeth very plausible, and formerly hath deceived us, that a Loadstone will not attract an Iron or Steel red hot. The falsity hereof discovered first by Kircherus, we can confirm by iterated experiment; very sensibly in armed Loadstones, and obscurely in any other.

True it is, that besides fire some other wayes there are of its destruction, as Age, Rust; and what is least dreamt on, an unnatural or contrary situation. For being impolarly adjoyned unto a more vigorous Loadstone, it will in a short time exchange its Poles; or being kept in undue position, that is, not lying on the Meridian, or else with its poles inverted, it receives in longer time impair in activity, exchange of Faces; and is more powerfully preserved by position then by the dust of Steel. But the sudden and surest way is fire; that is, fire not onely actual but potential; the one surely and suddenly, the other slowly and imperfectly; the one changing, the other destroying the figure. For if distilled Vinegar or Aqua fortis be poured upon the powder of Loadstone, the subsiding powder dried, retains some Magnetical vertue, and will be attracted by the Loadstone: but if the menstruum or dissolvent be evaporated to a consistence, and afterward doth shoot into Icycles or Crystals, the Loadstone hath no power upon them; and if in a full dissolution of Steel a separation of parts be made by precipitation or exhalation, the exsiccated powder hath lost its wings and ascends not unto the Loadstone. And though a

Loadstone fired doth presently omit its proper vertue, and according to the position in cooling contracts a new verticity from the Earth; yet if the same be laid awhile in aqua fortis or other corrosive water, and taken out before a considerable corrosion, it still reserves its attraction, and will convert the Needle according to former polarity. And that duly preserved from violent corrosion, or the natural disease of rust, it may long conserve its vertue, beside the Magnetical vertue of the Earth, which hath lasted since the Creation, a great example we have from the observation of our learned friend Mr. Graves, In his learned Pyramidographia. in an Ægyptian Idol cut out of Loadstone, and found among the Mummies; which still retains its attraction, though probably taken out of the Mine about two thousand years ago.

It is improbable what Pliny affirmeth concerning the object of its attraction, that it attracts not only ferreous bodies, but also liquorem vitri; for in the body of Glass there is no ferreous or magnetical nature which might occasion attraction. For of the Glass we use, the purest is made of the finest sand and the ashes of Chali or Glaswort, and the courser or green sort of the ashes of Brake or other plants. True it is that in the making of Glass, it hath been an ancient practice to cast in pieces of magnet, or perhaps manges: conceiving it carried away all ferreous and earthy parts, from the pure and running portion of Glass, which the Loadstone would not respect; and therefore if that attraction were not rather Electrical then Magnetical, it was a wondrous effect what Helmont delivereth concerning a Glass wherein the Magistery of Loadstone was prepared, which after retained an attractive quality.

But whether the Magnet attracteth more then common Iron, may be tried in other bodies. It seems to attract the Smyris or Emery in powder; It draweth the shining or glassie powder brought from the Indies, and usually implied in writingdust. There is also in Smiths Cinders by some adhesion of Iron whereby they appear as it were glazed, sometime to be found a magnetical operation; for some thereof applied have power to move the Needle. But whether the ashes of vegetables which grow over Iron Mines contract a magnetical quality, as containing some mineral particles, which by sublimation ascend unto their Roots, and are attracted together with their nourishment; according as some affirm from the like observations upon the Mines of Silver, Quick silver, and Gold, we must refer unto further experiment.

It is also improbable and something singular what some conceive, and Eusebius Nierembergius, a learned Jesuit of Spain delivers, that the body of man is magnetical, and being placed in a Boat, the Vessel will never rest untill the head respecteth the North. If this be true, the bodies of Christians do lye unnaturally in their Graves. King Cheops in his Tomb, and the Jews in their beds have fallen upon the natural position: who reverentially declining the situation of their Temple, nor willing to lye as that stood,

do place their Beds from North to South, and delight to sleep Meridionally. This Opinion confirmed would much advance the Microcosmical conceit, and commend the Geography of Paracelsus, who according to the Cardinal points of the World divideth the body of man: and therefore working upon humane ordure, and by long preparation rendring it odoriferous, he terms it Zibeta Occidentalis, Western Civet; making the face the East, but the posterious the America or Western part of his Microcosm. The verity hereof might easily be tried in Wales, where there are portable Boats, and made of Leather, which would convert upon the impulsion of any verticity; and seem to be the same whereof in his description of Britain Cæsar hath left some mention.

Another kind of verticity, is that which Angelus doce mihi jus, alias, Anagrammatically. Michael Sundevoigis, in a Tract De Sulphure, discovereth in Vegetables, from sticks let fall or depressed under water; which equally framed and permitted unto themselves, will ascend at the upper end, or that which was vertical in their vegetation; wherein notwithstanding, as yet, we have not found satisfaction. Although perhaps too greedy of Magnalities, we are apt to make but favourable experiments concerning welcome Truths, and such desired verities.

It is also wondrous strange what Lælius Bisciola reporteth, that if unto ten ounces of Loadstone one of Iron be added, it encreaseth not unto eleven, but weighs ten ounces still. Horæ subsecivæ. A relation inexcusable in a work of leisurable hours: the examination being as ready as the relation, and the falsity tried as easily as delivered. Nor is it to be omitted what is taken up by the Cœsius Bernardus a late Mineralogist, and originally confirmed by Porta, that Needles touched with a Diamond contract a verticity, even as they do with a Loadstone, which will not consist with experiment. And therefore, as Gilbertus observeth, he might be deceived, in touching such Needles with Diamonds, which had a verticity before, as we have declared most Needles to have; and so had he touched them with Gold or Silver, he might have concluded a magnetical vertue therein.

In the same form may we place Fracastorius his attraction of silver. Philostratus his Pantarbes, Apollodorus and Beda his relation of the Loadstone that attracted onely in the night. But most inexcusable is Franciscus Rueus, a man of our own profession; who in his discourse of Gemms mentioned in the Apocalyps, undertakes a Chapter of the Loadstone. Wherein substantially and upon experiment he scarce delivereth any thing: making long enumeration of its traditional qualities, whereof he seemeth to believe many, and some above convicted by experience, he is fain to salve as impostures of the Devil. But Boëtius de Boot Physitian unto Rodulphus the second, hath recompenced this defect; and in his Tract De Lapidibus & Gemmis, speaks very materially hereof; and his Discourse is consonant unto Experience and Reason.

As for Relations Historical, though many there be of less account, yet two alone deserve consideration: The first concerneth magnetical Rocks, and attractive Mountains in several parts of the Earth. The other the Tomb of Mahomet and bodies suspended in the air. Of Rocks magnetical there are likewise two relations; for some are delivered to be in the Indies, and some in the extremity of the North, and about the very Pole. The Northern account is commonly ascribed unto Olaus Magnus Archbishop of Upsale, who out of his Predecessor Joannes, Saxo, and others, compiled a History of some Northern Nations; but this assertion we have not discovered in that Work of his which commonly passeth amongst us, and should believe his Geography herein no more then that in the first line of his Book; when he affirmeth that Biarmia (which is not seventy degrees in latitude) hath the Pole for its Zenith, and Equinoctial for the Horizon.

Now upon this foundation, how uncertain soever men have erected mighty illations, ascribing thereto the cause of the Needles direction, and conceiving the effluents from these Mountains and Rocks invite the Lilly toward the North. Which conceit though countenanced by learned men, is not made out either by experience or reason, for no man hath yet attained or given a sensible account of the Pole by some degrees. It is also observed the Needle doth very much vary as it approacheth the Pole; whereas were there such direction from the Rocks, upon a nearer approachment it would more directly respect them. Beside, were there such magnetical Rocks under the Pole, yet being so far removed they would produce no such effect. For they that sail by the Isle of Ilua now called Elba in the Tuscan Sea which abounds in veins of Loadstone, observe no variation or inclination of the Needle; much less may they expect a direction from Rocks at the end of the Earth. And lastly, men that ascribe thus much unto Rocks of the North, must presume or discover the like magneticals at the South: For in the Southern Seas and far beyond the Equator, variations are large, and declinations as constant as in the Northern Ocean.

(Probably) there be no magnetical Rocks.

The other relation of Loadstone Mines and Rocks, in the shore of India is delivered of old by Pliny; wherein, saith he, they are so placed both in abundance and vigour, that it proves an adventure of hazard to pass those Coasts in a Ship with Iron nails. Serapion the Moor, an Author of good esteem and reasonable Antiquity, confirmeth the same, whose expression in the word magnes is this. The Mine of this Stone is in the Seacoast of India, whereto when Ships approach, there is no Iron in them which flies not like a Bird unto those Mountains; and therefore their ships are fastened not with Iron but Wood, for otherwise they would be torn to pieces. But this assertion, how positive soever, is contradicted by all Navigators that pass that way; which are now many, and of our own

Nation, and might surely have been controled by Nearchus the Admiral of Alexander; who not knowing the Compass, was fain to coast that shore.

Mahomet's tomb of stone, and built upon the ground.

For the relation concerning Mahomet, it is generally believed his Tomb at Medina Talnabi, in Arabia, without any visible supporters hangeth in the air between two Loadstones artificially contrived both above and below; which conceit is fabulous and evidently false from the testimony of Ocular Testators, who affirm his Tomb is made of Stone, and lyeth upon the ground; as beside others the learned Vossius observeth from Gabriel Sionita, and Joannes Hesronita, two Maronites in their relations hereof. Of such intentions and attempt by Mahometans we read in some Relators, and that might be the occasion of the Fable, which by tradition of time and distance of place enlarged into the Story of being accomplished. And this hath been promoted by attempts of the like nature; for we read in Pliny that one Dinocrates began to Arch the Temple of Arsinoe in Alexandria with Loadstone, that so her Statue might be suspended in the air to the amazement of the beholders. And to lead on our crudelity herein, confirmation may be drawn from History and Writers of good authority. So it is reported by Ruffinus, that in the Temple of Serapis there was an Iron Chariot suspended by Loadstones in the air; which stones removed, the Chariot fell and dashed into pieces. The like doth Beda report of Bellerophons Horse, which framed of Iron, was placed between two Loadstones, with wings expanded, pendulous in the air.

The verity of these Stories we shall not further dispute, their possibility we may in some way determine; if we conceive what no man will deny, that bodies suspended in the air have this suspension from one or many Loadstones placed both above and below it; or else by one or many placed only above it. Likewise the body to be suspended in respect of the Loadstone above, is either placed first at a pendulous distance in the medium, or else attracted unto that site by the vigor of the Loadstone. And so we first affirm, that possible it is, a body may be suspended between two Loadstones; that is, it being so equally attracted unto both, that it determineth it self unto neither. But surely this position will be of no duration; for if the air be agitated or the body waved either way, it omits the equilibration, and disposeth it self unto the nearest attractor. Again, It is not impossible (though hardly feasible) by a single Loadstone to suspend an Iron in the air, the Iron being artificially placed and at a distance guided toward the stone, until it find the neutral point, wherein its gravity just equals the magnetical quality, the one exactly extolling as much as the other depresseth. And lastly, Impossible it is that if an Iron rest upon the ground, and a Loadstone be placed over it, it should ever so arise as to hang in the way or medium; for that vigor which at a distance is able to overcome the resistance of its gravity and to lift it up from the Earth, will as it approacheth nearer be still more able to attract it; never remaining in the middle that could not abide in the extrems. Now the way of Baptista Porta that by a thred fastneth a Needle to a Table, and then so

guides and orders the same, that by the attraction of the Loadstone it abideth in the air, infringeth not this reason; for this is a violent retention, and if the thred be loosened, the Needle ascends and adheres unto the Attractor.

Powder of Loadstones, of what operation.

The third consideration concerneth Medical relations; wherein what ever effects are delivered, they are either derived from its mineral and ferreous condition, or else magnetical operation. Unto the ferreous and mineral quality pertaineth what Dioscorides an ancient Writer and Souldier under Anthony and Cleopatra affirmeth, that half a dram of Loadstone given with Honey and Water, proves a purgative medicine, and evacuateth gross humours. But this is a quality of great incertainty; for omitting the vehicle of Water and Honey, which is of a laxative power it self, the powder of some Loadstones in this dose doth rather constipate and binde, then purge and loosen the belly. And if sometimes it cause any laxity, it is probably in the same way with Iron and Steel unprepared, which will disturb some bodies, and work by Purge and Vomit. And therefore, whereas it is delivered in a Book ascribed unto Galen, that it is a good medicine in dropsies, and evacuates the waters of persons so affected: It may I confess by siccity and astriction afford a confirmation unto parts relaxed, and such as be hydropically disposed; and by these qualities it may be useful in Hernias or Ruptures, and for these it is commended by Ætius, Ægineta, and Oribatius; who only affirm that it contains the vertue of Hæmatites, and being burnt was sometimes vended for it. Wherein notwithstanding there is an higher vertue; and in the same prepared, or in rich veins thereof, though crude, we have observed the effects of Chalybeat Medicines; and the benefits of Iron and Steel in strong obstructions. And therefore that was probably a different vein of Loadstone, or infected with other mineral mixture, which the Ancients commended for a purgative medicine, and ranked the same with the violentest kinds thereof: with Hippophae, Cneoron, and Thymelæa, as we find it in Hippocrates De morbis internis.; and might be somewhat doubtful, whether by the magnesian stone, he understood the Loadstone; did not Achilles Statius define the same, the Stone that loveth Iron.

To this mineral condition belongeth what is delivered by some, that wounds which are made with weapons excited by the Loadstone, contract a malignity, and become of more difficult cure; which nevertheless is not to be found in the incision of Chyrurgions with knives and lances touched; which leave no such effect behind them. Hither we also refer that affirmative, which sayes the Loadstone is poison; and therefore in the lists of poisons we find it in many Authors. But this our experience cannot confirm, and the practice of the King of Zeilan clearly contradicteth; who as Garcias ab Horto, Physitian unto the Spanish Viceroy delivereth, hath all his meat served up in dishes of Loadstone, and conceives thereby he preserveth the vigour of youth.

But surely from a magnetical activity must be made out what is let fall by Ætius, that a Loadstone held in the hand of one that is podagrical, doth either cure or give great ease in the Gout. Or what Marcellus Empericus affirmeth, that as an amulet, it also cureth the headach; which are but additions unto its proper nature, and hopeful enlargements of its allowed attraction. For perceiving its secret power to draw magnetical bodies, men have invented a new attraction, to draw out the dolour and pain of any part. And from such grounds it surely became a philter, and was conceived a medicine of some venereal attraction; and therefore upon this stone they graved the Image of Venus, according unto that of Claudian, *Venerem magnetica gemma figurat*. Hither must we also ruler what is delivered concerning its power to draw out of the body bullets and heads of arrows, and for the like intention is mixed up in plaisters. Which course, although as vain and ineffectual it be rejected by many good Authors, yet is it not methinks so readily to be denied, nor the Practice of many Physicians which have thus compounded plaisters, thus suddenly to be condemned, as may be observed in the *Emplastrum divinum Nicolai*, the *Emplastrum nigrum* of Augspurg, the *Opodeldoch* and *Attractivum* of Paracelsus, with several more in the Dispensatory of Wecker, and practice of Sennertus. The cure also of Hernias, or Ruptures in Pareus: and the method also of curation lately delivered by Daniel Beckherus, D and approved by the Professors of Leyden, that is, of a young man of Spruceland that casually swallowed a knife about ten inches long, which was cut out of his stomach, and the wound healed up. In which cure to attract the knife to a convenient situation, there was applied a plaister made up with the powder of Loadstone. Now this kind of practice Libavius, Gilbertus, and lately Swickardus In his *Ars Magnetica*. condemn, as vain, and altogether unuseful; because a Loadstone in powder hath no attractive power; for in that form it omits his polarly respects, and loseth those parts which are the rule of attraction.

Wherein to speak compendiously, if experiment hath not deceived us, we first affirm that a Loadstone in powder omits not all attraction. For if the powder of a rich vein be in a reasonable quantity presented toward the Needle freely placed, it will not appear to be void of all activity, but will be able to stir it. Nor hath it only a power to move the Needle in powder and by it self, but this will it also do, if incorporated and mixed with plaisters; as we have made trial in the *Emplastrum de Minia*, with half an ounce of the mass, mixing a dram of Loadstone. For applying the magdaleon or roal unto the Needle, it would both stir and attract it; not equally in all parts, but more vigorously in some, according unto the Mine of the Stone, more plentifully dispersed in the mass. And lastly, In the Loadstone powdered, the polary respects are not wholly destroyed. For those diminutive particles are not atomical or meerly indivisible, but consist of dimensions sufficient for their operations, though in obscurer effects. Thus if unto the powder of Loadstone or Iron we admove the North Pole of the Loadstone, the Powders or small divisions will erect and conform themselves thereto: but if the South Pole approach, they will subside, and inverting their bodies, respect the Loadstone with the other

extream. And this will happen not only in a body of powder together, but in any particle or dust divided from it.

Now though we disavow not these plaisters, yet shall we not omit two cautions in their use, that therein the Stone be not too subtilly powdered, for it will better manifest its attraction in a more sensible dimension. That where is desired a speedy effect, it may be considered whether it were not better to relinquish the powdered plaisters, and to apply an entire Loadstone unto the part: And though the other be not wholly ineffectual, whether this way be not more powerful, and so might have been in the cure of the young man delivered by Beckerus.

The last consideration concerneth Magical relations; in which account we comprehend effects derived and fathered upon hidden qualities, specifical forms, Antipathies and Sympathies, whereof from received grounds of Art, no reasons are derived. Herein relations are strange and numerous; men being apt in all Ages to multiply wonders, and Philosophers dealing with admirable bodies, as Historians have done with excellent men, upon the strength of their great atcheivements, ascribing acts unto them not only false but impossible; and exceeding truth as much in their relations, as they have others in their actions. Hereof we shall briefly mention some delivered by Authors of good esteem: whereby we may discover the fabulous inventions of some, the credulous supinity of others, and the great disservice unto truth by both: multiplying obscurities in Nature, and authorising hidden qualities that are false; whereas wise men are ashamed there are so many true.

And first, Dioscorides puts a shrewd quality upon it, and such as men are apt enough to experiment, who therewith discovers the incontineny of a wife, by placing the Loadstone under her pillow, whereupon she will not be able to remain in bed with her husband. The same he also makes a help unto thievery. For Thieves saith he, having a design upon a house, do make a fire at the four corners thereof, and cast therein the fragments of Loadstone: whence ariseth a fume that so disturbeth the inhabitants, that they forsake the house and leave it to the spoil of the Robbers. This relation, how ridiculous soever, hath Albertus taken up above a thousand years after, and Marbodeus the Frenchman hath continued the same in Latine Verse, which with the Notes of Pictorius is currant unto our dayes. As strange must be the Lithomancy or divination from this Stone, whereby as Tzetzes delivers, Helenus the Prophet foretold the destruction of Troy: and the Magick thereof not safely to be believed, which was delivered by Orpheus, that sprinkled with water it will upon a question emit a voice not much unlike an Infant. But surely the Loadstone of Laurentius Guascus the Physitian, is never to be matched; wherewith, as Cardan delivereth, whatsoever Needles or Bodies were touched, the wounds and punctures made thereby, were never felt at all. And yet as strange is that which is delivered by some, that a Loadstone preserved in the salt of a Remora, acquires a power to attract gold out of the deepest Wells. Certainly a studied



absurdity, not casually cast out, but plotted for perpetuity: for the strangeness of the effect ever to be admired, and the difficulty of the trial never to be convicted.

These conceits are of that monstrosity that they refute themselves in their recitements. There is another of better notice, and whispered thorow the World with some attention; credulous and vulgar auditors readily believing it, and more judicious and distinctive heads, not altogether rejecting it. The conceit is excellent, and if the effect would follow, somewhat divine; whereby we might communicate like spirits, and confer on earth with Menippus in the Moon. And this is pretended from the sympathy of two Needles touched with the same Loadstone, and placed in the center of two Abecedary circles or rings, with letters described round about them, one friend keeping one, and another the other, and agreeing upon an hour wherein they will communicate. For then, saith Tradition, at what distance of place soever, when one Needle shall be removed unto any letter, the other by a wonderful sympathy will move unto the same. But herein I confess my experience can find no truth; for having expressly framed two circles of Wood, and according to the number of the Latine letters divided each into twenty three parts, placing therein two stiles or Needles composed of the same steel, touched with the same Loadstone, and at the same point: of these two, whensoever I removed the one, although but at the distance of half a span, the other would stand like Hercules pillars, and if the Earth stand still, have surely no motion at all. Now as it is not possible that any body should have no boundaries, or Sphear of its activity, so it is improbable it should effect that at distance, which nearer hand it cannot at all perform.

Again, The conceit is ill contrived, and one effect inferred, whereas the contrary will ensue. For if the removing of one of the Needles from A to B, should have any action or influence on the other, it would not intice it from A to B, but repell it from A to Z: for Needles excited by the same point of the stone, do not attract, but avoid each other, even as these also do, when their invigorated extreams approach unto one other.

Lastly, Were this conceit assuredly true, yet were it not a conclusion at every distance to be tried by every head: it being no ordinary or Almanack business, but a Problem Mathematical, to finde out the difference of hours in different places; nor do the wisest exactly satisfie themselves in all. For the hours of several places anticipate each other, according unto their Longitudes, which are not exactly discovered of every place; and therefore the trial hereof at a considerable interval, is best performed at the distance of the Antœci; that is, such habitations as have the same Meridian and equal parallel, on different sides of the Æquator; or more plainly the same Longitude and the same Latitude unto the South, which we have in the North. For unto such situations it is noon and midnight at the very same time.

And therefore the Sympathy of these Needles is much of the same mould with that intelligence which is pretended from the flesh of one body transmuted by incision into

another. De curtorum Chyrurgia. For if by the Art of Taliacotius, a permutation of flesh, or transmutation be made from one mans body into another, as if a piece of flesh be exchanged from the bicipital muscle of either parties arm, and about them both an Alphabet circumscribed; upon a time appointed as some conceptions affirm, they may communicate at what distance soever. For if the one shall prick himself in A, the other at the same time will have a sense thereof in the same part: and upon inspection of his arm perceive what letters the other points out in his. Which is a way of intelligence very strange: and would requite the lost Art of Pythagoras, who could read a reverse in the Moon.

Now this magnetical conceit how strange soever, might have some original in Reason; for men observing no solid body, whatsoever did interrupt its action, might be induced to believe no distance would terminate the same; and most conceiving it pointed unto the Pole of Heaven, might also opinion that nothing between could restrain it. Whosoever was the Author, the Æolus that blew it about was Famianus Strada, that Elegant Jesuit, in his Rhetorical prolusions, who chose out this subject to express the stile of Lucretius. But neither Baptista Porta, de Furtivis Literarum notis; Trithemius in his Steganography, Selenus in his Cryptography, Nunc. inanim. by D. Godwin Bishop of Hereford. Nuncius inanimatus make any consideration hereof, although they deliver many ways to communicate thoughts at distance. And this we will not deny may in some manner be effected by the Loadstone; that is, from one room into another; by placing a table in the wall common unto both, and writing thereon the same letters one against another: for upon the approach of a vigorous Loadstone unto a letter on this side, the Needle will move unto the same on the other. But this is a very different way from ours at present; and hereof there are many ways delivered, and more may be discovered which contradict not the rule of its operations.

As for Unguentum Armarium, called also Magneticum, it belongs not to this discourse, it neither having the Loadstone for its ingredient, nor any one of its actions: but supposeth other principles, as common and universal spirits, which convey the action of the remedy unto the part, and conjoins the vertue of bodies far disjoyned. But perhaps the cures it doth, are not worth so mighty principles; it commonly healing but simple wounds, and such as mundified and kept clean, do need no other hand then that of Nature, and the Balsam of the proper part. Unto which effect there being fields of Medicines, it may be a hazardous curiosity to rely on this; and because men say the effect doth generally follow, it might be worth the experiment to try, whether the same will not ensue, upon the same Method of cure, by ordinary Balsams, or common vulnerary plaisters.

Many other Magnetisms may be pretended, and the like attractions through all the creatures of Nature. Whether the same be verified in the action of the Sun upon inferiour bodies, whether there be Æolian Magnets, whether the flux and reflux of the

Sea be caused by any Magnetism from the Moon; whether the like be really made out, or rather Metaphorically verified in the sympathies of Plants and Animals, might afford a large dispute; and Kircherus in his *Catena Magnetica* hath excellently discussed the same; which work came late unto our hand, but might have much advantaged this Discourse.

Other Discourses there might be made of the Loadstone: as Moral, Mystical, Theological; and some have handsomely done them; as Ambrose, Austine, Gulielmus Parisiensis, and many more, but these fall under no Rule, and are as boundless as mens inventions. And though honest minds do glorifie God hereby; yet do they most powerfully magnifie him, and are to be looked on with another eye, who demonstratively set forth its Magnalities; who not from postulated or precarious inferences, entreat a courteous assent; but from experiments and undeniable effects, enforce the wonder of its Maker.

Footnotes

D De cultrivoro Prussiaco, . The cure of the Prussian Knife.

## CHAPTER IV

### Of Bodies Electrical.

Bodies Electrical, what?

Having thus spoken of the Loadstone and Bodies Magnetical, I shall in the next place deliver somewhat of Electrical, and such as may seem to have attraction like the other. Hereof we shall also deliver what particularly spoken or not generally known is manifestly or probably true, what generally believed is also false or dubious. Now by Electrical bodies, I understand not such as are Metallical, mentioned by Pliny, and the Ancients; for their Electrum was a mixture made of Gold, with the Addition of a fifth part of Silver; a substance now as unknown as true Aurichalcum, or Corinthian Brass, and set down among things lost by Pancirollus. Nor by Electrick Bodies do I conceive such only as take up shavings, straws, and light bodies, in which number the Ancients only placed Jet and Amber; but such as conveniently placed unto their objects attract all bodies palpable whatsoever. I say conveniently placed, that is, in regard of the object, that it be not too ponderous, or any way affixed; in regard of the Agent, that it be not foul or sullied, but wiped, rubbed, and excited; in regard of both, that they be conveniently distant, and no impediment interposed. I say, all bodies palpable, thereby excluding fire, which indeed it will not attract, nor yet draw through it; for fire consumes its effluxions by which it should attract.

Now although in this rank but two were commonly mentioned by the Ancients, Gilbertus discovereth many more; as Diamonds, Saphyrs, Carbuncles, Iris, Opalls, Amethysts, Beril, Crystal, Bristolstones, Sulphur, Mastick, hard Wax, hard Rosin, Arsenic, Salgemm, RochAllum, common Glass, Stibium, or Glass of Antimony. Unto these Cabeus addeth white Wax, Gum Elemi, Gum Guaici, Pix Hispanica, and Gypsum. And unto these we add Gum Anime, Benjamin, Talcum, Chinadishes, Sandaraca, Turpentine, Styrax Liquida, and Caranna dried into a hard consistence. And the same attraction we find, not onely in simple bodies, but such as are much compounded; as in the Oxycroceum plaister, and obscurely that ad Herniam, and Gratia Dei; all which smooth and rightly prepared, will discover a sufficient power to stir the Needle, settled freely upon a wellpointed pin; and so as the Electrick may be applied unto it without all disadvantage.

But the attraction of these Electricks we observe to be very different. Resinous or unctuous bodies, and such as will flame, attract most vigorously, and most thereof without frication; as Anime, Benjamin, and most powerfully good hard Wax, which will convert the Needle almost as actively as the Loadstone. And we believe that all or most

of this substance if reduced to hardness, tralucency or clearness, would have some attractive quality. But juices concrete, or Gums easily dissolving in water, draw not at all: as Aloe, Opium, Sanguis Draconis, Lacca, Calbanum, Sagapenum. Many stones also both precious and vulgar, although terse and smooth, have not this power attractive: as Emeralds, Pearl, Jaspis, Corneleans, Agathe, Heliotropes, Marble, Alabaster, Touchstone, Flint, and Bezoar. Glass attracts but weakly, though clear; some slick stones and thick Glasses indifferently: Arsenic but weakly, so likewise Glass of Antimony, but Crocus Metallorum not at all. Salts generally but weakly, as Sal Gemma, Allum, and also Talke; nor very discoverably by any frication, but if gently warmed at the fire, and wiped with a dry cloth, they will better discover their Electricities.

No Metal attracts, nor Animal concretion we know, although polite and smooth; as we have made trial in Elks Hoofs, HawksTalons, the Sword of a Swordfish, Tortoisshells, Seahorse, and Elephants Teeth, in Bones, in Hartshorn, and what is usually conceived Unicornshorn. No Wood though never so hard and polished, although out of some thereof Electrck bodies proceed; as Ebony, Box, Lignum vitæ, Cedar, etc. And although Jet and Amber be reckoned among Bitumens, yet neither do we find Asphaltus, that is, Bitumens of Judea, nor Seacole, nor Camphire, nor Mummia to attract, although we have tried in large and polished pieces. Now this attraction have we tried in straws and paleous bodies, in Needles of Iron, equilibrated, Powders of Wood and Iron, in Gold and Silver foliate. And not only in solid but fluent and liquid bodies, as oyls made both by expression and distillation; in Water, in spirits of Wine, Vitriol and Aquafortis.

But how this attraction is made, is not so easily determined; that 'tis performed by effluviums is plain, and granted by most; for Electricks will not commonly attract, except they grow hot or become perspirable. For if they be foul and obnubilated, it hinders their effluxion; nor if they be covered, though but with Linen or Sarsenet, or if a body be interposed, for that intercepts the effluvium. If also a powerful and broad Electrck of Wax or Anime be held over fine powder, the Atoms or small particles will ascend most numerously unto it; and if the Electrck be held unto the light, it may be observed that many thereof will fly, and be as it were discharged from the Electrck to the distance sometime of two or three inches. Which motion is performed by the breath of the effluvium issuing with agility; for as the Electrck cooleth, the projection of the Atoms ceaseth.

Cabeus his way for attraction in bodies Electrck.

The manner hereof Cabeus wittily attempteth, affirming that this effluvium attenuateth and impelleth the neighbor air, which returning home in a gyration, carrieth with it the obvious bodies unto the Electrck. And this he labours to confirm by experiments; for if the straws be raised by a vigorous Electrck, they do appear to wave and turn in their ascents. If likewise the Electrck be broad, and the straws light and chaffy, and held at a

reasonable distance, they will not arise unto the middle, but rather adhere toward the Verge or Borders thereof. And lastly, if many straws be laid together, and a nimble Electrick approach, they will not all arise unto it, but some will commonly start aside, and be whirled a reasonable distance from it. Now that the air impelled returns unto its place in a gyration or whirling, is evident from the Atoms or Motes in the Sun. For when the Sun so enters a hole or window, that by its illumination the Atoms or Motes become perceptible, if then by our breath the air be gently impelled, it may be perceived, that they will circularly return and in a gyration unto their places again.

The way of Sir Kenelm Digby.

Another way of their attraction is also delivered; that is, by a tenuous emanation or continued effluvium, which after some distance retracteth into it self; as is observable in drops of Syrups, Oyl, and seminal Viscosities, which spun at length, retire into their former dimensions. Now these effluviūms advancing from the body of the Electrick, in their return do carry back the bodies whereon they have laid hold within the Sphere or Circle of their continuities; and these they do not onely attract, but with their viscous arms hold fast a good while after. And if any shall wonder why these effluviūms issuing forth impel and protrude not the straw before they can bring it back, it is because the effluvium passing out in a smaller thred and more enlengthened filament, it stirreth not the bodies interposed, but returning unto its original, falls into a closer substance, and carrieth them back unto it self. And this way of attraction is best received, embraced by Sir Kenelm Digby in his excellent Treaty of bodies, allowed by Des Cartes in his principles of Philosophy, as far and concerneth fat and resinous bodies, and with exception of Glass, whose attraction he also deriveth from the recess of its effluction. And this in some manner the words of Gilbertus will bear: *Effluvia illa tenuiora concipiunt & amplectuntur corpora, quibus uniuntur, & electris tanquam extensis brachiis, & ad fontem propinquitate invalescentibus effluviis, deducuntur.* And if the ground were true, that the Earth were an Electrick body, and the air but the effluvium thereof, we might have more reason to believe that from this attraction, and by this effluction, bodies tended to the Earth, and could not remain above it.

Our other discourse of Electricks concerneth a general opinion touching Jet and Amber, that they attract all light bodies, except Ocymum or Basil, and such as be dipped in oyl or oyled; and this is urged as high as Theophrastus: but Scaliger acquitteth him; And had this been his assertion, Pliny would probably have taken it up, who herein stands out, and delivereth no more but what is vulgarly known. But Plutarch speaks positively in his Symposiacks, that Amber attracteth all bodies, excepting Basil and oyled substances. With Plutarch consent many Authors both Ancient and Modern; but the most inexcusable are Lemnius and Rueus, whereof the one delivering the nature of Minerals mentioned in Scripture, the infallible fountain of Truth, confirmeth their vertues with erroneous traditions; the other undertaking the occult and hidden Miracles

of Nature, accepteth this for one; and endeavoureth to alledge a reason of that which is more then occult, that is, not existent.

Now herein, omitting the authority of others, as the Doctrine of experiment hath informed us, we first affirm, That Amber attracts not Basil, is wholly repugnant unto truth. For if the leaves thereof or dried stalks be stripped into small straws, they arise unto Amber, Wax, and other Electrics, no otherwise then those of Wheat and Rye: nor is there any peculiar fatness or singular viscosity in that plant that might cause adhesion, and so prevent its ascension. But that Jet and Amber attract not straws oyled, is in part true and false. For if the straws be much wet or drenched in oyl, true it is that Amber draweth them not; for then the oyl makes the straws to adhere unto the part whereon they are placed, so that they cannot rise unto the Attractor; and this is true, not onely if they be soaked in Oyl, but spirits of Wine or Water. But if we speak of Straws or festucous divisions lightly drawn over with oyl, and so that it causeth no adhesion; or if we conceive an Antipathy between Oyl and Amber, the Doctrine is not true. For Amber will attract straws thus oyled, it will convert the Needles of Dials made either of Brass or Iron, although they be much oyled; for in these Needles consisting free upon their Center, there can be no adhesion. It will likewise attract Oyl it self, and if it approacheth unto a drop thereof, it becometh conical, and ariseth up unto it, for Oyl taketh not away his attraction, although it be rubbed over it. For if you touch a piece of Wax already excited with common Oyl, it will notwithstanding attract, though not so vigorously as before. But if you moisten the same with any Chymical Oyl, Water, or spirits of Wine, or only breath upon it, it quite omits its attraction, for either its influencies cannot get through, or will not mingle with those substances.

It is likewise probable the Ancients were mistaken concerning its substance and generation; they conceiving it a vegetable concretion made of the gums of Trees, especially Pine and Poplar falling into the water, and after indurated or hardened, whereunto accordeth the Fable of Phaetons sisters: but surely the concretion is Mineral, according as is delivered by Boetius. For either it is found in Mountains and mediterraneous parts; and so it is a fat and unctuous sublimation in the Earth, concreted and fixed by salt and nitrous spirits wherewith it meeteth. Or else, which is most usual, it is collected upon the Seashore; and so it is a fat and bituminous juice coagulated by the saltness of the Sea. Now that salt spirits have a power to congeal and coagulate unctuous bodies, is evident in Chymical operations; in the distillations of Arsenick, sublimate and Antimony; in the mixture of oyl of Juniper, with the salt and acide spirit of Sulphur, for thereupon ensueth a concretion unto the consistence of Birdlime; as also in spirits of salt, or Aqua fortis poured upon oyl of Olive, or more plainly in the Manufacture of Soap. And many bodies will coagulate upon commixture, whose separated natures promise no concretion. Thus upon a solution of Tin by Aqua

fortis, there will ensue a coagulation, like that of whites of Eggs. How the stone is bred in the Kidney or Bladder. Thus the volatile salt of Urine will coagulate Aqua vitæ, or spirits of Wine; and thus perhaps (as Helmont excellently declareth) the stones or calculous concretions in Kidney or Bladder may be produced: the spirits or volatile salt of Urine conjoyning with the Aqua vitæ potentially lying therein; as he illustrateth from the distillation of fermented Urine. From whence ariseth an Aqua vitæ or spirit, which the volatile salt of the same Urine will congeal; and finding an earthy concurrence, strike into a lapideous substance.

Of a Bee and a Viper involved in Amber. Mart. l. .

Lastly, We will not omit what Bellabonus upon his own experiment writ from Dantzich unto Mellichius, as he hath left recorded in his Chapter, De succino, that the bodies of Flies, Pismires, and the like, which are said oftentimes to be included in Amber, are not real but representative, as he discovered in several pieces broke for that purpose. If so, the two famous Epigrams hereof in Martial are but Poetical, the Pismire of Brassavolus imaginary, and Cardans Mousoleum for a Flie, a meer phansie. But hereunto we know not how to assent, as having met with some whose reals made good their representments.



## CHAPTER V

### **Compendiously of sundry other common Tenents, concerning Mineral and Terreous Bodies, which examined, prove either false or dubious.**

. And first we hear it in every mouth, and in many good Authors read it, That a Diamond, which is the hardest of stones, not yielding unto Steel, Emery, or any thing but its own powder, is yet made soft, or broke by the blood of a Goat. Thus much is affirmed by Pliny, Solinus, Albertus, Cyprian, Austin, Isidore, and many Christian Writers, alluding herein unto the heart of man and the precious bloud of our Saviour, who was typified by the Goat that was slain, and the scapeGoat in the Wilderness; and at the effusion of whose bloud, not only the hard hearts of his enemies relented, but the stony rocks and vail of the Temple were shattered. But this I perceive is easier affirmed then proved. For Lapidaries, and such as profess the art of cutting this stone, do generally deny it; and they that seem to countenance it, have in their deliveries so qualified it, that little from thence of moment can be inferred for it. For first, the holy Fathers, without a further enquiry did take it for granted, and rested upon the authority of the first deliverers. As for Albertus, he promiseth this effect, but conditionally, not except the Goat drink wine, and be fed with Siler montanum, petroselinum, and such herbs as are conceived of power to break the stone in the bladder. But the words of Pliny, from whom most likely the rest at first derived it, if strictly considered, do rather overthrow, then any way advantage this effect. His words are these: *Hircino rumpitur sanguine, nec aliter quam recenti, calidoque macerata, & sic quoque multis ictibus, tunc etiam præterquam eximias incudes malleosque ferreos frangens.* That is, it is broken with Goats blood, but not except it be fresh and warm, and that not without many blows, and then also it will break the best Anvils and Hammers of Iron. And answerable hereto, is the assertion of Isidore and Solinus. By which account, a Diamond steeped in Goats bloud, rather increaseth in hardness, then acquireth any softness by the infusion; for the best we have are comminuable without it; and are so far from breaking hammers, that they submit unto pistillation, and resist not an ordinary pestle.

*Pulvis Lithontripticus.*

Upon this conceit arose perhaps the discovery of another; that the bloud of a Goat was sovereign for the Stone, as it stands commended by many good Writers, and brings up the composition in the powder of Nicolaus, and the Electuary of the Queen of Colein. Or rather because it was found an excellent medicine for the Stone, and its ability commended by some to dissolve the hardest thereof; it might be conceived by amplifying apprehensions, to be able to break a Diamond; and so it came to be ordered that the Goat should be fed with saxifragous herbs, and such as are conceived of power to break the stone. However it were, as the effect is false in the one, so is it surely very doubtful in the other. For although inwardly received it may be very diuretick, and

expulse the stone in the Kidneys, yet how it should dissolve or break that in the bladder, will require a further dispute; and perhaps would be more reasonably tried by a warm injection thereof, then as it is commonly used. Wherein notwithstanding, we should rather rely upon the urine in a castlings bladder, a resolution of Crabs eyes, or the second distillation of Urine, as Helmont hath commended; or rather (if any such might be found) a Chylifactory menstruum or digestive preparation drawn from species or individuals, whose stomacks peculiarly dissolve lapideous bodies.

. That Glass is poison, according unto common conceit, I know not how to grant. Not onely from the innocency of its ingredients, that is, fine Sand, and the ashes of Glasswort of Fearn, which in themselves are harmless and useful: or because I find it by many commended for the Stone, but also from experience, as having given unto Dogs above a dram thereof, subtilly powdered in Butter and Paste, without any visible disturbance.

Why Glass is commonly held to be poysonous.

The conceit is surely grounded upon the visible mischief of Glass grosly or coarsly powdered, for that indeed is mortally noxious, and effectually used by some to destroy Mice and Rats; for by reason of its acuteness and angularity, it commonly excoriates the parts through which it passeth, and solicits them unto a continual expulsion. Whereupon there ensues fearful symptomes, not much unlike those which attend the action of poison. From whence notwithstanding, we cannot with propriety impose upon it that name, either by occult or elementary quality, which he that concedeth will much enlarge the Catalogue or Lists of Poisons. For many things, neither deleterious by substance or quality, are yet destructive by figure, or some occasional activity. So are Leeches destructive, and by some accounted poison; not properly, that is by temperamental contrariety, occult form, or so much as elemental repugnancy; but because being inwardly taken they fasten upon the veins, and occasion an effusion of blood, which cannot be easily stanchd. So a Sponge is mischievous, not in it self, for in its powder it is harmless: but because being received into the stomach it swelleth, and occasioning a continual distension, induceth a strangulation. So Pins, Needles, ears of Rye or Barley may be poison. So Daniel destroyed the Dragon by a composition of three things, whereof neither was poison alone, nor properly all together, that is, Pitch, Fat, and Hair, according as is expressed in the History. Then Daniel took Pitch, and Fat, and Hair, and did seeth them together, and made lumps thereof, these he put in the Dragons mouth, and so he burst asunder. That is, the Fat and Pitch being cleaving bodies, and the Hair continually extimulating the parts: by the action of the one, Nature was provoked to expell, but by the tenacity of the other forced to retain: so that there being left no passage in or out, the Dragon brake in pieces. It must therefore be taken of groslypowdered Glass, what is delivered by Grevinus: and from the same must that mortal dysentery proceed which is related by Sanctorius. And in the same sense shall we

only allow a Diamond to be poison; and whereby as some relate Paracelsus himself was poisoned. So even the precious fragments and cordial gems which are of frequent use in Physick, and in themselves confessed of useful faculties, received in gross and angular Powders, may so offend the bowels, as to procure desperate languors, or cause most dangerous fluxes.

That Glass may be rendred malleable and pliable unto the hammer, many conceive, and some make little doubt, when they read in Dio, Pliny, and Petronius, that one unhappily effected it for Tiberius. Which notwithstanding must needs seem strange unto such as consider, that bodies are ductile from a tenacious humidity, which so holdeth the parts together; that though they dilate or extend, they part not from each others. That bodies run into Glass, when the volatile parts are exhaled, and the continuing humour separated: the Salt and Earth, that is, the fixed parts remaining. And therefore vitrification maketh bodies brittle, as destroying the viscous humours which hinder the disruption of parts. Which may be verified even in the bodies of Metals. For Glass of Lead or Tin is fragile, when that glutinous Sulphur hath been fired out, which made their bodies ductile.

He that would most probably attempt it, must experiment upon Gold. Whose fixed and flying parts are so conjoined, whose Sulphur and continuing principle is so united unto the Salt, that some may be hoped to remain to hinder fragility after vitrification. But how to proceed, though after frequent corrosion, as that upon the agency of fire, it should not revive into its proper body before it comes to vitrifie, will prove no easie discovery.

. That Gold inwardly taken, either in substance, infusion, decoction or extinction, is a cordial of great efficacy, in sundry Medical uses, although a practice much used, is also much questioned, and by no man determined beyond dispute. There are hereof I perceive two extream opinions; some excessively magnifying it, and probably beyond its deserts; others extreamly vilifying it, and perhaps below its demerits. Some affirming it a powerful Medicine in many diseases, others averring that so used, it is effectual in none: and in this number are very eminent Physicians, Erastus, Duretus, Rondeletius, Brassavolus and many other, who beside the strigments and sudorous adhesions from mens hands, acknowledge that nothing proceedeth from Gold in the usual decoction thereof. Now the capital reason that led men unto this opinion, was their observation of the inseparable nature of Gold; it being excluded in the same quantity as it was received, without alteration of parts, or diminution of its gravity.

Now herein to deliver somewhat which in a middle way may be entertained; we first affirm, that the substance of Gold is invincible by the powerfulest action of natural heat; and that not only alimentally in a substantial mutation, but also medicamentally in any corporeal conversion. As is very evident, not only in the swallowing of golden bullets,

but in the lesser and foliate divisions thereof: passing the stomach and guts even as it doth the throat, that is, without abatement of weight or consistence. So that it entereth not the veins with those electuaries, wherein it is mixed: but taketh leave of the permeant parts, at the mouths of the Meseraicks, or Lacteal Vessels, and accompanieth the inconvertible portion unto the siege. Nor is its substantial conversion expectible in any composition or aliment wherein it is taken. And therefore that was truly a starving absurdity, which befel the wishes of Midas. And little credit there is to be given to the golden Hen, related by Wendlerus. So in the extinction of Gold, we must not conceive it parteth with any of its salt or dissoluble principle thereby, as we may affirm of Iron; for the parts thereof are fixed beyond division, nor will they separate upon the strongest test of fire. This we affirm of pure Gold: for that which is currant and passeth in stamp amongst us, by reason of its allay, which is a proportion of Silver or Copper mixed therewith, is actually dequantitated by fire, and possibly by frequent extinction.

Secondly, Although the substance of Gold be not immuted or its gravity sensibly decreased, yet that from thence some vertue may proceed either in substantial reception or infusion we cannot safely deny. For possible it is that bodies may emit vertue and operation without abatement of weight; as is evident in the Loadstone, whose effluencies are continual, and communicable without a minoration of gravity. And the like is observable in Bodies electrical, whose emissions are less subtile. So will a Diamond or Sapphire emit an effluvium sufficient to move the Needle or a Straw, without diminution of weight. Nor will polished Amber although it send forth a gross and corporal exhalation, be found a long time defective upon the exactest scales. Which is more easily conceivable in a continued and tenacious effluvium, whereof a great part retreats into its body.

Thirdly, If amulets do work by emanations from their bodies, upon those parts whereunto they are appended, and are not yet observed to abate their weight; if they produce visible and real effects by imponderous and invisible emissions, it may be unjust to deny the possible efficacy of Gold, in the nonomission of weight, or depredation of any ponderous particles.

Lastly, Since Stibium or Glass of Antimony, since also its Regulus will manifestly communicate unto Water or Wine, a purging and vomitory operation; and yet the body it self, though after iterated infusions, cannot be found to abate either vertue or weight: we shall not deny but Gold may do the like, that is, impart some effluences unto the infusion, which carry with them the separable subtilties thereof.

That therefore this Metal thus received, hath any undeniable effect, we shall not imperiously determine, although beside the former experiments, many more may induce us to believe it. But since the point is dubious and not yet authentically decided, it will be no discretion to depend on disputable remedies; but rather in cases of known

danger, to have recourse unto medicines of known and approved activity. For, beside the benefit accruing unto the sick, hereby may be avoided a gross and frequent error, commonly committed in the use of doubtful remedies, conjointly with those which are of approved virtues; that is to impute the cure unto the conceited remedy, or place it on that whereon they place their opinion. Whose operation although it be nothing, or its concurrence not considerable, yet doth it obtain the name of the whole cure: and carrieth often the honour of the capital energie, which had no finger in it.

Herein exact and critical trial should be made by publick enjoynment, whereby determination might be settled beyond debate: for since thereby not only the bodies of men, but great Treasures might be preserved, it is not only an error of Physick, but folly of State, to doubt thereof any longer.

. That a pot full of ashes, will still contain as much water as it would without them, although by Aristotle in his Problems taken for granted, and so received by most, is not effectable upon the strictest experiment I could ever make. For when the airy interstices are filled, and as much of the salt of the ashes as the water will imbibe is dissolved, there remains a gross and terreous portion at the bottom, which will possess a space by it self, according whereto there will remain a quantity of Water not receivable; so will it come to pass in a pot of salt, although decrepitated; and so also in a pot of Snow. For so much it will want in reception, as its solution taketh up, according unto the bulk whereof, there will remain a portion of Water not to be admitted. So a Glass stuffed with pieces of Sponge will want about a sixth part of what it would receive without it. So Sugar will not dissolve beyond the capacity of the Water, nor a Metal in aqua fortis be corroded beyond its reception. And so a pint of salt of Tartar exposed unto a moist air until it dissolve, will make far more liquor, or as some term it oyl, then the former measure will contain.

Nor is it only the exclusion of air by water, or repletion of cavities possessed thereby, which causeth a pot of ashes to admit so great a quantity of Water, but also the solution of the salt of the ashes into the body of the dissolvent. So a pot of ashes will receive somewhat more of hot Water then of cold, for the warm water imbibeth more of the Salt; and a vessel of ashes more then one of pindust or filings of Iron; and a Glass full of Water will yet drink in a proportion of Salt or Sugar without overflowing.

Nevertheless to make the experiment with most advantage, and in which sense it approacheth nearest the truth, it must be made in ashes thoroughly burnt and well reverberated by fire, after the salt thereof hath been drawn out by iterated decoctions. For then the body being reduced nearer unto Earth, and emptied of all other principles, which had former ingression unto it, becometh more porous, and greedily drinketh in water. He that hath beheld what quantity of Lead the test of saltless ashes will imbibe, upon the refining of Silver, hath encouragement to think it will do very much more in water.

## The Ingredients of Gunpowder.

. Of white powder and such as is discharged without report, there is no small noise in the World: but how far agreeable unto truth, few I perceive are able to determine. Herein therefore to satisfie the doubts of some, and amuse the credulity of others, We first declare, that Gunpowder consisteth of three ingredients, Saltpetre, Smallcoal, and Brimstone. Saltpetre although it be also natural and found in several places, yet is that of common use an artificial Salt, drawn from the infusion of salt Earth, as that of Stales, Stables, Dovehouses, Cellars, and other covered places, where the rain can neither dissolve, nor the Sun approach to resolve it. Brimstone is a Mineral body of fat and inflammable parts, and this is either used crude, and called Sulphur Vive, and is of a sadder colour; or after depuration, such as we have in magdeleons or rolls, of a lighter yellow. Smallcoal is known unto all, and for this use is made of Sallow, Willow, Alder, Hazel, and the like; which three proportionably mixed, tempered, and formed into granulary bodies, do make up that Powder which is in use for Guns.

Now all these, although they bear a share in the discharge, yet have they distinct intentions, and different offices in the composition. From Brimstone proceedeth the piercing and powerful firing; for Smallcoal and Petre together will onely spit, nor vigorously continue the ignition. From Smallcoal ensueth the black colour and quick accension; for neither Brimstone nor Petre, although in Powder, will take fire like Smallcoal, nor will they easily kindle upon the sparks of a Flint; as neither will Camphire, a body very inflammable: but Smallcoal is equivalent to Tinder, and serveth to light the Sulphur. It may also serve to diffuse the ignition through every part of the mixture; and being of more gross and fixed parts, may seem to moderate the activity of Saltpetre, and prevent too hasty rarefaction. From Saltpetre proceedeth the force and the report; for Sulphur and Smallcoal mixed will not take fire with noise, or exilition, and Powder which is made of impure and greasie Petre hath but a weak emission, and giveth a faint report. And therefore in the three sorts of Powder the strongest containeth most Saltpetre, and the proportion thereof is about ten parts of Petre unto one of Coal and Sulphur.

But the immediate cause of the Report is the vehement commotion of the air upon the sudden and violent eruption of the Powder; for that being suddenly fired, and almost altogether, upon this high rarefaction, requireth by many degrees a greater space then before its body occupied; but finding resistance, it actively forceth his way, and by concussion of the air occasioneth the Report. Now with what violence it forceth upon the air, may easily be conceived, if we admit what Cardan affirmeth, that the Powder fired doth occupy an hundred times a greater space then its own bulk; or rather what Snellius more exactly accounteth; that it exceedeth its former space no less then  $1000$  times. The cause of Thunder. And this is the reason not only of this fulminating report of Guns, but may resolve the cause of those terrible cracks, and affrighting noises of Heaven; that is,

the nitrous and sulphureous exhalations, set on fire in the Clouds; whereupon requiring a larger place, they force out their way, not only with the breaking of the cloud, but the laceration of the air about it. The greatest distance of the Clouds. When if the matter be spirituous, and the cloud compact, the noise is great and terrible: If the cloud be thin, and the Materials weak, the eruption is languid, ending in coruscations and flashes without noise, although but at the distance of two miles; which is esteemed the remotest distance of clouds. And therefore such lightnings do seldom any harm. And therefore also it is prodigious to have thunder in a clear sky, as is observably recorded in some Histories.

The cause of Earthquakes.

From the like cause may also proceed subterraneous Thunders and Earthquakes, when sulphureous and nitreous veins being fired, upon rarefaction do force their way through bodies that resist them. Where if the kindled matter be plentiful, and the Mine close and firm about it, subversion of Hills and Towns doth sometimes follow: If scanty, weak, and the Earth hollow or porous, there only ensueth some faint concussion or tremulous and quaking Motion. Surely, a main reason why the Ancients were so imperfect in the doctrine of Meteors, was their ignorance of Gunpowder and Fireworks, which best discover the causes of many thereof.

Now therefore he that would destroy the report of Powder, must work upon the Petre; he that would exchange the colour, must think how to alter the Smallcoal. For the one, that is, to make white Powder, it is surely many ways feasible: The best I know is by the powder of rotten Willows, Spunk, or Touchwood prepared, might perhaps make it Russet: and some, as Beringuccio In his Pyrotechnia. affirmeth, have promised to make it Red. All which notwithstanding doth little concern the Report, for that, as we have shewed, depends on another Ingredient. And therefore also under the colour of black, this principle is very variable; for it is made not onely by Willow, Alder, Hazel, etc. But some above all commend the coals of Flax and Rushes, and some also contend the same may be effected with Tinder.

As for the other, that is, to destroy the Report, it is reasonably attempted but two ways; either by quite leaving out, or else by silencing the Saltpetre. How to abate the vigour thereof, or silence its bombulation, a way is promised by Porta, not only in general terms by some fat bodies, but in particular by Borax and butter mixed in a due proportion; which saith he, will so go off as scarce to be heard by the discharger; and indeed plentifully mixed, it will almost take off the Report, and also the force of the charge. That it may be thus made without Saltpetre, I have met with but one example, that is, of Alphonsus Duke of Ferrara De examine Salium., who in the relation of Brassavolus and Cardan, invented such a Powder as would discharge a bullet without Report.

That therefore white Powder there may be, there is no absurdity; that also such a one as may give no report, we will not deny a possibility. But this however, contrived either with or without Saltpetre, will surely be of little force, and the effects thereof no way to be feared: For as it omits of Report so will it of effectual exclusion, and so the charge be of little force which is excluded. For thus much is reported of that famous Powder of Alphonsus, which was not of force enough to kill a Chicken, according to the delivery of Brassavolus. *Jamque pulvis inventus est qui glandem sine bombo projicit, nec tamen vehementer ut vel pullum interficere possit.*

It is not to be denied, there are ways to discharge a bullet, not only with Powder that makes no noise, but without any Powder at all; as is done by Water and Windguns, but these afford no fulminating Report, and depend on single principles. And even in ordinary Powder there are pretended other ways to alter the noise and strength of the discharge; and the best, if not only way, consists in the quality of the Nitre: for as for other ways which make either additions or alterations in the Powder, or charge, I find therein no effect: That unto every pound of Sulphur, an adjection of one ounce of Quicksilver, or unto every pound of Petre, one ounce of Sal Armoniac will much intend the force, and consequently the Report, as Beringuccio hath delivered, I find no success therein. That a piece of Opium will dead the force and blow, as some have promised, I find herein no such peculiarity, no more then in any Gum or viscose body: and as much effect there is to be found from Scammony. That a bullet dipped in oyl by preventing the transpiration of air, will carry farther, and pierce deeper, as Porta affirmeth, my experience cannot discern. That Quicksilver is more destructive then shot, is surely not to be made out; for it will scarce make any penetration, and discharged from a Pistol, will hardly pierce through a Parchment. That Vinegar, spirits of Wine, or the distilled water of Orange-pills, wherewith the Powder is tempered, are more effectual unto the Report than common Water, as some do promise, I shall not affirm; but may assuredly more conduce unto the preservation and durance of the Powder, as Cataneo hath well observed. *Cat. avvertimenti intorne a un Bombardiero.*

That the heads of arrows and bullets have been discharged with that force, as to melt or grow red hot in their flight, though commonly received, and taken up by Aristotle in his Meteors, is not so easily allowable by any, who shall consider, that a Bullet of Wax will mischief without melting; that an Arrow or Bullet discharged against Linen or Paper do not set them on fire; and hardly apprehend how an Iron should grow red hot, since the swiftest motion at hand will not keep one red that hath been made red by fire; as may be observed in swinging a red hot Iron about, or fastning it into a Wheel; which under that motion will sooner grow cold then without it. That a Bullet also mounts upward upon the horizontall or pointblank discharge, many Artists do not allow: who contend that it describeth a parabolical and bowing line, by reason of its natural gravity inclining it always downward.



But, Beside the prevalence from Saltpetre, as Masteringredient in the mixture; Sulphur may hold a greater use in the composition and further activity in the exclusion, then is by most conceived. For Sulphur vive makes better Powder then common Sulphur, which nevertheless is of a quick accension. For Smallcoal, Saltpetre, and Camphire made into Powder will be of little force, wherein notwithstanding there wants not the accending ingredient. And Camphire though it flame well, yet will not flush so lively, or defecate Saltpetre, if you inject it thereon, like Sulphur; as in the preparation of Sal prunellæ. And lastly, though many ways may be found to light this Powder, yet is there none I know to make a strong and vigorous Powder of Saltpetre, without the admixtion of Sulphur. Arsenic red and yellow, that is Orpement and Sandarach may perhaps do something, as being inflamable and containing Sulphur in them; but containing also a salt, and mercurial mixtion, they will be of little effect; and white or crystalline Arsenic of less, for that being artificial, and sublimed with salt, will not endure flammation.

This Antipathy or contention between Saltpetre and Sulphur upon an actual fire, in their compleat and distinct bodies, is also manifested in their preparations, and bodies which invisibly contain them. Thus in the preparation of Crocus Metallorum, the matter kindleth and flusheth like Gunpowder, wherein notwithstanding, there is nothing but Antimony and Saltpetre. But this may proceed from the Sulphur of Antimony, not enduring the society of Saltpetre; for after three or four accensions, through a fresh addition of Petre, the Powder will flush no more, for the sulphur of the Antimony is quite exhaled. Thus Iron in Aqua fortis will fall into ebullition, with noise and emication, as also a crass and fumid exhalation, which are caused from this combat of the sulphur of Iron with the acid and nitrous spirits of Aqua fortis. So is it also in Aurum fulminans, or Powder of Gold dissolved in Aqua Regis, and precipitated with oyl of Tartar, which will kindle without an actual fire, and afford a report like Gunpowder; that is not as Crolius affirmeth from any Antipathy between Sal Armoniac Deconsensu Chymicorum, etc. and Tartar, but rather between the nitrous spirits of Aqua Regis, commixed per minima with the sulphur of Gold, as Sennertus hath observed.

How Coral of a Plant becomes a Stone.

That Coral (which is a Lithophyton or stoneplant, and groweth at the bottom of the Sea) is soft under Water, but waxeth hard in the air, although the assertion of Dioscorides, Pliny, and consequently Solinus, Isidore, Rueus, and many others, and stands believed by most, we have some reason to doubt, especially if we conceive with common Believers, a total softness at the bottom, and this induration to be singly made by the air, not only from so sudden a petrification and strange induration, not easily made out from the qualities of air, but because we find it rejected by experimental enquiries. In the French Copy. Johannes Beguinus in his Chapter of the tincture of Coral undertakes to clear the World of this Error, from the express experiment of John Baptista de Nicole, who was Overseer of the gathering of Coral upon the Kingdom of Thunis. This

Gentleman, saith he, desirous to find the nature of Coral, and to be resolved how it groweth at the bottom of the Sea, caused a man to go down no less then a hundred fathom, with express to take notice whether it were hard or soft in the place where it groweth. Who returning, brought in each hand a branch of Coral, affirming it was as hard at the bottom, as in the air where he delivered it. The same was also confirmed by a trial of his own, handling it a fathom under water before it felt the air. Boetius in his Tract De Gemmis, is of the same opinion, not ascribing its concretion unto the air, but the coagulating spirits of Salt, and lapidifical juice of the Sea, which entring the parts of that Plant, overcomes its vegetability, and converts it into a lapideous substance. And this, saith he, doth happen when the Plant is ready to decay; for all Coral is not hard, and in many concreted Plants some parts remain unpetrified, that is the quick and livelier parts remain as Wood, and were never yet converted. Now that Plants and ligneous bodies may indurate under Water without approachment of air, we have experiment in Coralline, with many Coralloidal concretions; and that little stony Plant which Mr. Johnson nameth, Hippuris coralloides, and Gesner, foliis mansu Arenosis, we have found in fresh water, which is the less concretive portion of that Element. We have also with us the visible petrification of Wood in many waters, whereof so much as is covered with water converteth into stone; as much as is above it and in the air, retaineth the form of Wood, and continueth as before.

Gans Histor. Coral.

Now though in a middle way we may concede, that some are soft and others hard; yet whether all Coral were first a woody substance, and afterward converted; or rather some thereof were never such, but from the sprouting spirit of Salt, were able even in their stony natures to ramifie and send forth branches; as is observable in some stones, in silver and metallick bodies, is not without some question. And such at least might some of those be, which Fiarounti observed to grow upon Bricks at the bottom of the Sea, upon the coast of Barbaric.

Of what matter the China dishes be made.

We are not thoroughly resolved concerning Porcellane or China dishes, that according to common belief they are made of Earth, which lieth in preparation about an hundred years under ground; for the relations thereof are not onely divers, but contrary, and Authors agree not herein. Guido Pancirollus will have them made of Eggshells, Lobstershells, and Gypsum laid up in the Earth the space of years: of the same affirmation is Scaliger, and the common opinion of most. Ramuzius in his Navigations is of a contrary assertion, that they are made out of Earth, not laid under ground, but hardned in the Sun and Wind, the space of forty years. But Gonzales de Mendoza, a man imployed into China from Philip the second King of Spain, upon enquiry and ocular experience, delivered a way different from all these. For inquiring into the artifice

thereof, he found they were made of a Chalky Earth; which beaten and steeped in water, affordeth a cream or fatness on the top, and a gross subsidence at the bottom; out of the cream or superfluity, the finest dishes, saith he, are made, out of the residue thereof the coarser; which being formed, they gild or paint, and not after an hundred years, but presently commit unto the furnace. This, saith he, is known by experience, and more probable then what Odoardus Barbosa hath delivered, that they are made of shells, and buried under earth an hundred years. And answerable in all points hereto, is the relation of Linschotten, a diligent enquirer, in his Oriental Navigations. Later confirmation may be had from Alvarez the Jesuit, who lived long in those parts, in his relations of China. That Porcellane Vessels were made but in one Town of the Province of Chiamsi: That the earth was brought out of other Provinces, but for the advantage of water, which makes them more polite and perspicuous, they were only made in this. That they were wrought and fashioned like those of other Countries, whereof some were tinted blew, some red, others yellow, of which colour only they presented unto the King.

The latest account hereof may be found in the voyage of the Dutch Embassadors sent from Batavia unto the Emperour of China, printed in French, which plainly informeth, that the Earth whereof Porcellane dishes are made, is brought from the Mountains of Hoang, and being formed into square loaves, is brought by water, and marked with the Emperours Seal: that the Earth it self is very lean, fine, and shining like Sand: and that it is prepared and fashioned after the same manner which the Italians observe in the fine Earthen Vessels of Faventia or Fuenca: that they are so reserved concerning that Artifice, that 'tis only revealed from Father unto Son: that they are painted with Indico baked in a fire for fifteen days together, and with very dry and not smoaking Wood: which when the Author had seen he could hardly contain from laughter at the common opinion above rejected by us.

Now if any enquire, why being so commonly made, and in so short a time, they are become so scarce, or not at all to be had? The Answer is given by these last Relators, that under great penalties it is forbidden to carry the first sort out of the Country. And of those surely the properties must be verified, which by Scaliger and others are ascribed unto Chinadishes: That they admit no poison, that they strike fire, that they will grow hot no higher then the liquor in them ariseth. For such as pass amongst us, and under the name of the finest, will only strike fire, but not discover Aconite, Mercury, or Arsenic; but may be useful in dysenteries and fluxes beyond the other.

Whether a Carbuncle (which is esteemed the best and biggest of Rubies) doth flame in the dark, or shine like a coal in the night, though generally agreed on by common Believers, is very much questioned by many. By Milius, who accounts it a Vulgar Error: By the learned Boetius, who could not find it verified in that famous one of Rodolphus, which was as big as an Egg, and esteemed the best in Europe. Wherefore although we

dispute not the possibility, and the like is said to have been observed in some Diamonds, yet whether herein there be not too high an apprehension, and above its natural radiancy, is not without just doubt: however it be granted a very splendid Gem, and whose sparks may somewhat resemble the glances of fire, and Metaphorically deserve that name. And therefore when it is conceived by some, that this Stone in the Brestplate of Aaron respected the Tribe of Dan, who burnt the City of Laish; and Sampson of the same Tribe, who fired the Corn of the Philistims; in some sense it may be admitted, and is no intollerable conception.

As for that Indian Stone that shined so brightly in the Night, and pretended to have been shewn to many in the Court of France, as Andreus Chioccus hath declared out of Thuanus, it proved but an imposture, as that eminent Philosopher Licetus Licet de quæsit. per Epistolas. hath discovered, and therefore in the revised Editions of Thuanus, it is not to be found. Licet de lapide Bononiensi. As for the Phosphorus or Bononian Stone, which exposed unto the Sun, and then closely shut up, will afterward afford a light in the dark; it is of unlike consideration, for that requireth calcination or reduction into a dry powder by fire, whereby it imbibeth the light in the vaporous humidity of the air about it, and therefore maintaineth its light not long, but goes out when the vaporous vehicle is consumed. Whether the Ætites or Eaglestone hath that eminent property to promote delivery or restrain abortion, respectively applied to lower or upward parts of the body, we shall not discourage common practice by our question: but whether they answer the account thereof, as to be taken out of Eagles nests, cooperating in Women unto such effects, as they are conceived toward the young Eagles: or whether the single signature of one stone included in the matrix and belly of another, were not sufficient at first, to derive this vertue of the pregnant Stone, upon others in impregnation, may yet be farther considered. Many sorts there are of this ratling Stone, beside the Geodes, containing a softer substance in it. Divers are found in England, and one we met with on the Seashore, but because many of eminent use are pretended to be brought from Iseland, wherein are divers airies of Eagles, we cannot omit to deliver what we received from a learned person in that Country, Theodorus Ionas Hitterdalæ Pastor. Ætites an in nidis Aquilarum aliquando fuerit repertus, nescio. Nostra certè memoria, etiam inquirentibus non contigit invenisse, quare in fabulis habendum.

Terrible apprehensions and answerable unto their names, are raised of Fayrie stones, and Elves spurs, found commonly with us in Stone, Chalk, and Marlpits, which notwithstanding are no more than Echinometrites and Belemnites, the SeaHedgeHog, and the Dartstone, arising from some siliceous Roots, and softer then that of Flint, the Masterstone, lying more regularly in courses, and arising from the primary and strongest spirit of the Mine. Of the Echinites, such as are found in Chalkpits are white, glassie, and built upon a Chalky inside; some of an hard and flinty substance, are found

in Stonepits and elsewhere. Common opinion commendeth them for the Stone, but are most practically used against Films in Horses eyes.

. Lastly, He must have more heads than Rome had Hills, that makes out half of those vertues ascribed unto stones, and their not only Medical, but Magical proprieties, which are to be found in Authors of great Name. In Psellus, Serapion, Evax, Albertus, Aleazar, Marbodeus; in Maiolus, Rueus, Mylius, and many more.

That Lapis Lasuli hath in it a purgative faculty we know; Against poison. that Bezoar is Antidotal, Provoking Urine. Lapis Judaicus diuretical, Against the Falling sickness. Coral Antepileptical, we will not deny. That Cornelians, Jaspis, Heliotropes, and Bloodstones, may be of vertue to those intentions they are implied, experience and visible effects will make us grant. But that an Amethyst prevents inebriation, that an Emerald will break if worn in copulation. That a Diamond laid under the pillow, will betray the incontinency of a wife. That a Sapphire is preservative against enchantments; that the fume of an Agath will avert a tempest, or the wearing of a Crysoprase make one out love with Gold; as some have delivered, we are yet, I confess, to believe, and in that infidelity are likely to end our days. And therefore, they which in the explication of the two Beryls upon the Ephod, or the twelve stones in the Rational or Brestplate of Aaron, or those twelve which garnished the wall of the holy City in the Apocalyps, have drawn their significations from such as these; or declared their symbolical verities from such traditional falsities, have surely corrupted the sincerity of their Analogies, or misunderstood the mystery of their intentions.

Most men conceive that the twelve stones in Aarons brestplate made a Jewel surpassing any, and not to be parallel'd; which notwithstanding will hardly be made out from the description of the Text, for the names of the Tribes were engraven thereon, which must notably abate their lustre. Beside, it is not clear made out that the best of Gemms, a Diamond was amongst them; nor is to be found in the list thereof, set down by the Jerusalem Thargum, wherein we find the darker stones of Sardius, Sardonyx, and Jasper; and if we receive them under those names wherein they are usually described, it is not hard to contrive a more illustrious and splendent Jewel. But being not ordained for meer lustre by diaphanous and pure translucencies, their mysterious significations became more considerable then their Gemmary substances; and those no doubt did nobly answer the intention of the Institutor. Beside some may doubt whether there be twelve distinct species of noble translucent Gemms in nature, at least yet known unto us, and such as may not be referred unto some of those in high esteem among us, which come short of the number of twelve; which to make up we must find out some others to match and join with the Diamond, Beryl, Saphyr, Emerald, Amethyst, Topaz, Crysolit, Jacynth, Ruby, and if we may admit it in this number, the Oriental Gianat.

## CHAPTER VI

### **Of sundry Tenets concerning Vegetables or Plants, which examined, prove either false or dubious.**

Many Mola's and false conceptions there are of Mandrakes, the first from great Antiquity, conceiveth the Root thereof resembleth the shape of Man; which is a conceit not to be made out by ordinary inspection, or any other eyes, then such as regarding the Clouds, behold them in shapes conformable to preapprehensions.

Now whatever encouraged the first invention, there have not been wanting many ways of its promotion. The first a Catachrestical and far derived similitude it holds with Man; that is, in a bifurcation or division of the Root into two parts, which some are content to call Thighs; whereas notwithstanding they are oftentimes three, and when but two, commonly so complicated and crossed, that men for this deceit are fain to effect their design in other plants; And as fair a resemblance is often found in Carrots, Parsnips, Briony, and many others. There are, I confess, divers Plants which carry about them not only the shape of parts, but also of whole Animals, but surely not all thereof, unto whom this conformity is imputed. Whoever shall peruse the signatures of Crollius, or rather the Phytognomy of Porta, and strictly observe how vegetable Realities are commonly forced into Animal Representations, may easily perceive in very many, the semblance is but postulatory, and must have a more assimilating phansie then mine to make good many thereof.

Illiterate heads have been led on by the name Μάνδρα, Spelunca., which in the first syllable expresseth its Representation; but others have better observed the Laws of Etymology, and deduced it from a word of the same language, because it delighteth to grow in obscure and shady places; which derivation, although we shall not stand to maintain, yet the other seemeth answerable unto the Etymologies of many Authors, who often confound such nominal Notations. Not to enquire beyond our own profession, the Latine Physitians which most adhered unto the Arabick way, have often failed herein; particularly Valescus de Tarranta, In the old Edition. a received Physitian, in whose Philonium or Medical practice these may be observed: Diarhea, saith he, Quia pluries venit in die. Herisepela, quasi hærens pilis, Emorrohis, ab emach sanguis & morrohis quod est cadere. Lithargia à Litos quod est oblivio & Targus morbus, Scotomia à Scotus quod est videre, & mias musca. Ophthalmia ab opus Græce quod est succus, & Talmon quod est oculus. Paralysis, quasi læsio partis. Fistula à fos sonus & stolon quod est emissio, quasi emissio soni vel vocis. Which are derivations as strange indeed as the other, and hardly to be parallel'd elsewhere; confirming not only the words of one language with another, but creating such as were never yet in any.

The received distinction and common Notation by Sexes, hath also promoted the conceit; for true it is, that Herbalists from ancient times have thus distinguished them, naming that the Male, whose leaves are lighter, and Fruit and Apples rounder; but this is properly no generative division, but rather some note of distinction in colour, figure or operation. For though Empedocles affirm, there is a mixt, and undivided Sex in Vegetables; and Scaliger upon Aristotle De Plantis., doth favourably explain that opinion; yet will it not consist with the common and ordinary acception, nor yet with Aristotles definition. For if that be Male which generates in another, that Female which procreates in it self; if it be understood of Sexes conjoined, all Plants are Female; and if of disjoined and congressive generation, there is no Male or Female in them at all.

The impostures touching the Root of Mandrake.

But the Atlas or main Axis which supported this opinion, was dayly experience, and the visible testimony of sense. For many there are in several parts of Europe, who carry about Roots and sell them unto ignorant people, which handsomely make out the shape of Man or Woman. But these are not productions of Nature, but contrivances of Art, as divers have noted, and Mathiolus plainly detected, who learned this way of Trumpery from a vagabond cheater lying under his cure for the French disease. His words were these, and may determine the point, *Sed profecto vanum & fabulosum*, etc. But this is vain and fabulous, which ignorant people, and simple women believe; for the roots which are carried about by impostors to deceive unfruitful women, are made of the roots of Canes, Briony and other plants: for in these yet fresh and virent, they carve out the figures of men and women, first sticking therein the grains of Barley or Millet, where they intend the hair should grow; then bury them in sand until the grains shoot forth their roots, which at the longest will happen in twenty days; they afterward clip and trim those tender strings in the fashion of beards and other hairy tegument. All which like other impostures once discovered is easily effected, and in the root of white Briony may be practised every spring.

What is therefore delivered in favour thereof, by Authors ancient or modern, must have its root in tradition, imposture, far derived similitude, or casual and rare contingency. So may we admit of the Epithet of Pythagoras, who calls it *Anthropomorphus Orchis* *Anthropomorphus* *cujus Icon* in *Kircheri Magia parastatica.*; and that of Columella, who terms it *Semihomo*; more appliable unto the *ManOrchis*, whose flower represents a Man. Thus is Albertus to be received when he affirmeth, that Mandrakes represent mankind with the distinction of either Sex. *De mandragora*. Under these restrictions may those Authors be admitted, which for this opinion are introduced by Drusius; nor shall we need to question the monstrous root of Briony described in Aldrovandus *De monstris.*

Generations equivocal, are yet commonly regular and of a determinate form or species.

The second assertion concerneth its production. That it naturally groweth under Gallowses and places of execution, arising from fat or urine that drops from the body of the dead; a story somewhat agreeable unto the fable of the Serpents teeth sowed in the earth by Cadmus; or rather the birth of Orion from the urine of Jupiter, Mercury, and Neptune. Now this opinion seems grounded on the former, that is, a conceived similitude it hath with man; and therefore from him in some way they would make out its production: Which conceit is not only erroneous in the foundation, but injurious unto Philosophy in the superstruction. Making putrifactive generations, correspondent unto seminal productions, and conceiving in equivocal effects and univocal conformity unto the efficient. Which is so far from being verified of animals in their corruptive mutations into Plants, that they maintain not this similitude in their nearer translation into animals. So when the Oxe corrupteth into Bees, or the Horse into Hornets, they come not forth in the image of their originals. So the corrupt and excrementous humours in man are animated into Lice; and we may observe, that Hogs, Sheep, Goats, Hawks, Hens, and others, have one peculiar and proper kind of vermine; not resembling themselves according to seminal conditions, yet carrying a settled and confined habitude unto their corruptive originals. And therefore come not forth in generations erratical, or different from each other; but seem specifically and in regular shapes to attend the corruption of their bodies, as do more perfect conceptions, the rule of seminal productions.

The third affirmeth the roots of Mandrakes do make a noise, or give a shriek upon eradication; which is indeed ridiculous, and false below confute: arising perhaps from a small and stridulous noise, which being firmly rooted, it maketh upon divulsion of parts. A slender foundation for such a vast conception: for such a noise we sometime observe in other Plants, in Parsenips, Liquorish, Eringium, Flags, and others.

The last concerneth the danger ensuing, That there follows an hazard of life to them that pull it up, that some evil fate pursues them, and they live not very long after. Therefore the attempt hereof among the Ancients, was not in ordinary way; but as Pliny informeth, when they intended to take up the root of this Plant, they took the wind thereof, and with a sword describing three circles about it, they digged it up, looking toward the West. A conceit not only injurious unto truth, and confutable by daily experience, but somewhat derogatory unto the providence of God; that is, not only to impose so destructive a quality on any Plant, but to conceive a Vegetable, whose parts are useful unto many, should in the only taking up prove mortal unto any. To think he suffereth the poison of Nubia Granum Nubiæ. to be gathered, Napellus, Aconite, and Thora, to be eradicated, yet this not to be moved. That he permitteth Arsenick and mineral poisons to be forced from the bowels of the Earth, yet not this from the surface thereof. This were to introduce a second forbidden fruit, and inhance the first malediction, making it



not only mortal for Adam to taste the one, but capital unto his posterity to eradicate or dig up the other.

Now what begot, at least promoted so strange conceptions, might be the magical opinion hereof; this being conceived the Plant so much in use with Circe, and therefore named Circea, as Dioscorides and Theophrastus have delivered, which being the eminent Sorcerers of elder story, and by the magick of simples believed to have wrought many wonders: some men were apt to invent, others to believe any tradition or magical promise thereof.

Analogous relations concerning other plants, and such as are of near affinity unto this, have made its currant smooth, and pass more easily among us. For the same effect is also delivered by Josephus, concerning the root Baaras; by Ælian of Cynospastus; and we read in Homer the very same opinion concerning Moly,

Μῶλυ δὲ μιν καλέουσι θεοί· χαλεπὸν δὲ τ' ὀρύσσειν

Ἀνδράσι γε θνητοῖσι· θεοὶ δὲ τε πάντα δύνανται.

The Gods it Moly call, whose Root to dig away,

Is dangerous unto Man; but Gods, they all things may.

Now parallels or like relations alternately relieve each other, when neither will pass asunder, yet are they plausible together; their mutual concurrences supporting their solitary instabilities.

Signaturists have somewhat advanced it; who seldom omitting what Ancients delivered; drawing into inference received distinction of sex, not willing to examine its humane resemblance; and placing it in the form of strange and magical simples, have made men suspect there was more therein, then ordinary practice allowed; and so became apt to embrace whatever they heard or read conformable unto such conceptions.

Lastly, The conceit promoteth it self: for concerning an effect whose trial must cost so dear, it fortifies it self in that invention; and few there are whose experiment it need to fear. For (what is most contemptible) although not only the reason of any head, but experience of every hand may well convict it, yet will it not by divers be rejected; for prepossessed heads will ever doubt it, and timorous beliefs will never dare to trie it. So these Traditions how low and ridiculous soever, will find suspition in some, doubt in others, and serve as tests or trials of Melancholy and superstitious tempers for ever.

That Cinamon, Ginger, Clove, etc., are not of the same tree.

. That Cinamon, Ginger, Clove, Mace, and Nutmeg, are but the several parts and fruits of the same tree, is the common belief of those which daily use them. Whereof to speak distinctly, Ginger is the root of neither Tree nor Shrub, but of an herbaceous Plant, resembling the Water Flower Deluce, as Garcias first described; or rather the common Reed, as Lobelius since affirmed. Very common in many parts of India, growing either from Root or Seed, which in December and January they take up, and gently dried, roll it up in earth, whereby occluding the pores, they conserve the natural humidity, and so prevent corruption.

Cinamon is the inward bark of a Cinamon Tree, whereof the best is brought from Zeilan; this freed from the outward bark, and exposed unto the Sun, contracts into those folds wherein we commonly receive it. If it have not a sufficient isolation it looketh pale, and attains not its laudable colour; if it be sunned too long, it suffereth a torrefaction, and descendeth somewhat below it.

Clove seems to be either the rudiment of a fruit, or the fruit it self growing upon the Clove tree, to be found but in few Countries. The most commendable is that of the Isles of Molucca; it is first white, afterward green, which beaten down, and dried in the Sun, becometh black, and in the complexion we receive it.

Nutmeg is the fruit of a Tree differing from all these, and as Garcias describeth it, somewhat like a Peach; growing in divers places, but fructifying in the Isle of Banda, The fruit hereof consisteth of four parts; the first or outward part is a thick and carnous covering like that of a Walnut. The second a dry and flosculous coat, commonly called Mace. The third a harder tegument or shell, which lieth under the Mace. The fourth a Kernel included in the shell, which is the same we call Nutmeg. All which both in their parts and order of disposure, are easily discerned in those fruits, which are brought in preserves unto us.

Now if because Mace and Nutmegs proceed from one Tree, the rest must bear them company; or because they are all from the East Indies, they are all from one Plant: the Inference is precipitous, nor will there such a Plant be found in the Herbal of Nature.

What the Misseltoe in some Trees is.

. That Viscus Arboreus or Misseltoe is bred upon Trees, from seeds which Birds, especially Thrushes and Ringdoves let fall thereon, was the Creed of the Ancients, and is still believed among us, is the account of its production, set down by Pliny, delivered by Virgil, and subscribed by many more. If so, some reason must be assigned, why it groweth onely upon certain Trees, and not upon many whereon these Birds do light. For as Exotick observers deliver, it groweth upon Almond trees, Chesnut, Apples, Oaks, and Pinetrees. As we observe in England very commonly upon Apple, Crabs, and

Whitethorn; sometimes upon Sallow, Hazel, and Oak: rarely upon Ash, Limetree, and Maple; never, that I could observe, upon Holly, Elm, and many more. Why it groweth not in all Countries and places where these Birds are found; for so Brassavolus affirmeth, it is not to be found in the Territory of Ferrara, and was fain to supply himself from other parts of Italy. Why if it ariseth from a seed, if sown it will not grow again, as Pliny affirmeth, and as by setting the Berries thereof, we have in vain attempted its production; why if it cometh from seed that falleth upon the tree, it groweth often downwards, and puts forth under the bough, where seed can neither fall nor yet remain. Hereof beside some others, the Lord Verulam hath taken notice. And they surely speak probably who make it an arboreous excrescence, or rather superplant, bred of a viscous and superfluous sap which the tree it self cannot assimilate. And therefore sprouteth not forth in boughs and surcles of the same shape, and similary unto the Tree that beareth it; but in a different form, and secondary unto its specified intention, wherein once failing, another form succeedeth: and in the first place that of Misseltoe, in Plants and Trees disposed to its production. And therefore also where ever it groweth, it is of constant shape, and maintains a regular figure; like other supercrescences, and such as living upon the stock of others, are termed parasitical Plants, as Polypody, Moss, the smaller Capillaries, and many more: So that several regions produce several Misseltoes; India one, America another, according to the law and rule of their degenerations.

Now what begot this conceit, might be the enlargement of some part of truth contained in its story. For certain it is, that some Birds do feed upon the berries of this Vegetable, and we meet in Aristotle with one kind of Trush called the Missel Trush Ἰξόβορος., or feeder upon Misseltoe. But that which hath most promoted it, is a received proverb, *Turdus sibi malum cecat*; applicable unto such men as are authors of their own misfortunes. For according unto ancient tradition and Plinies relation, the Bird not able to digest the fruit whereon she feedeth; from her inconverted muting ariseth this Plant, of the Berries whereof Birdlime is made, wherewith she is after entangled. But although Proverbs be popular principles, yet is not all true that is proverbial; and in many thereof, there being one thing delivered, and another intended; though the verbal expression be false, the Proverb is true enough in the verity of its intention.

Paganish superstition about the Misseltoe of the Oak.

As for the Magical vertues in this Plant, and conceived efficacy unto veneficial intentions, it seemeth a Pagan relique derived from the ancient Druides, the great admirers of the Oak, especially the Misseltoe that grew thereon; which according unto the particular of Pliny, they gathered with great solemnity. For after sacrifice the Priest in a white garment ascended the tree, cut down the Misseltoe with a golden hook, and received it in a white coat; the vertue whereof was to resist all poisons, and make fruitful any that used it. Vertues not expected from Classical practice; and did they fully answer their promise which are so commended, in Epileptical intentions, we would abate these

qualities. Country practice hath added another, to provoke the afterbirth, and in that case the decoction is given unto Cows. That the Berries are poison as some conceive, we are so far from averring, that we have safely given them inwardly; and can confirm the experiment of Brassavolus, that they have some purgative quality.

. The Rose of Jericho, that flourishes every year just about Christmas Eve, is famous in Christian reports; which notwithstanding we have some reason to doubt, and are plainly informed by Bellonius, it is but a Monastical imposture, as he hath delivered in his observations, concerning the Plants in Jericho. That which promoted the conceit, or perhaps begot its continuance, was a propriety in this Plant. For though it be dry, yet will it upon imbibition of moisture dilate its leaves, and explicate its flowers contracted, and seemingly dried up. And this is to be effected not only in the Plant yet growing, but in some manner also in that which is brought exsuccous and dry unto us. Which quality being observed, the subtilty of contrivers did commonly play this shew upon the Eve of our Saviours Nativity, when by drying the Plant again, it closed the next day, and so pretended a double mystery: referring unto the opening and closing of the womb of Mary.

There wanted not a specious confirmation from a text in Ecclesiasticus Cap. ., *Quasi palma exultata sum in Cades, & quasi plantatio Rosæ in Jericho*: I was exalted like a Palmtree in Engaddi, and as a Rose in Jericho. The sound whereof in common ears, begat an extraordinary opinion of the Rose of that denomination. But herein there seemeth a mistake: for by the Rose in the Text, is implied the true and proper Rose, as first the Greek *φύτα τοῦ ῥόδου.*, and ours accordingly rendreth it. But that which passeth under this name, and by us is commonly called the Rose of Jericho, is properly no Rose, but a small thorny shrub or kind of Heath, bearing little white flowers, far differing from the Rose; whereof Bellonius a very inquisitive Herbalist, could not find any in his travels thorow Jericho. A Plant so unlike a Rose, it hath been mistaken by some good Simplist for Amomum; which truly understood is so unlike a Rose, that as Dioscorides delivers, the flowers thereof are like the white Violet, and its leaves resemble Briony.

Suitable unto this relation almost in all points is that of the Thorn at Glassenbury, and perhaps the daughter hereof; herein our endeavours as yet have not attained satisfaction, and cannot therefore enlarge. Thus much in general we may observe, that strange effects are naturally taken for miracles by weaker heads, and artificially improved to that apprehension by wiser. Certainly many precocious Trees, and such as spring in the Winter, may be found in most parts of Europe, and divers also in England. Such a Thorn there is in Parham Park in Suffolk, and elsewhere. For most Trees do begin to sprout in the Fall of the leaf or Autumn, and if not kept back by cold and outward causes, would leaf about the Solstice. Now if it happen that any be so strongly constituted, as to make this good against the power of Winter, they may produce their

leaves or blossoms in that season. And perform that in some singles, which is observable in whole kinds; as in Ivy, which blossoms and bears at least twice a year, and once in the Winter; as also in Furz, which flowereth in that season.

. That ferrum Equinum, or Sferra Cavallo hath a vertue attractive of Iron, a power to break locks, and draw off the shoes of a Horse that passeth over it; whether you take it for one kind of Securidaca, or will also take in Lunaria, we know it to be false: and cannot but wonder at Mathiolus, who upon a parallel in Pliny was staggered into suspension. Who notwithstanding in the imputed vertue to open things, close and shut up, could laugh himself at that promise from the herb Æthiopis or Æthiopian mullen; and condemn the judgment of Scipio, who having such a picklock, would spend so many years in battering the Gates of Carthage. Which strange and Magical conceit, seems to have no deeper root in reason, then the figure of its seed; for therein indeed it somewhat resembles a Horseshoe; which notwithstanding Baptista Porta hath thought too low a signification, and raised the same unto a Lunary representation.

How Beer and Wine come to be spoiled by Lightning.

. That Bayes will protect from the mischief of Lightning and Thunder, is a quality ascribed thereto, common with the Figtree, Eagle, and skin of a Seal. Against so famous a quality, Vicomercatus produceth experiment of a Baytree blasted in Italy. And therefore although Tiberius for this intent, did wear a Lawrel upon his Temples, yet did Augustus take a more probable course, who fled under arches and hollow vaults for protection. And though Porta conceive, because in a streperous eruption, it riseth against fire, it doth therefore resist lightning, yet is that no emboldning Illation. And if we consider the threefold effect of Jupiters Trisulck, to burn, discuss, and terebrate; and if that be true which is commonly delivered, that it will melt the blade, yet pass the scabbard; kill the child, yet spare the mother; dry up the wine, yet leave the hogshead entire: though it favour the amulet, it may not spare us; it will be unsure to rely on any preservative, 'tis no security to be dipped in Styx, or clad in the armour of Ceneus. Now that Beer, Wine, and other liquors, are spoiled with lightning and thunder, we conceive it proceeds not onely from noise and concussion of the air, but also noxious spirits, which mingle therewith, and draw them to corruption; whereby they become not only dead themselves, but sometime deadly unto others, as that which Seneca mentioneth; whereof whosoever drank, either lost his life, or else his wits upon it.

How drinks intoxicate or overcome men.

. It hath much deceived the hope of good fellows, what is commonly expected of bitter Almonds, and though in Plutarch confirmed from the practice of Claudius his Physitian, that Antidote against ebriety hath commonly failed. Surely men much versed in the practice do err in the theory of inebriation; conceiving in that disturbance the brain doth

only suffer from exhalations and vaporous ascensions from the stomach, which fat and oily substances may suppress. Whereas the prevalent intoxication is from the spirits of drink dispersed into the veins and arteries, from whence by common conveyances they creep into the brain, insinuate into its ventricles, and beget those vertiges accompanying that perversion. And therefore the same effect may be produced by a Glisten, the Head may be intoxicated by a medicine at the Heel. So the poisonous bites of Serpents, although on parts at distance from the head, yet having entered the veins, disturb the animal faculties, and produce the effects of drink, or poison swallowed. And so as the Head may be disturbed by the skin, it may the same way be relieved; as is observable in balneations, washings, and fomentations, either of the whole body, or of that part alone.

## CHAPTER VII

### Of some Insects, and the properties of several Plants.

Few ears have escaped the noise of the Deadwatch, that is, the little clickling sound heard often in many rooms, somewhat resembling that of a Watch; and this is conceived to be of an evil omen or prediction of some persons death: wherein notwithstanding there is nothing of rational presage or just cause of terroure unto melancholy and meticulous heads. For this noise is made by a little sheathwinged gray Insect found often in Wainscot, Benches, and Woodwork, in the Summer. We have taken many thereof, and kept them in thin boxes, wherein I have heard and seen them work and knock with a little proboscis or trunk against the side of the box, like Apicus Martius, or Woodpecker against a tree. It worketh best in warm weather, and for the most part giveth not over under nine or eleven stroaks at a time. He that could extinguish the terrifying apprehensions hereof, might prevent the passions of the heart, and many cold sweats in Grandmothers and Nurses, who in the sickness of children, are so startled with these noises.

. The presage of the year succeeding, which is commonly made from Insects or little Animals in Oak apples, according to the kinds thereof, either Maggot, Fly, or Spider; that is, of Famine, War, or Pestilence; whether we mean that woody excrescence, which shooteth from the branch about May, or that round and Applelike accretion which groweth under the leaf about the latter end of Summer, is I doubt too distinct, nor verifiable from event.

For Flies and Maggots are found every year, very seldom Spiders: And Helmont affirmeth he could never find the Spider and the Fly upon the same Trees, that is the signs of War and Pestilence, which often go together: Beside, that the Flies found were at first Maggots, experience hath informed us; for keeping these excrescencies, we have observed their conversions, beholding in Magnifying Glasses the daily progression thereof. As may be also observed in other Vegetable excretions, whose Maggots do terminate in Flies of constant shapes; as in the Nutgalls of the Outlandish Oak, and the Mossie tuft of the wild Briar; which having gathered in November we have found the little Maggots which lodged in wooden Cells all Winter, to turn into Flies in June.

Abundance of Flies, Maggots, etc., what may they naturally signifie.

We confess the opinion may hold some verity in the Analogy, or Emblematical phansie. For Pestilence is properly signified by the Spider, whereof some kinds are of a very venomous Nature. Famine by Maggots, which destroy the fruits of the Earth. And War not improperly by the Fly; if we rest in the phansie of Homer, who compares the valiant Grecian unto a Fly.

Some verity it may also have in it self, as truly declaring the corruptive constitution in the present sap and nutrimental juice of the Tree; and may consequently discover the disposition of that year, according to the plenty or kinds of these productions. For if the putrifying juices of bodies bring forth plenty of Flies and Maggots, they give forth testimony of common corruption, and declare that the Elements are full of the seeds of putrifaction, as the great number of Caterpillars, Gnats, and ordinary Insects do also declare. If they run into Spiders, they give signs of higher putrifaction, as plenty of Vipers and Scorpions are confessed to do; the putrifying Materials producing Animals of higher mischiefs, according to the advance and higher strain of corruption.

. Whether all Plants have seed, were more easily determinable, if we could conclude concerning Hartstongue, Fern, the Caterpillaries, Lunaria, and some others. But whether those little dusty particles, upon the lower side of the leaves, be seeds and seminal parts; or rather, as it is commonly conceived, excremental separations, we have not as yet been able to determine by any germination or univocal production from them when they have been sowed on purpose: but having set the roots of Harts tongue in a garden, a year or two after there came up three or four of the same Plants, about two yards distance from the first. Thus much we observe, that they seem to renew yearly, and come not fully out till the Plant be in his vigour: and by the help of Magnifying Glasses we find these dusty Atoms to be round at first, and fully representing seeds, out of which at last proceed little Mites almost invisible; so that such as are old stand open, as being emptied of some bodies formerly included; which though discernable in Hartstongue, is more notoriously discoverable in some differencies of Brake or Fern.

But exquisite Microscopes and Magnifying Glasses have at last cleared this doubt, whereby also long ago the noble Fredericus Cæsius beheld the dusts of Polypody as bigg as Pepper corns; and as Johannes Faber testifieth, made draughts on Paper of such kind of seeds, as bigg as his Glasses represented them: and set down such Plants under the Classis of Herbæ Tergifætæ, as may be observed in his notable Botanical Tables.

. Whether the sap of Trees runs down to the roots in Winter, whereby they become naked and grow not; or whether they do not cease to draw any more, and reserve so much as sufficeth for conservation, is not a point indubitable. For we observe, that most Trees, as though they would be perpetually green, do bud at the Fall of the leaf, although they sprout not much forward untill the Spring, and warmer weather approacheth; and many Trees maintain their leaves all Winter, although they seem to receive very small advantage in their growth. But that the sap doth powerfully rise in the Spring, to repair that moisture whereby they barely subsisted in the Winter, and also to put the Plant in a capacity of fructification: he that hath beheld how many gallons of water may in a small time be drawn from a Birchtrees in the Spring, hath slender reason to doubt.



That Camphire Eunuchates, or begets in Men an impotency unto Venery, observation will hardly confirm; and we have found it to fail in Cocks and Hens, though given for many days; which was a more favourable trial then that of Scaliger, when he gave it unto a Bitch that was proud. For the instant turgescence is not to be taken off, but by Medicines of higher Natures; and with any certainty but one way that we know, which notwithstanding, by suppressing that natural evacuation, may encline unto Madness, if taken in the Summer.

In the History of Prodigies we meet with many showrs of Wheat; how true or probable, we have not room to debate. Only thus much we shall not omit to inform, That what was this year found in many places, and almost preached for Wheat rained from the clouds, was but the seed of Ivyberries, which somewhat represent it; and though it were found in Steeples and high places, might be conveyed thither, or muted out by Birds: for many feed thereon, and in the crops of some we have found no less then three ounces.

That every plant might receive a Name according unto the disease it cureth, was the wish of Paracelsus. A way more likely to multiply Empiricks then Herbalists; yet what is practised by many is advantageous unto neither; that is, relinquishing their proper appellations to rebaptize them by the name of Saints, Apostles, Patriarchs, and Martyrs, to call this the herb of John, that of Peter, this of James, or Joseph, that of Mary or Barbara. For hereby apprehensions are made additional unto their proper Natures; whereon superstitious practices ensue, and stories are framed accordingly to make good their foundations.

We cannot omit to declare the gross mistake of many in the Nominal apprehension of Plants; to instance but in few. An herb there is commonly called *Betonica Pauli*, or *Pauls Betony*; hereof the People have some conceit in reference to St. Paul; whereas indeed that name is derived from *Paulus Ægineta*, an ancient Physitian of Ægina, and is no more then *Speedwell*, or *Fluellen*. The like expectations are raised from *Herba Trinitatis*; which notwithstanding obtaineth that name from the figure of its leaves, and is one kind of *Liverwort*, or *Hepatica*. In *Milium Solis*, the Epithete of the Sun hath enlarged its opinion; which hath indeed no reference thereunto, it being no more then *Lithospermon*, or *Grummel*, or rather *Milium Soler*; which as Serapion from *Aben Juliel* hath taught us, because it grew plentifully in the Mountains of Soler, received that appellation. Why the Jews ear is used for sore Throats. In Jewsears something is conceived extraordinary from the Name, which is in propriety but *Fungus sambucinus*, or an excrescence about the Roots of Elder, and concerneth not the Nation of the Jews, but Judas Iscariot, upon a conceit, he hanged on this Tree; and is become a famous Medicine in Quinsies, sore Throats, and strangulations ever since. And so are they deceived in the name of *HorseRaddish*, *HorseMint*, *Bullrush*, and many more: conceiving therein some prenominal consideration, whereas indeed that expression is but a Grecism, by the prefix of *Hippos* and *Bous*, that is, Horse and Bull, intending no

more then Great. According whereto the great Dock is called Hippolapathum; and he that calls the Horse of Alexander, Greathead, expresseth the same which the Greeks do in Bucephalus.

Lastly, Many things are delivered and believed of other Plants, wherein at least we cannot but suspend. That there is a property in Basil to propagate Scorpions, and that by the smell thereof they are bred in the brains of men, is much advanced by Hollerius, who found this Insect in the brains of a man that delighted much in this smell. Wherein beside that we find no way to conjoin the effect unto the cause assigned; herein the Moderns speak but timorously, and some of the Ancients quite contrarily. For, according unto Oribasius, Physitian unto Julian, The Affricans, Men best experienced in poisons, affirm, whosoever hath eaten Basil, although he be stung with a Scorpion, shall feel no pain thereby: which is a very different effect, and rather antidotally destroying, then seminally promoting its production.

That the leaves of Catapucia or Spurge, being plucked upward or downward, respectively perform their operations by Purge or Vomit, as some have written, and old wives still do preach, is a strange conceit, ascribing unto Plants positional operations, and after the manner of the Loadstone; upon the Pole whereof if a Knife be drawn from the handle unto the point, it will take up a Needle; but if drawn again from the point to the handle, it will attract it no more.

That Cucumbers are no commendable fruits, that being very waterish, they fill the veins with crude and windy serosities; that containing little Salt or spirit, they may also debilitate the vital acidity, and fermental faculty of the Stomach, we readily concede. But that they should be so cold, as be almost poison by that quality, it will be hard to allow, without the contradiction of Galen In his Anatomia Sambuci.: who accounteth them cold but in the second degree, and in that Classis have most Physitians placed them.

That Elder Berries are poison, as we are taught by tradition, experience will unteach us. And beside the promises of Blochwitzius, the healthful effects thereof daily observed will convict us.

That an Ivy Cup will separate Wine from Water, if filled with both, the Wine soaking through, but the Water still remaining, as after Pliny many have averred, we know not how to affirm; who making trial thereof, found both the liquors to soak indistinctly through the bowl.

That Sheep do often get the Rot, by feeding in boggy grounds where Rossolis groweth, seems beyond dispute. That this herb is the cause thereof, Shepherds affirm and deny; whether it hath a cordial vertue by sudden refection, sensible experiment doth hardly confirm, but that it may have a Balsamical and resumptive Vertue, whereby it becomes a

good Medicine in Catarrhes and Consumptive dispositions, Practice and Reason conclude. That the lentous drops upon it are not extraneous, and rather an exudation from it self, then a rorid concretion from without, beside other grounds, we have reason to conceive; for having kept the Roots moist and earthed in close chambers, they have, though in lesser plenty, sent out these drops as before.

That Flos Affricanus is poison, and destroyeth Dogs, in two experiments we have not found.

That Yew and the Berries thereof are harmless, we know.

That a Snake will not endure the shade of an Ash, we can deny. Nor is it inconsiderable what is affirmed by Bellonius Lib. observat.; for if his Assertion be true, our apprehension is oftentimes wide in ordinary simples, and in common use we mistake one for another. We know not the true Thyme; the Savourie in our Gardens is not that commended of old; and that kind of Hysop the Ancients used, is unknown unto us, who make great use of another.

We omit to recite the many Vertues, and endless faculties ascribed unto Plants, which sometime occur in grave and serious Authors; and we shall make a bad transaction for truth to concede a verity in half. To reckon up all, it were employment for Archimedes, who undertook to write the number of the Sands. Swarms of others there are, some whereof our future endeavours may discover; common reason I hope will save us a labour in many: Whose absurdities stand naked unto every eye; Errours not able to deceive the Embleme of Justice, and need no Argus to descry them. Herein there surely wants expurgatory animadversions, whereby we might strike out great numbers of hidden qualities; and having once a serious and conceded list, we might with more encouragement and safety attempt their Reasons.

## **THE THIRD BOOK**

**Of divers popular and received Tenets concerning Animals, which  
examined, prove either false or dubious.**

### **CHAPTER I**

#### **Of the Elephant.**

The first shall be of the Elephant, whereof there generally passeth an opinion it hath no joints; and this absurdity is seconded with another, that being unable to lie down, it sleepeth against a Tree; which the Hunters observing, do saw it almost asunder; whereon the Beast relying, by the fall of the Tree, falls also down it self, and is able to rise no more. Which conceit is not the daughter of later times, but an old and grayheaded error, even in the days of Aristotle, as he delivereth in his Book, *De incessu Animalium*, and stands successively related by several other authors: by Diodorus Siculus, Strabo, Ambrose, Cassiodore, Solinus, and many more. Now herein methinks men much forget themselves, not well considering the absurdity of such assertions.

How progression is made in animals.

For first, they affirm it hath no joints, and yet concede it walks and moves about; whereby they conceive there may be a progression or advancement made in Motion without inflexion of parts. Now all progression or Animals locomotion being (as Aristotle teacheth) performed *tractu et pulsu*; that is, by drawing on, or impelling forward some part which was before in station, or at quiet; where there are no joints or flexures, neither can there be these actions. And this is true, not onely in Quadrupedes, Volatils, and Fishes, which have distinct and prominent Organs of Motion, Legs, Wings, and Fins; but in such also as perform their progression by the Trunk, as Serpents, Worms, and Leeches. Jointlike parts. Whereof though some want bones, and all extended articulations, yet have they arthritical Analogies, and by the motion of fibrous and musculous parts, are able to make progression. Which to conceive in bodies inflexible, and without all protrusion of parts, were to expect a Race from Hercules his pillars; or hope to behold the effects of Orpheus his Harp, when trees found joints, and danced after his Musick.

Again, While men conceive they never lie down, and enjoy not the position of rest, ordained unto all pedestrious Animals, hereby they imagine (what reason cannot conceive) that an Animal of the vastest dimension and longest duration, should live in a continual motion, without that alternity and vicissitude of rest whereby all others continue; and yet must thus much come to pass, if we opinion they lye not down and

enjoy no decumbence at all. Extensive or Tonical Motion, what? For station is properly no rest, but one kind of motion, relating unto that which Physitians (from Galen) do name extensive or tonical; that is, an extension of the muscles and organs of motion maintaining the body at length or in its proper figure.

Wherein although it seem to be unmoved, it is not without all Motion; for in this position the muscles are sensibly extended, and labour to support the body; which permitted unto its proper gravity, would suddenly subside and fall unto the earth; as it happeneth in sleep, diseases, and death. From which occult action and invisible motion of the muscles in station (as Galen declareth) proceed more offensive lassitudes then from ambulation. And therefore the Tyranny of some have tormented men with long and enforced station, and though Ixion and Sisiphus which always moved, do seem to have the hardest measure; yet was not Titius favoured, that lay extended upon Caucasus; and Tantalus suffered somewhat more then thirst, that stood perpetually in Hell. Thus Mercurialis in his Gymnasticks justly makes standing one kind of exercise; and Galen when we lie down, commends unto us middle figures, that is, not to lye directly, or at length, but somewhat inflected, that the muscles may be at rest; for such as he termeth Hypobolemaioi or figures, of excess, either shrinking up or stretching out, are wearisome positions, and such as perturb the quiet of those parts. Now various parts do variously discover these indolent and quiet positions, some in right lines, as the wrists: some at right angles, as the cubit: others at oblique angles, as the fingers and the knees: all resting satisfied in postures of moderation, and none enduring the extremity of flexure or extension.

Moreover men herein do strangely forget the obvious relations of history, affirming they have no joints, whereas they dayly read of several actions which are not performable without them. They forget what is delivered by Xiphilinus, and also by Suetonius in the lives of Nero and Galba, that Elephants have been instructed to walk on ropes, in publick shews before the people. Which is not easily performed by man, and requireth not only a broad foot, but a pliable flexure of joints, and commandible disposure of all parts of progression. They pass by that memorable place in Curtius, concerning the Elephant of King Porus, *Indus qui Elephantem regebat, descendere eum ratus, more solito procumbere jussit in genua cæteri quoque (ita enim instituti erant) demisere corpora in terram. De rebus gestis Emanuelis.* They remember not the expression of Osorius, when he speaks of the Elephant presented to Leo the tenth, *Pontificem ter genibus flexis, et demisso corporis habitu venerabundus salutavit.* But above all, they call not to mind that memorable shew of Germanicus, wherein twelve Elephants danced unto the sound of Musick, and after laid them down in the Tricliniums, or places of festival Recumbency.

They forget the Etymologie of the Knee, *Γόνυ* from *γώνια*. approved by some Grammarians. They disturb the position of the young ones in the womb: which upon

extension of legs is not easily conceivable; and contrary unto the general contrivance of Nature. Nor do they consider the impossible exclusion thereof, upon extension and rigour of the legs.

Lastly, they forget or consult not experience, whereof not many years past, we have had the advantage in England, by an Elephant shewn in many parts thereof, not only in the posture of standing, but kneeling and lying down. Whereby although the opinion at present be well suppressed, yet from some strings of tradition, and fruitful recurrence of error, it is not improbable it may revive in the next generation again. This being not the first that hath been seen in England; for (besides some others) as Polydore Virgil relateth, Lewis the French King sent one to Henry the third, and Emanuel of Portugal another to Leo the tenth into Italy, where notwithstanding the error is still alive and epidemical, as with us.

Round, Pillarlike.

The hint and ground of this opinion might be the gross and somewhat Cylindrical composure of the legs, the equality and less perceptible disposure of the joints, especially in the former legs of this Animal; they appearing when he standeth, like Pillars of flesh, without any evidence of articulation. The different flexure and order of the joints might also countenance the same, being not disposed in the Elephant, as they are in other quadrupedes, but carry a nearer conformity unto those of Man; that is, the bought of the forelegs, not directly backward, but laterally and somewhat inward; but the hough or suffraginous flexure behind rather outward. Somewhat different unto many other quadrupedes, as Horses, Camels, Deer, Sheep, and Dogs; for their forelegs bend like our legs, and their hinder legs like our arms, when we move them to our shoulders. But quadrupedes oviparous, as Frogs, Lizards, Crocodiles, have their joints and motive flexures more analogously framed unto ours; and some among viviparous, that is, such thereof as can bring their forefeet and meat therein unto their mouths, as most can do that have the clavicles or collarbones: whereby their breasts are broader, and their shoulders more asunder, as the Ape, the Monkey, the Squirrel and some others. If therefore any shall affirm the joints of Elephants are differently framed from most of other quadrupedes, and more obscurely and grosly almost then any, he doth herein no injury unto truth. But if *à dicto secundum quid ad dictum simpliciter*, he affirmeth also they have no articulations at all, he incurs the controulment of reason, and cannot avoide the contradiction also of sense.

As for the manner of their venation, if we consult historical experience, we shall find it to be otherwise then as is commonly presumed, by sawing away of Trees. The accounts whereof are to be seen at large in Johannes, Hugo, Edwardus Lopez, Garcias ab horto, Cadamustus, and many more.

Other concernments there are of the Elephant, which might admit of discourse; and if we should question the teeth of Elephants, that is, whether they be properly so termed, or might not rather be called horns: it were no new enquiry of mine, but a Paradox as old as Oppianus. Cyneget. lib. . Whether as Pliny and divers since affirm it, that Elephants are terrified, and make away upon the grunting of Swine, Garcias ab horto may decide, who affirmeth upon experience, they enter their stalls, and live promiscuously in the Woods of Malavar. That the situation of the genitals is averse, and their copulation like that which some believe of Camels, as Pliny hath also delivered, is not to be received; for we have beheld that part in a different position; and their coition is made by supersaliency, like that of horses, as we are informed by some who have beheld them in that act. That some Elephants have not only written whole sentences, as Ælian ocularly testifieth, but have also spoken, as Oppianus delivereth, and Christophorus à Costa particularly relateth; although it sound like that of Achilles Horse in Homer, we do not conceive impossible. Some Brutes tolerably well organized for speech and approaching to reason. Nor beside the affinity of reason in this Animal any such intollerable incapacity in the organs of divers quadrupedes, whereby they might not be taught to speak, or become imitators of speech like Birds. Strange it is how the curiosity of men that have been active in the instruction of Beasts, have never fallen upon this artifice; and among those, many paradoxical and unheard of imitations, should not attempt to make one speak. The Serpent that spake unto Eve, the Dogs and Cats that usually speak unto Witches, might afford some encouragement. And since broad and thick chops are required in Birds that speak, since lips and teeth are also organs of speech; from these there is also an advantage in quadrupedes, and a proximity of reason in Elephants and Apes above them all. Since also an Echo will speak without any mouth at all, articulately returning the voice of man, by only ordering the vocal spirit in concave and hollow places; whether the musculous and motive parts about the hollow mouths of Beasts, may not dispose the passing spirit into some articulate notes, seems a query of no great doubt.

## CHAPTER II

### Of the Horse.

The second Assertion, that an Horse hath no gall, is very general, nor only swallowed by the people, and common Farriers, but also received by good Veterinarians, Veterinarians or Farriers. and some who have laudably discoursed upon Horses. It seemeth also very ancient; for it is plainly set down by Aristotle, an Horse and all solid ungulous or whole hoofed animals have no gall; and the same is also delivered by Pliny, which notwithstanding we find repugnant unto experience and reason. For first, it calls in question the providence or wise provision of Nature; who not abounding in superfluities, is neither deficient in necessities. Wherein nevertheless there would be a main defect, and her improvision justly accusable, if such a feeding Animal, and so subject unto diseases from bilious causes, should want a proper conveyance for choler; or have no other receptacle for that humour then the Veins, and general mass of bloud.

It is again controllable by experience, for we have made some search and enquiry herein; encouraged by Absyrtus a Greek Author, in the time of Constantine, who in his *Hippiatrics Medicina equaria.*, obscurely assigneth the gall a place in the liver; but more especially by Carlo Ruini the Bononian, who in his *Anatomia del Cavallo*, hath more plainly described it, and in a manner as I found it. For in the particular enquiry into that part, in the concave or simous part of the Liver, whereabout the Gall is usually seated in quadrupedes, I discover an hollow, long and membranous substance, of a pale colour without, and lined with Choler and Gall within; which part is by branches diffused into the lobes and several parcels of the Liver; from whence receiving the fiery superfluity, or cholerick remainder, by a manifest and open passage, it conveyeth it into the duodenum or upper gut, thence into the lower bowels; which is the manner of its derivation in Man and other Animals. And therefore although there be no eminent and circular follicle, no round bag or vesicle which long containeth this humour: yet is there a manifest receptacle and passage of choler from the Liver into the Guts: which being not so shut up, or at least not so long detained, as it is in other Animals: procures that frequent excretion, and occasions the Horse to dung more often then many other, which considering the plentiful feeding, the largeness of the guts, and their various circumvolution, was prudently contrived by providence in this Animal. Choler the natural glister. For choler is the natural Glister, or one excretion whereby Nature excludeth another; which descending daily into the bowels, extimulates those parts, and excites them unto expulsion. And therefore when this humour aboundeth or corrupteth, there succeeds oftentimes a cholerica passio, that is, a sudden and vehement Purgation upward and downward: and when the passage of gall becomes obstructed, the body grows costive, and the excrements of the belly white; as it happeneth in the Jaundice.



If any therefore affirm an Horse hath no gall, that is, no receptacle, or part ordained for the separation of Choler, or not that humour at all; he hath both sense and reason to oppose him. But if he saith it hath no bladder of Gall, and such as is observed in many other Animals, we shall oppose our sense, if we gainsay him. Thus must Aristotle be made out when he denieth this part, by this distinction we may relieve Pliny of a contradiction, who in one place affirming an Horse hath no gall, delivereth yet in another, that the gall of an Horse was accounted poison; and therefore at the sacrifices of Horses in Rome, it was unlawful for the Flamen Priest. to touch it. But with more difficulty, or hardly at all is that reconcileable which is delivered by our Countryman, and received Veterinarian; whose words in his Masterpiece, and Chapter of diseases from the Gall, are somewhat too strict, and scarce admit a Reconciliation. The fallacie therefore of this conceit is not unlike the former; *A dicto secundum quid ad dictum simpliciter*. Because they have not a bladder of gall, like those we usually observe in others, they have no gall at all. Which is a Paralogism not admittible; a fallacy that dwels not in a cloud, and needs not the Sun to scatter it.

## CHAPTER III

### Of the Dove.

The third assertion is somewhat like the second, that a Dove or Pigeon hath no gall; which is affirmed from very great antiquity; for as Pierius observeth, from this consideration the Egyptians did make it the Hieroglyphick of Meekness. It hath been averred by many holy Writers, commonly delivered by Postillers and Commentators, who from the frequent mention of the Dove in the Canticles, the precept of our Saviour, to be wise as Serpents, and innocent as Doves: and especially the appearance of the Holy Ghost in the similitude of this Animal, have taken occasion to set down many affections of the Dove, and what doth most commend it, is, that it hath no gall. And hereof have made use not only Minor Divines, but Cyprian, Austin, Isidore, Beda, Rupertus, Jansenius, and many more.

Whereto notwithstanding we know not how to assent, it being repugnant unto the Authority and positive determination of ancient Philosophy. The affirmative of Aristotle in his History of Animals is very plain, *Fel aliis ventri, aliis intestino jungitur*: Some have the gall adjoined to the guts, as the Crow, the Swallow, Sparrow, and the Dove; the same is also attested by Pliny, and not without some passion by Galen, who in his Book *De Atra bile*, accounts him ridiculous that denies it.

It is not agreeable to the constitution of this Animal, nor can we so reasonably conceive there wants a Gall: that is, the hot and fiery humour in a body so hot of temper, which Phlegm or Melancholy could not effect. Salubrium, ° Now of what complexion it is, Julius Alexandrinus declareth, when he affirmeth that some upon the use thereof, have fallen into Feavers and Quinsies. The temper of their Dung and intestinal Excretions do also confirm the same; which Topically applied become a Phænigmus or Rubifying Medicine, and are of such fiery parts, that as we read in Galen, they have of themselves conceived fire, and burnt a house about them. And therefore when in the famine of Samaria (wherein the fourth part of a Cab of Pigeons dung was sold for five pieces of silver,) it is delivered by Josephus, that men made use hereof in stead of common Salt: although the exposition seem strange, it is more probable then many other. For that it containeth very much Salt, as beside the effects before expressed, is discernable by taste, and the earth of Columbaries or Dovehouses, so much desired in the artifice of Saltpetre. And to speak generally, the Excrement of Birds hath more of Salt and acrimony, then that of other pissing animals. Now if because the Dove is of a mild and gentle nature, we cannot conceive it should be of an hot temper; our apprehensions are not distinct in the measure of constitutions, and the several parts which evidence such conditions. Whence the irascible, whence the concupiscible Passions do most arise. For the Irascible passions do follow the temper of the heart, but the concupiscible distractions the crasis of the liver. Now many have hot livers, which have but cool and

temperate hearts; and this was probably the temper of Paris, a contrary constitution to that of Ajax, and both but short of Medea, who seemed to exceed in either.

Lastly, it is repugnant to experience, for Anatomical enquiry discovereth in them a gall: and that according to the determination of Aristotle, not annexed unto the liver, but adhering unto the guts: nor is the humour contained in smaller veins, or obscurer capillations, but in a vesicle, or little bladder, though some affirm it hath no bag at all. And therefore the Hieroglyphick of the Ægyptians, though allowable in the sense, is weak in the foundation: who expressing meekness and lenity by the portract of a Dove with a tail erected, affirmed it had no gall in the inward parts, but only in the rump, and as it were out of the body. And therefore also if they conceived their gods were pleased with the sacrifice of this Animal, as being without gall, the ancient Heathens were surely mistaken in the reason, and in the very oblation. Whereas in the holocaust or burnt offering of Moses, the gall was cast away: for as Ben Maimon instructeth Levit. ., the inwards whereto the gall adhereth were taken out with the crop, according unto the Law: which the Priest did not burn, but cast unto the East, that is, behind his back, and readiest place to be carried out of the Sanctuary. Doves, the Birds of Venus, why? And if they also conceived that for this reason they were the Birds of Venus, and wanting the furious and discording part, were more acceptable unto the Deity of Love, they surely added unto the conceit, which was at first venereal: and in this Animal may be sufficiently made out from that conception.

The ground of this conceit is partly like the former, the obscure situation of the gall, and out of the liver, wherein it is commonly enquired. But this is a very unjust illation, not well considering with what variety this part is seated in Birds. In some both at the stomach and the liver, as in the Capriceps; in some at the liver only, as in Cocks, Turkeys, and Pheasants; in others at the guts and liver, as in Hawks and Kites, in some at the guts alone, as Crows, Doves, and many more. And these perhaps may take up all the ways of situation, not only in Birds, but also other Animals; for what is said of the Anchovie, Ἐγκρασίχολος. that answerable unto its name, it carrieth the gall in the head, is farther to be enquired. And though the discoloured particles in the skin of an Heron be commonly termed Galls, yet is not this Animal deficient in that part, but containeth it in the Liver. And thus when it is conceived that the eyes of Tobias were cured by the gall of the fish Callyonimus, or Scorpius marinus, commended to that effect by Dioscorides, although that part were not in the liver, yet there were no reason to doubt that probability. And whatsoever Animal it was, it may be received without exception, when it's delivered, the married couple as a testimony of future concord, did cast the gall of the sacrifice behind the Altar.

A strict and literal acception of a loose and tropical expression was a second ground hereof. For while some affirmed it had no gall, intending only thereby no evidence of anger or fury; others have construed it anatomically, and denied that part at all. By

which illation we may infer, and that from sacred Text, a Pigeon hath no heart; according to that expression, Hosea . Factus est Ephraim sicut Columba seducta non habens Cor. And so from the letter of the Scripture we may conclude it is no mild, but a fiery and furious animal, according to that of Jeremy, Cap. . Facta est terra in desolationem à facie iræ Columbæ: and again, Revertamur ad terram nativitatis nostræ à facie gladii Columbæ. Cap. . Where notwithstanding the Dove is not literally intended; but thereby may be implied the Babylonians, whose Queen Semiramis was called by that name, and whose successors did bear the Dove in their Standard. So is it proverbially said, Formicæ sua bilis inest, habet et musca splenem; whereas we know Philosophy doubteth these parts, nor hath Anatomy so clearly discovered them in those insects.

If therefore any affirm a Pigeon hath no gall, implying no more thereby then the lenity of this Animal, we shall not controvert his affirmation. Thus may we make out the assertions of Ancient Writers, and safely receive the expressions of Divines and worthy Fathers. But if by a transition from Rhetorick to Logick, he shall contend, it hath no such part or humour, he committeth an open fallacy, and such as was probably first committed concerning Spanish Mares, whose swiftness tropically expressed from their generation by the wind; might after be grosly taken, and a real truth conceived in that conception.

## CHAPTER IV

### Of the Bever.

That a Bever to escape the Hunter, bites off his testicles or stones, is a Tenet very ancient; and hath had thereby advantage of propagation. Æsops Apologues, of what antiquity. For the same we find in the Hieroglyphicks of the Egyptians in the Apologue of Æsop, an Author of great Antiquity, who lived in the beginning of the Persian Monarchy, and in the time of Cyrus: the same is touched by Aristotle in his Ethicks, but seriously delivered by Ælian, Pliny, and Solinus: the same we meet with in Juvenal, who by an handsome and Metrical expression more welcomly engrafts it in our junior Memories:

imitatus Castora, qui se

Eunuchum ipse facit, cupiens evadere damno

Testiculorum, adeo medicatum intelligit inguen.

It hath been propagated by Emblems: and some have been so bad Grammarians as to be deceived by the Name, deriving Castor à castrando, whereas the proper Latine word is Fiber, and Castor but borrowed from the Greek, so called quasi γάστωρ, that is, Animal ventricosum, from his swaggy and prominent belly.

Herein therefore to speak compendiously, we first presume to affirm that from strict enquiry, we cannot maintain the evulsion or biting off any parts, and this is declarable from the best and most professed Writers: for though some have made use hereof in a Moral or Tropical way, yet have the professed Discoursers by silence deserted, or by experience rejected this assertion. Thus was it in ancient times discovered, and experimentally refuted by one Sestius a Physitian, as it stands related by Pliny; by Dioscorides, who plainly affirms that this tradition is false; by the discoveries of Modern Authors, who have expressly discoursed hereon, as Aldrovandus, Mathiolus, Gesnerus, Bellonius; by Olaus Magnus, Peter Martyr, and others, who have described the manner of their Venations in America; they generally omitting this way of their escape, and have delivered several other, by which they are daily taken.

The original of the conceit was probably Hieroglyphical, which after became Mythological unto the Greeks, and so set down by Æsop; and by process of tradition, stole into a total verity, which was but partially true, that is in its covert sense and Morality. Now why they placed this invention upon the Bever (beside the Medicable and Merchantable commodity of Castoreum, or parts conceived to be bitten away) might be the sagacity and wisdom of that Animal, which from the works it performs, and especially its Artifice in building, is very strange, and surely not to be matched by any

other. Omitted by Plutarch, *De solertia Animalium*, but might have much advantaged the drift of that Discourse.

If therefore any affirm a wise man should demean himself like the Bever, who to escape with his life, contemneth the loss of his genitals, that is in case of extremity, not strictly to endeavour the preservation of all, but to sit down in the enjoyment of the greater good, though with the detriment and hazard of the lesser; we may hereby apprehend a real and useful Truth. In this latitude of belief, we are content to receive the Fable of Hippomanes, who redeemed his life with the loss of a Golden Ball; and whether true or false, we reject not the Tragœdy of Absyrtus, and the dispersion of his Members by Medea, to perplex the pursuit of her Father. But if any shall positively affirm this act, and cannot believe the Moral, unless he also credit the Fable; he is surely greedy of delusion, and will hardly avoid deception in theories of this Nature. The Error therefore and Alogy in this opinion, is worse then in the last; that is, not to receive Figures for Realities, but expect a verity in Apologues; and believe, as serious affirmations, confessed and studied Fables.

Again, If this were true, and that the Bever in chase makes some divulsion of parts, as that which we call Castoreum; yet are not the same to be termed Testicles or Stones; for these Cods or Follicles are found in both Sexes, though somewhat more protuberant in the Male. There is hereto no derivation of the seminal parts, nor any passage from hence, unto the Vessels of Ejaculation: some perforations onely in the part it self, through which the humour included doth exudate: as may be observed in such as are fresh, and not much dried with age. And lastly, The Testicles properly so called, are of a lesser magnitude, and seated inwardly upon the loins: and therefore it were not only a fruitless attempt, but impossible act, to Eunuchate or castrate themselves: and might be an hazardous practice of Art, if at all attempted by others.

Now all this is confirmed from the experimental Testimony of five very memorable Authors: Bellonius, Gesnerus, Amatus, Rondeletius, and Mathiolus: who receiving the hint hereof from Rondeletius in the Anatomy of two Bevers, did find all true that had been delivered by him, whose words are these in his learned Book *De Piscibus*: *Fibri in inguinibus geminos tumores habent, utrinque vnicum, ovi Auscrini magnitudine, inter hos est mentula in maribus, in fæminis pudendum, hi tumores testes non sunt, sed folliculi membrana contexti, in quorum medio sunguli sunt meatus è quibus exudat liquor pinguis et cerosus, quem ipse Castor sæpe admoto ore lambit et exugit, postea veluti oleo, corporis partes oblini: Hos tumores testes non esse hinc maxime colligitur, quod ab illis nulla est ad mentulam via neque ductus quo humor in mentulæ meatum derivitur, et foras emittatur; præterea quod testes intus reperiuntur, eosdem tumores Moscho animali inesse puto, è quibus odoratum illud plus emanat.* Then which words there can be no plainer, nor more evidently discovering the impropriety of this appellation. That which is included in the cod or visible bag about the groin, being not

the Testicle, or any spermatical part; but rather a collection of some superfluous matter deflowing from the body, especially the parts of nutrition as unto their proper emunctories; and as it doth in Musk and Civet Cats, though in a different and offensive odour; proceeding partly from its food, that being especially Fish; whereof this humour may be a garous excretion and olidous separation.

Most therefore of the Moderns before Rondeletius, and all the Ancients excepting Sestius, have misunderstood this part, conceiving Castoreum the Testicles of the Bever; as Dioscorides, Galen, Ægineta, Ætius, and others have pleased to name it. The Egyptians also failed in the ground of their Hieroglyphick, when they expressed the punishment of Adultery by the Bever depriving himself of his testicles, which was amongst them the penalty of such incontinency. Nor is Ætius perhaps, too strictly to be observed, when he prescribeth the stones of the Otter, or Riverdog, as succedaneous unto Castoreum. But most inexcusable of all is Pliny, who having before him in one place the experiment of Sestius against it, sets down in another, that the Bevers of Pontus bite off their testicles: and in the same place affirmeth the like of the Hyena. Which was indeed well joined with the Bever, as having also a bag in those parts; if thereby we understand the Hyena odorata, or Civet Cat, as is delivered and graphically described by Castellus. Castellus de Hyena odorifera.

Now the ground of this mistake might be the resemblance and situation of these tumours about those parts, wherein we observe the testicles in other animals. Which notwithstanding is no well founded illation, for the testicles are defined by their office, and not determined by place or situation; they having one office in all, but different seats in many. For beside that, no Serpent, or Fishes oviparous, that neither biped nor quadruped oviparous have testicles exteriourly, or prominent in the groin; some also that are viviparous contain these parts within, as beside this Animal, the Elephant and the Hedghog.

If any therefore shall term these testicles, intending metaphorically, and in no strict acception; his language is tolerable, and offends our ears no more then the Tropical names of Plants: when we read in Herbals, of Dogs, Fox, and Goatstones. But if he insisteth thereon, and maintaineth a propriety in this language: our discourse hath overthrown his assertion, nor will Logic permit his illation; that is, from things alike, to conclude a thing the same; and from an accidental convenience, that is a similitude in place or figure, to infer a specifical congruity or substantial concurrence in Nature.

## CHAPTER V

### Of the Badger.

That a Brock or Badger hath the legs on one side shorter then of the other, though an opinion perhaps not very ancient, is yet very general; received not only by Theorists and unexperienced believers, but assented unto by most who have the opportunity to behold and hunt them daily. Which notwithstanding upon enquiry I find repugnant unto the three Determinators of Truth, Authority, Sense, and Reason. For first, Albertus Magnus speaks dubiously, confessing he could not confirm the verity hereof; but Aldrovandus plainly affirmeth, there can be no such inequality observed. And for my own part, upon indifferent enquiry, I cannot discover this difference, although the regardable side be defined, and the brevity by most imputed unto the left.

Again, It seems no easie affront unto Reason, and generally repugnant unto the course of Nature; for if we survey the total set of Animals, we may in their legs, or Organs of progression, observe an equality of length, and parity of Numeration; that is, not any to have an odd leg, or the supporters and movers of one side not exactly answered by the other. Although the hinder may be unequal unto the fore and middle legs, as in Frogs, Locusts, and Grasshoppers; or both unto the middle, as in some Beetles and Spiders, as is determined by Aristotle, *De incesu Animalium*. Perfect and viviparous quadrupeds, so standing in their position of proneness, that the opposite joints of Neighbourlegs consist in the same plane; and a line descending from their Navel intersects at right angles the axis of the Earth. It happeneth often I confess that a Lobster hath the Chely or great claw of one side longer then the other; but this is not properly their leg, but a part of apprehension, and whereby they hold or seiz upon their prey; for the legs and proper parts of progression are inverted backward, and stand in a position opposite unto these.

Lastly, The Monstrosity is ill contrived, and with some disadvantage; the shortness being affixed unto the legs of one side, which might have been more tolerably placed upon the thwart or Diagonal Movers. Diagonion, a line drawn from the cross angles. For the progression of quadrupeds being performed per Diametrum, that is the cross legs moving or resting together, so that two are always in motion, and two in station at the same time; the brevity had been more tolerable in the cross legs. For then the Motion and station had been performed by equal legs; whereas herein they are both performed by unequal Organs, and the imperfection becomes discoverable at every hand.



## CHAPTER VI

### Of the Bear.

That a Bear brings forth her young informous and unshapen, which she fashioneth after by licking them over, is an opinion not only vulgar, and common with us at present: but hath been of old delivered by ancient Writers. Upon this foundation it was an Hieroglyphick with the Egyptians: Aristotle seems to countenance it; Solinus, Pliny, and Ælian directly affirm it, and Ovid smoothly delivereth it:

*Nec catulus partu quem reddidit ursa recenti*

*Sed male viva caro est, lambendo mater in artus*

*Ducit, et in formam qualem cupit ipsa reducit.*

Which notwithstanding is not only repugnant unto the sense of every one that shall enquire into it, but the exact and deliberate experiment of three Authentick Philosophers. The first of Mathiolus in his Comment on Dioscorides, whose words are to this effect. In the Valley of Anania about Trent, in a Bear which the Hunters eventerated or opened, I beheld the young ones with all their parts distinct: and not without shape, as many conceive; giving more credit unto Aristotle and Pliny, then experience and their proper senses. Of the same assurance was Julius Scaliger in his Exercitations, *Ursam fœtus informes potius ejicere, quam parere, si vera dicunt, quos postea linctu effingat: Quid hujusce fabulæ authoribus fidei habendum ex hac historia cognosces; In nostris Alpibus venatores fætum Ursam cepere, dissecta ea fætus plane formatus intus inventus est.* And lastly, Aldrovandus who from the testimony of his own eyes affirmeth, that in the Cabinet of the Senate of Bononia, there was preserved in a Glass a Cub taken out of a Bear perfectly formed, and compleat in every part.

It is moreover injurious unto Reason, and much impugneth the course and providence of Nature, to conceive a birth should be ordained before there is a formation. For the conformation of parts is necessarily required, not onely unto the prerequisites and previous conditions of birth, as Motion and Animation: but also unto the parturition or very birth it self: Wherein not only the Dam, but the younglings play their parts; and the cause and act of exclusion proceedeth from them both. For the exclusion of Animals is not meerly passive like that of Eggs, nor the total action of delivery to be imputed unto the Mother: but the first attempt beginneth from the Infant: which at the accomplished period attempteth to change his Mansion: and struggling to come forth, dilacerates and breaks those parts which restrained him before.

Beside (what few take notice of) Men hereby do in an high measure vilifie the works of God, imputing that unto the tongue of a Beast, which is the strangest Artifice in all the

acts of Nature; that is the formation of the infant in the Womb, not only in Mankind, but all viviparous Animals. Formation in the Matrix, the admirable work of Nature. Wherein the plastick or formative faculty, from matter appearing Homogeneous, and of a similary substance, erecteth Bones, Membranes, Veins, and Arteries: and out of these contriveth every part in number, place, and figure, according to the law of its species. Which is so far from being fashioned by any outward agent, that once omitted or perverted by a slip of the inward Phidias, it is not reducible by any other whatsoever. And therefore Mirè me plasmaverunt manus tuæ, though it originally respected the generation of Man, yet is it appliable unto that of other Animals; who entring the Womb in bare and simple Materials, return with distinction of parts, and the perfect breath of life. He that shall consider these alterations without, must needs conceive there have been strange operations within; which to behold, it were a spectacle almost worth ones beeing, a sight beyond all; except that Man had been created first, and might have seen the shew of five dayes after.

Now as the opinion is repugnant both unto sense and Reason, so hath it probably been occasioned from some slight ground in either. Thus in regard the Cub comes forth involved in the Chorion, a thick and tough Membrane obscuring the formation, and which the Dam doth after bite and tear asunder; the beholder at first sight conceives it a rude and informous lump of flesh, and imputes the ensuing shape unto the Mouthing of the Dam; which addeth nothing thereunto, but only draws the curtain, and takes away the vail which concealed the Piece before. And thus have some endeavoured to enforce the same from Reason; that is, the small and slender time of the Bears gestation, or going with her young; which lasting but few days (a Month some say) the exclusion becomes precipitous, and the young ones consequently informous; according to that of Solinus, Trigesimus dies uterum liberat ursæ; unde evenit ut præcipitata fæcunditas informes creet partus. But this will overthrow the general Method of Nature in the works of generation. For therein the conformation is not only antecedent, but proportional unto the exclusion; and if the period of the birth be short, the term of conformation will be as sudden also. There may I confess from this narrow time of gestation ensue a Minority or smalness in the exclusion; but this however inferreth no infirmity, and it still receiveth the Name of a natural and legitimate birth; whereas if we affirm a total infirmity, it cannot admit so forward a term as an Abortment, for that supposeth conformation. So we must call this constant and intended act of Nature, a slip or effluxion Ἐκρυσις., that is an exclusion before conformation: before the birth can bear the name of the Parent, or be so much as properly called an Embryon.

## CHAPTER VII

### Of the Basilisk.

Many Opinions are passant concerning the Basilisk or little King of Serpents, commonly called the Cockatrice: some affirming, others denying, most doubting the relations made hereof. What therefore in these incertainties we may more safely determine: that such an Animal there is, if we evade not the testimony of Scripture and humane Writers, we cannot safely deny. So it is said Psalm . Super Aspidem et Basiliscum ambulabis, wherein the Vulgar Translation retaineth the Word of the Septuagint, using in other places the Latine expression Regulus, as Proverbs . Mordebit ut coluber, et sicut Regulus venena diffundet: and Jeremy . Ecce ego mittam vobis serpentes Regulos, etc. That is, as ours translate it, Behold I will send Serpents, Cockatrices among you which will not be charmed, and they shall bite you. And as for humane Authors, or such as have discoursed of Animals, or Poisons, it is to be found almost in all: in Dioscorides, Galen, Pliny, Solinus, Ælian, Ætius, Avicen, Ardoynus, Grevinus, and many more. In Aristotle I confess we find no mention thereof, but Scaliger in his Comment and enumeration of Serpents, hath made supply; and in his Exercitations delivereth that a Basilisk was found in Rome, in the days of Leo the fourth. The like is reported by Sigonius; and some are so far from denying one, that they have made several kinds thereof: for such is the Catoblepas of Pliny conceived to be by some, and the Dryinus of Ætius by others.

But although we deny not the existence of the Basilisk, yet whether we do not commonly mistake in the conception hereof, and call that a Basilisk which is none at all, is surely to be questioned. For certainly that which from the conceit of its generation we vulgarly call a Cockatrice, and wherein (but under a different name) we intend a formal Identity and adequate conception with the Basilisk; is not the Basilisk of the Ancients, whereof such wonders are delivered. For this of ours is generally described with legs, wings, a Serpentine and winding tail, and a crist or comb somewhat like a Cock. But the Basilisk of elder times was a proper kind of Serpent, not above three palms long, as some account; and differenced from other Serpents by advancing his head, and some white marks or coronary spots upon the crown, as all authentick Writers have delivered.

Nor is this Cockatrice only unlike the Basilisk, but of no real shape in Nature; and rather an Hieroglyphical fansie, to express different intentions, set forth in different fashions. Sometimes with the head of a Man, sometime with the head of an Hawk, as Pierius hath delivered; and as with addition of legs the Heralds and Painters still describe it. Nor was it only of old a symbolical and allowable invention, but is now become a manual contrivance of Art, and artificial imposture; whereof besides others, Scaliger hath taken notice: Basilici formam mentiti sunt vulgo Gallinacco similem, et pedibus binis; neque

enim absimiles sunt cæteris serpentibus, nisi macula quasi in vertice candida, unde illi nomen Regium; that is, men commonly counterfeit the form of a Basilisk with another like a Cock, and with two feet; whereas they differ not from other serpents, but in a white speck upon their Crown. Now although in some manner it might be counterfeited in Indian Cocks, and flying Serpents, yet is it commonly contrived out of the skins of Thornbacks, Scaits, or Maids, as Aldrovand hath observed, By way of figure. and also graphically described in his excellent Book of Fishes; and for satisfaction of my own curiosity I have caused some to be thus contrived out of the same Fishes.

Nor is onely the existency of this animal considerable, but many things delivered thereof, particularly its poison and its generation. Concerning the first, according to the doctrine of the Ancients, men still affirm, that it killeth at a distance, that it poisoneth by the eye, and by priority of vision. Destructive. Now that deleterious it may be at some distance, and destructive without corporal contaction, what uncertainty soever there be in the effect, there is no high improbability in the relation. For if Plagues or pestilential Atoms have been conveyed in the Air from different Regions, if men at a distance have infected each other, if the shadows of some trees be noxious, if Torpedoes deliver their opium at a distance, and stupifie beyond themselves; we cannot reasonably deny, that (beside our gross and restrained poisons requiring contiguity unto their actions) there may proceed from subtiller seeds, more agile emanations, which contemn those Laws, and invade at distance unexpected.

That this venenation shooteth from the eye, and that this way a Basilisk may empoison, although thus much be not agreed upon by Authors, some imputing it unto the breath, others unto the bite, it is not a thing impossible. For eyes receive offensive impressions from their objects, and may have influences destructive to each other. Effluxion of corporeal species. For the visible species of things strike not our senses immaterially, but streaming in corporal raies, do carry with them the qualities of the object from whence they flow, and the medium through which they pass. How the Basilisk kills at distance. Thus through a green or red Glass all things we behold appear of the same colours; thus sore eyes affect those which are sound, and themselves also by reflection, as will happen to an inflamed eye that beholds it self long in a Glass; thus is fascination made out, and thus also it is not impossible, what is affirmed of this animal, the visible rayes of their eyes carrying forth the subtilest portion of their poison, which received by the eye of man or beast, infecteth first the brain, and is from thence communicated unto the heart.

But lastly, That this destruction should be the effect of the first beholder, or depend upon priority of aspection, is a point not easily to be granted, and very hardly to be made out upon the principles of Aristotle, Alhazen, Vitello, and others, who hold that sight is made by Reception, and not by extramission; by receiving the raies of the object into the eye, and not by sending any out. For hereby although he behold a man first, the Basilisk

should rather be destroyed, in regard he first receiveth the rayes of his Antipathy, and venomous emissions which objectively move his sense; but how powerful soever his own poison be, it invadeth not the sense of man, in regard he beholdeth him not. And therefore this conceit was probably begot by such as held the opinion of sight by extramission; as did Pythagoras, Plato, Empedocles, Hipparrchus, Galen, Macrobius, Proclus, Simplicius, with most of the Ancients, and is the postulate of Euclide in his Opticks, but now sufficiently convicted from observations of the Dark Chamber.

The generation of the Cocks egg.

As for the generation of the Basilisk, that it proceedeth from a Cocks egg hatched under a Toad or Serpent, it is a conceit as monstrous as the brood it self. For if we should grant that Cocks growing old, and unable for emission, amass within themselves some seminal matter, which may after conglobate into the form of an egg, yet will this substance be unfruitful. As wanting one principle of generation, and a commixture of both sexes, which is required unto production, as may be observed in the eggs of Hens not trodden; and as we have made trial in some which are termed Cocks eggs. Ovum Centeninum, or the last egg which is a very little one. It is not indeed impossible that from the sperm of a Cock, Hen, or other Animal, being once in putrescence, either from incubation or otherwise, some generation may ensue, not univocal and of the same species, but some imperfect or monstrous production, even as in the body of man from putrid humours, and peculiar ways of corruption, there have succeeded strange and unseconded shapes of worms; whereof we have beheld some our selves, and read of others in medical observations. And so may strange and venomous Serpents be several ways engendered; but that this generation should be regular, and alway produce a Basilisk, is beyond our affirmation, and we have good reason to doubt.

Again, It is unreasonable to ascribe the equivocacy of this form unto the hatching of a Toad, or imagine that diversifies the production. For Incubation alters not the species, nor if we observe it, so much as concurs either to the sex or colour: as appears in the eggs of Ducks or Partridges hatched under a Hen, there being required unto their exclusion only a gentle and continued heat: and that not particular or confined unto the species or parent. So have I known the seed of Silkworms hatched on the bodies of women: and Pliny reports that Livia the wife of Augustus hatched an egg in her bosome. Nor is only an animal heat required hereto, but an elemental and artificial warmth will suffice: for as Diodorus delivereth, the Ægyptians were wont to hatch their eggs in Ovens, and many eyewitnesses confirm that practice unto this day. And therefore this generation of the Basilisk, seems like that of Castor and Helena; he that can credit the one, may easily believe the other: that is, that these two were hatched out of the egg which Jupiter in the form of a Swan, begat on his Mistress Leda.

The occasion of this conceit might be an Ægyptian tradition concerning the Bird Ibis: which after became transferred unto Cocks. For an opinion it was of that Nation, that the Ibis feeding upon Serpents, that venomous food so inquinated their oval conceptions, or eggs within their bodies, that they sometimes came forth in Serpentine shapes, and therefore they always brake their eggs, nor would they endure the Bird to sit upon them. But how causeless their fear was herein, the daily incubation of Ducks, Peahens, and many other testifie, and the Stork might have informed them; which Bird they honoured and cherished, to destroy their Serpents.

That which much promoted it, was a misapprehension of holy Scripture upon the Latine translation in Esa. , *Ova aspidum ruperunt et telas Arenearum texuerunt, qui comedent de ovis eorum morietur, et quod confotum est, erumpet in Regulum*. From whence notwithstanding, beside the generation of Serpents from eggs, there can be nothing concluded; and what kind of Serpents are meant, not easie to be determined, for Translations are here very different: Tremellius rendering the Asp Hæmorrhous, and the Regulus or Basilisk a Viper, and our translation for the Asp sets down a Cockatrice in the Text, and an Adder in the margin.

Another place of Esay doth also seem to countenance it, Chap. . *Ne læteris Philistæa quoniam diminuta est virga percussoris tui, de radice enim colubri egredietur Regulus, et semen ejus absorbens volucrum*, which ours somewhat favourably rendereth: Out of the Serpents Root shall come forth a Cockatrice, and his fruit shall be a fiery flying Serpent. But Tremellius, *è radice Serpentis prodit Hæmorrhous, et fructus illius præster volans*; wherein the words are different, but the sense is still the same; for therein are figuratively intended Uzziah and Ezechias; for though the Philistines had escaped the minor Serpent Uzziah, yet from his stock a fiercer Snake should arise, that would more terribly sting them, and that was Ezeckias.

But the greatest promotion it hath received from a misunderstanding of the Hieroglyphical intention. For being conceived to be the Lord and King of Serpents, to aw all others, nor to be destroyed by any; the Ægyptians hereby implied Eternity, and the awful power of the supreme Deitie: and therefore described a crowned Asp or Basilisk upon the heads of their gods. As may be observed in the Bembine Table, and other Ægyptian Monuments.

## CHAPTER VIII

### Of the Wolf.

Such a Story as the Basilisk is that of the Wolf concerning priority of vision, that a man becomes hoarse or dumb, if a Wolf have the advantage first to eye him. And this is a plain language affirmed by Plynny: In Italia ut creditur, Luporum visus est noxius, vocemque homini, quem prius contemplatur adimere; so is it made out what is delivered by Theocritus, and after him by Virgil:

Vox quoque Mœrim

Jam fugit ipsa, Lupi Mœrim videre priores.

Thus is the Proverb to be understood, when during the discourse, if the party or subject interveneth, and there ensueth a sudden silence, it is usually said, *Lupus est in fabula*. Which conceit being already convicted, not only by Scaliger, Riolanus, and others; but daily confutable almost every where out of England, we shall not further refute.

The ground or occasional original hereof, was probably the amazement and sudden silence the unexpected appearance of Wolves do often put upon Travellers; not by a supposed vapour, or venomous emanation, but a vehement fear which naturally produceth obmutescence; and sometimes irrecoverable silence. Thus Birds are silent in presence of an Hawk, and Pliny saith that Dogs are mute in the shadow of an Hiæna. But thus could not the mouths of worthy Martyrs be silenced, who being exposed not onely unto the eyes, but the merciless teeth of Wolves, gave loud expressions of their faith, and their holy clamours were heard as high as Heaven.

That which much promoted it beside the common Proverb, was an expression in Theocritus, a very ancient Poet, οὐ φθέγγῃ λύκον εἶδες *Edere non poteris vocem*, Lycus est tibi visus; which Lycus was Rival unto another, and suddenly appearing stopped the mouth of his Corrivall: now Lycus signifying also a Wolf, occasioned this apprehension; men taking that appellatively, which was to be understood properly, and translating the genuine acception. Which is a fallacy of *Æquivocation*, and in some opinions begat the like conceit concerning Romulus and Remus, that they were fostered by a Wolf, the name of the Nurse being Lupa; and founded the fable of Europa, and her carriage over Sea by a Bull, because the Ship or Pilots name was Taurus. And thus have some been startled at the Proverb, *Bos in lingua*, confusedly apprehending how a man should be said to have an Oxe in his tongue, that would not speak his mind; which was no more then that a piece of money had silenced him: for by the Oxe was onely implied a piece of coin stamped with that figure, first currant with the Athenians, and after among the Romans.

## CHAPTER IX

### Of the Deer.

The common Opinion concerning the long life of Animals, is very ancient, especially of Crows, Choughs and Deer; in moderate accounts exceeding the age of man, in some the days of Nestor, and in others surmounting the years of Artephius or Methuselah. From whence Antiquity hath raised proverbial expressions, and the real conception of their duration, hath been the Hyperbolical expression of many others. From all the rest we shall single out the Deer, upon concession a longlived Animal, and in longævity by many conceived to attain unto hundreds; wherein permitting every man his own belief, we shall our selves crave liberty to doubt, and our reasons are these ensuing.

The first is that of Aristotle, drawn from the increment and gestation of this Animal, that is, its sudden arrivance unto growth and maturity, and the small time of its remainder in the Womb. His words in the translation of Scaliger are these, *De ejus vitæ longitudine fabulantur; neque enim aut gestatio aut incrementum hinnulorum ejusmodi sunt ut præstent argumentum longævi animalis*; that is, Fables are raised concerning the vivacity of Deer; for neither are their gestation or increment, such as may afford an argument of long life. And these, saith Scaliger, are good Mediums conjunctively taken, that is, not one without the other. For of Animals viviparous such as live long, go long with young, and attain but slowly to their maturity and stature. So the Horse that liveth above thirty, arriveth unto his stature about six years, and remaineth above ten moneths in the womb: so the Camel that liveth unto fifty, goeth with young no less then ten moneths, and ceaseth not to grow before seven; and so the Elephant that liveth an hundred, beareth its young above a year, and arriveth unto perfection at twenty. On the contrary, the Sheep and Goat, which live but eight or ten years, go but five moneths, and attain to their perfection at two years; and the like proportion is observable in Cats, Hares, and Conies. And so the Deer that endureth the womb but eight moneths, and is compleat at six years, from the course of Nature, we cannot expect to live an hundred; nor in any proportional allowance much more then thirty. As having already passed two general motions observable in all animations, that is, its beginning and encrease; and having but two more to run thorow, that is, its state and declination; which are proportionally set out by Nature in every kind: and naturally proceeding admit of inference from each other.

The other ground that brings its long life into question, is the immoderate salacity, and almost unparallel'd excess of venery, which every September may be observed in this Animal: and is supposed to shorten the lives of Cocks, Partridges, and Sparrows. Certainly a confessed and undeniable enemy unto longævity, and that not only as a sign in the complexional desire and impetuosity, but also as a cause in the frequent act, or iterated performance thereof. For though we consent not with that Philosopher, who



thinks a spermatical emission unto the weight of one drachm, is æquivalent unto the effusion of sixty ounces of blood; yet considering the exolution and languor ensuing that act in some, the extenuation and marcor in others, and the visible acceleration it maketh of age in most: we cannot but think it much abridgeth our days. Although we also concede that this exclusion is natural, that Nature it self will find a way hereto without either act or object: And although it be placed among the six Nonnaturals, that is, such as neither naturally constitutive, nor merely destructive, do preserve or destroy according unto circumstance: yet do we sensibly observe an impotency or total privation thereof, prolongeth life: and they live longest in every kind that exercise it not at all. Eunuchs and gelded creatures generally longer lived. And this is true not only in Eunuchs by Nature, but Spadoes by Art: for castrated Animals in every species are longer lived then they which retain their virilities. For the generation of bodies is not merely effected as some conceive, of souls, that is, by Irradiation, or answerably unto the propagation of light, without its proper diminution: but therein a transmission is made materially from some parts, with the Idea of every one: and the propagation of one, is in a strict acception, some minoration of another. From the parts of generation. And therefore also that axiom in Philosophy, that the generation of one thing, is the corruption of another: although it be substantially true concerning the form and matter, is also dispositively verified in the efficient or producer.

As for more sensible arguments, and such as relate unto experiment: from these we have also reason to doubt its age, and presumed vivacity: for where long life is natural, the marks of age are late: and when they appear, the journey unto death cannot be long. Now the age of Deer (as Aristotle not long ago observed) is best conjectured, by view of the horns and teeth. From the horns there is a particular and annual account unto six years: they arising first plain, and so successively branching: after which the judgment of their years by particular marks becomes uncertain. But when they grow old, they grow less branched, and first do lose their ἀμυντήρες or propugnacula; that is, their browantlers, or lowest furcations next the head, which Aristotle saith the young ones use in fight: and the old as needless, have them not at all. The same may be also collected from the loss of their Teeth, whereof in old age they have few or none before in either jaw. Now these are infallible marks of age, and when they appear, we must confess a declination: which notwithstanding (as men inform us in England, where observations may well be made), will happen between twenty and thirty. As for the bone, or rather induration of the Roots of the arterial vein and great artery, which is thought to be found only in the heart of an old Deer, and therefore becomes more precious in its Rarity; it is often found in Deer much under thirty, and we have known some affirm they have found it in one of half that age. And therefore in that account of Pliny, of a Deer with a Collar about his neck, put on by Alexander the Great, and taken alive an hundred years after, with other relations of this nature, we much suspect imposture or mistake. And if we grant their verity, they are but single relations, and very rare contingencies in

individuals, not affording a regular deduction upon the species. For though Ulysses his Dog lived unto twenty, and the Athenian Mule unto fourscore, yet do we not measure their days by those years, or usually say, they live thus long. Nor can the three hundred years of John of times Psalm ., or Nestor, overthrow the assertion of Moses, or afford a reasonable encouragement beyond his septuagenary determination.

The ground and authority of this conceit was first Hieroglyphical, the Ægyptians expressing longævity by this Animal; but upon what uncertainties, and also convincible falsities they often erected such Emblems, we have elsewhere delivered. And if that were true which Aristotle delivers of his time Histor. animal. lib. ., and Pliny was not afraid to take up long after, the Ægyptians could make but weak observations herein; for though it be said that Æneas feasted his followers with Venison, yet Aristotle affirms that neither Deer nor Boar were to be found in Africa. And how far they miscounted the lives and duration of Animals, is evident from their conceit of the Crow, which they presume to live five hundred years; and from the lives of Hawks, which (as Ælian delivereth) the Ægyptians do reckon no less then at seven hundred.

The second which led the conceit unto the Grecians, and probably descended from the Egyptians was Poetical; and that was a passage of Hesiod, thus rendered by Ausonius.

Ter binos deciesque novem super exit in annos,

Justa senescentum quos implet vita virorum.

Hos novies superat vivendo gorrula cornix,

Et quater egreditur cornicis sæcula cervus,

Alipidem cervum ter vincit corvus.

To ninety six the life of man ascendeth,

Nine times as long that of the Chough extendeth,

Four times beyond the life of Deer doth go,

And thrice is that surpassed by the Crow.

So that according to this account, allowing ninety six for the age of Man, the life of a Deer amounts unto three thousand four hundred fifty six. A conceit so hard to be made out, that many have deserted the common and literal construction. So Theon in Aratus would have the number of nine not taken strictly, but for many years. In other opinions the compute so far exceedeth the truth, that they have thought it more probable to take the word Genea, that is, a generation consisting of many years, but for one year, or a

single revolution of the Sun; which is the remarkable measure of time, and within the compass whereof we receive our perfection in the womb. So that by this construction, the years of a Deer should be but thirty six, as is discoursed at large in that Tract of Plutarch, concerning the cessation of Oracles; and whereto in his discourse of the Crow, Aldrovandus also inclineth. Others not able to make it out, have rejected the whole account, as may be observed from the words of Pliny, *Hesiodus qui primus aliquid de longævitate vitæ prodidit, fabulose (reor) multa de hominum ævo referens, cornici novem nostras attribuit ætates, quadruplum ejus cervis, id triplicatum corvis, et reliqua fabulosius de Phœnice et nymphis.* And this how slender soever, was probably the strongest ground Antiquity had for this longævity of Animals; that made Theophrastus expostulate with Nature concerning the long life of Crows; that begat that Epithete of Deer *τετρακόρωνος.* in Oppianus, and that expression of Juvenal,

*Longa et cervina senectus.*

The third ground was Philosophical, and founded upon a probable Reason in Nature, that is, the defect of a Gall, which part (in the opinion of Aristotle and Pliny) this Animal wanted, and was conceived a cause and reason of their long life: according (say they) as it happeneth unto some few men, who have not this part at all. But this assertion is first defective in the verity concerning the Animal alledged: for though it be true, a Deer hath no Gall in the Liver like many other Animals, yet hath it that part in the Guts, as is discoverable by taste and colour: and therefore Pliny doth well correct himself, when having affirmed before it had no Gall, he after saith, some hold it to be in the guts; and that for their bitterness, dogs will refuse to eat them. The assertion is also deficient in the verity of the Induction or connumeration of other Animals conjoined herewith, as having also no Gall; that is, as Pliny accounteth, Equi, Muli, etc. Horses, Mules, Asses, Deer, Goats, Boars, Camels, Dolphins, have no Gall. In Dolphins and Porpoces I confess I could find no Gall. But concerning Horses, what truth there is herein we have declared before; as for Goats we find not them without it; what Gall the Camel hath, Aristotle declareth: that Hogs also have it, we can affirm; and that not in any obscure place, but in the Liver, even as it is seated in man.

That therefore the Deer is no shortlived Animal, we will acknowledge: that comparatively, and in some sense longlived we will concede; and thus much we shall grant if we commonly account its days by thirty six or forty: for thereby it will exceed all other cornigerous Animals. But that it attaineth unto hundreds, or the years delivered by Authors, since we have no authentick experience for it, since we have reason and common experience against it, since the grounds are false and fabulous which do establish it: we know no ground to assent.

Concerning Deer there also passeth another opinion, that the Males thereof do yearly lose their pizzel. For men observing the decidence of their horns, do fall upon the like

conceit of this part, that it annually rotteth away, and successively reneweth again. Now the ground hereof was surely the observation of this part in Deer after immoderate venery, and about the end of their Rut, which sometimes becomes so relaxed and pendulous, it cannot be quite retracted: and being often beset with flies, it is conceived to rot, and at last to fall from the body. But herein experience will contradict us: for Deer which either die or are killed at that time, or any other, are always found to have that part entire. And reason will also correct us: for spermatical parts, or such as are framed from the seminal principles of parents, although homogeneous or similiary, will not admit a Regeneration, much less will they receive an integral restauration, which being organical and instrumental members, consist of many of those. Now this part, or Animal of Plato, containeth not only sanguineous and reparable particles: but is made up of veins, nerves, arteries, and in some Animals, of bones: whose reparation is beyond its own fertility, and a fruit not to be expected from the fructifying part it self. Which faculty were it communicated unto Animals, whose originals are double, as well as unto Plants, whose seed is within themselves: we might abate the Art of Taliacotius, and the new inarching of Noses. And therefore the fancies of Poets have been so modest, as not to set down such renovations, even from the powers of their deities: for the mutilated shoulder of Pelops was pieced out with Ivory, and that the limbs of Hippolitus were set together, not regenerated by Æsculapius, is the utmost assertion of Poetry.

## CHAPTER X

### Of the Kingfisher.

That a Kingfisher hanged by the bill, sheweth in what quarter the wind is by an occult and secret propriety, converting the breast to that point of the Horizon from whence the wind doth blow, is a received opinion, and very strange; introducing natural Weathercocks, and extending Magnetical positions as far as Animal Natures. A conceit supported chiefly by present practice, yet not made out by Reason or Experience.

Whence it is, that some creatures presage the weather.

Unto Reason it seemeth very repugnant, that a carcass or body disanimated, should be so affected with every wind, as to carry a conformable respect and constant habitude thereto. For although in sundry Animals we deny not a kind of natural Meteorology or innate presentation both of wind and weather, yet that proceeding from sense receiving impressions from the first mutation of the air, they cannot in reason retain that apprehension after death, as being affections which depend on life, and depart upon disanimation. And therefore with more favourable Reason may we draw the same effect or sympathie upon the Hedghog, whose presentation of winds is so exact, that it stoppeth the North or Southern hole of its nest, according to the prenotion of these winds ensuing: which some men observing, have been able to make predictions which way the wind would turn, and been esteemed hereby wise men in point of weather. Now this proceeding from sense in the creature alive, it were not reasonable to hang up an Hedghogs head, and to expect a conformable motion unto its living conversion. And though in sundry Plants their vertues do live after death, and we know that Scammony, Rhubarb and Senna will purge without any vital assistance; yet in Animals and sensible creatures, many actions are mixt, and depend upon their living form, as well as that of mition; and though they wholly seem to retain unto the body, depart upon disunion. Thus Glowworms alive, project a lustre in the dark, which fulgour notwithstanding ceaseth after death; and thus the Torpedo which being alive stupifies at a distance, applied after death, produceth no such effect; which had they retained in places where they abound, they might have supplied Opium, and served as frontals in Phrensies.

As for experiment, we cannot make it out by any we have attempted; for if a single Kingfisher be hanged up with untwisted silk in an open room, and where the air is free, it observes not a constant respect unto the mouth of the wind, but variously converting, doth seldom breast it right. If two be suspended in the same room, they will not regularly conform their breasts, but ofttimes respect the opposite points of Heaven. And if we conceive that for exact exploration, they should be suspended where the air is quiet and unmoved, that clear of impediments, they may more freely convert upon their natural verticity; we have also made this way of inquisition, suspending them in large

and capacious glasses closely stopped; wherein nevertheless we observed a casual station, and that they rested irregularly upon conversion. Wheresoever they rested, remaining inverted, and possessing one point of the Compass, whilst the wind perhaps had passed the two and thirty.

Commonly mistaken for the true Halcion, ours being rather the Ispida.

The ground of this popular practice might be the common opinion concerning the vertue prognostick of these Birds; as also the natural regard they have unto the winds, and they unto them again; more especially remarkable in the time of their nidulation, and bringing forth their young. For at that time, which happeneth about the brumal Solstice, it hath been observed even unto a proverb, that the Sea is calm, and the winds do cease, till the young ones are excluded; and forsake their nest which floateth upon the Sea, and by the roughness of winds might otherwise be overwhelmed. But how far hereby to magnifie their prediction we have no certain rule; for whether out of any particular prenotion they chuse to sit at this time, or whether it be thus contrived by concurrence of causes and providence of Nature, securing every species in their production, is not yet determined. Surely many things fall out by the design of the general motor, and undreamt of contrivance of Nature, which are not imputable unto the intention or knowledge of the particular Actor. So though the seminality of Ivy be almost in every earth, yet that it ariseth and groweth not, but where it may be supported; we cannot ascribe the same unto the distinction of the seed, or conceive any science therein which suspends and conditionates its eruption. So are there likewise many things in Nature, which are the fore runners or signs of future effects, whereto they neither concur in causality or prenotion, but are secretly ordered by the providence of causes, and concurrence of actions collateral to their signations.

It was also a custome of old to keep these Birds in chests, upon opinion that they prevented Moths; whether it were not first hanged up in Rooms to such effects, is not beyond all doubt. Or whether we mistake not the posture of suspension, hanging it by the bill, whereas we should do it by the back; that by the bill it might point out the quarters of the wind; for so hath Kircherus described the Orbis and the Sea Swallow. But the eldest custome of hanging up these birds was founded upon a tradition that they would renew their feathers every year as though they were alive: In expectation whereof four hundred years ago Albertus Magnus was deceived.