

John Clarke. p. 12

ibourn, 12



Lud. Vives.

Nature is not to be examined by the Lamp of the Gentiles, yielding both an obscure and maligne light: but by the Torch of the Sunne, which Christ hath brought into the darknesse of the World. And for that very cause we have had occasion to write, lest we should be necessitated to follow the traditions of the Gentiles; between whom and us there is so vast a difference in Religion. And to say truth, as Aristotl's writings have much learning and ingenuity, so they have very much obscurity: which hath given occasion to some to enquire after, and suppose they see those things which are no where in being, &c.

We therefore in thy light, ô God, shall see light. Pjal. 36. v. 10.

NATURALL
PHILOSOPHIE
REFORMED

BY

DIVINE LIGHT:

OR,

A SYNOPSIS of Physicks:

BY

J. A. COMENIUS:

Exposed

To the censure of those that are lovers
of LEARNING, and desire to be
taught of GOD.

Being a view of the *WORLD* in
generall, and of the particular *Creatures*
therein contened; grounded upon
Scripture Principles.

With a briefe APPENDIX touching
the *Diseases* of the *Body, Mind, and Soul*;
with their generall *Remedies.*

By the same AUTHOR.

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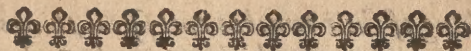
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To the truly studious of
wisdome, from Christ
the fountain of wisdome,
greeting.

Acobus Acontius, a most excellent man, offended at the evill disposition of our scribbling age wished that it might be provided, that none should write and publish any thing, untesse it were some new thing; which should both be of his own observation, and might make for the glory of God, and the edification of the Church, and from whence so much fruit might be hoped, that what time is bestowed on the reading of it, the readers could not bestow it better elswhere: that so nothing might be done which was already done, but what was yet to be done. For few Writers (says hee) bring any
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thing of their own: but onely steal, things and words, of which they make Books, &c. Which they know to be most truly spoken, who are to peruse that *far-rago* of Books, wherewith we are yearly little less then overwhelmed. For if you look on the titles, you shall have them always new and very specious: if on the thing, it is always the same boiled over and over above a thousand times, and Coleworts crammed in, even to nauseating. And though something of new observation be offered, yet to what purpose is it, that whole Books should therefore be written, and those new things found out so buried in things ordinary, that either a man hath no mind to enquire, what of new observation is in them, or cannot do it without tediousness of spirit and loss of time. But it is not my business to inveigh against this disorder in many words. I come now to declare why I my self come out in publick. And I will lay

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lay it open in a word I bring something new, and different from the common way of Philosophie: And I bring it so, as that I hope, it will be without any ones hinderance or molestation, as conteining in a very few leaves, matters of very great moment. And I bring it to satisfy the aefires of others this way. For whereas I had the year last past, given a proof of my Philologicall endeavours, *Fanua Linguarum reserata*, (or a seminary of Arts and Languages) which was courteously received, and that with applause, and approved almost by all mens verdict, (as severall letters, dated either to my self or my friends, touching that matter do testifie,) some (of the number of those, who at this time bend their desires, thoughts and devours, to rectifie the method of studies) began to solicit mee, to put out my philosophicall Works, or at least to desire a communication of my conceptions, especially in Physicks. Ha-
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ving no other minde therefore, but to bring something for mine owne part that may be profitable, if it may be; or else that others may have occasion by me, to bring better matters; I purposed with my self to expose to the light, this same *Synopsis of Physicks*, lately dictated in this Schoole, that publick censure might be made of this also, as well as of my former Work. Which that it might be, it seemed meet to give some further intimation of the occasion and scope of our undertaking, to those that wil offer themselves to be our censors.

After that the calamitous lot of exile had thrust mee, who was by calling a Divine, back to the services of the School, wherein I was desirous to beare my self, not slightly, but so as that I might discharg the trust committed to me; it chanced that I hapned, among other things, upon *Ludovicus Vives* his Books, *de tradendis disciplinis*. In these

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these when I had found most wholesome counsels, for the repairing of Philosophie, and the whole course of studies, I began extremely to grieve, that a man of so piercing a wit, after he noted so many most evident errors, had not put to his hand to make those rough things smooth, but the judgment of one touching this excellent Writer, *that Vives saw better what was not then what was*, made mee to consider, that it is usuall with the wisdom of God to communicate things by degrees. Yet I thought with my self that others should take this as an occasion to labour to designe one certain and infallible way among so many deviations discovered unto them: which I wondered that men were so backward to essay for full a hundred years. (For I knew not whether any one had gone about it.) But it hapned, that a certain learned man, to whom I communicated these complaints of mine in a more fami-

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familiar manner, shew'd mee a Book call'd, *Prodromus philosophiæ instauranda* by *Thomas Campanella* an *Italian*: which I read over with incredible joy, and being inflamed with an exceeding great hope of new Light, I greedily turn'd through his *Realis philosophiæ epilogistica* (for so hee calls it) set forth in foure Books, as also the Books *de rerum sensu*, where ever I could get them. Whereby I found my desires in some sort satisfied, but not throughout. For his very foundation, that all things were made up of two contrary principles only, offended me. (For I was already most fully perswaded of the number of three principles out of the divine Book of *Genesis*: and and I remember out of *Hugo Grotius*, disputing against the *Manichees*, That of two things fighting one with the other, destruction might follow, but an ordinate construction could never follow.) And besides I observed that *Campanella*

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nella himself was not very certaine of his own hypotheses: as one that began to waver in his assertions towards the positions of *Galilæus* touching the earths mobility, and yet to call them in doubt himself: as it is evident enough in his Apologie for *Galilæus*.

But when I chanced afterwards upon a piece of Sir *Francis Bacon* Baron of *Verulam*, *Chancellour of England*, entituled *instauratio magna* (an admirable work, and which I look upon no otherwise, then as a most bright beam of a new age of Philosophers now arising) I understood that in some particulars also of *Campanella*, such solid Demonstrations, as the truth of things requires, were wanting. Yet it grieved me again, that I saw most noble *Verulam* present us indeed with a true key of Nature, but not open the secrets of Nature, onely shewing us by a few examples, how they were to be opened; and leave the rest to depend on
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observations and inductions continued
— for severall ages. Yet I saw neverthe-
less, that my hopes were not quite left
in suspense: in as much as I perceived
my minde so enlightned by the light
which it received from those severall
sparks, now grown welnigh to a torch,
that some great secrets of Nature, and
very obscure places of Scripture, (the
reason of which I knew not before)
were now plain, as it were of their own
accord, to the exceeding great content
of my mind. For now with thole, that
have lighted upon a more sound way
of Philosophie in this age, I saw and
rested in it;

I *That the onely true, genuine and
plain way of Philosophie is to fetch all
— things from sense, reason and Scripture.*

II *That the Peripatetick philosophie
is not onely defective in many parts,
— and many ways intricate, full of turnings
and windings, and partly also erroneous,
so that it is not onely unprofitable for Chri-
stians,*

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stians, but also (without correction and perfection hurtfull.

III That philosophy may be reformed and perfected, by an harmonick reduction of all things that are and are made, to sense reason and Scripture, with so much evidence and certainty (in all such things as are of most concernment, and have any necessity) that any mortall man seeing may see, and feeling may feel, the truth scattered every where.

Of all and every of which observations, least we should seem to have dreamed somewhat, there will be something to be said more at large.

And for the first we make three principles of Philosophy, with Campanella, and his happy Interpreter Tobie Adams, Sense, Reason and Scripture: But so joyntly, that whosoever would not be left in ignorance or doubt, should rest on no one of these without the others, otherwise it wil be a most ready precipice into errors. For Sense, though

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it make an immediate impression upon us of the truth imprinted upon things: yet because it is very often confounded, either by reason of the multitude of things in a manner infinite, and the strange complications of formes: or G wearied and tired, sometimes with the distance of the objects, and so consequently dazeled and deceived. *Reason* must of necessity be imployed, which may conclude alike of like things, and contrarily of contrary things, by observing their proportion, and so supply the defect of sense, and correct its errors.

But then because many things are remote both from sense and reason (which we cannot in any sort attain unto by sense, nor yet by reason firmly enough) we are indepted to the grace of God, that he hath by *his Word* revealed unto us even some secrets which concern us to know. Therefore if any one desire the true knowledg of things, these

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these three *principles of knowing* must of force be conjoynd. Otherwise, he that will follow the guidance of sense onely, will never be wiser then the common sort; nor be able to imagine the Moon lesse then a starre; the Sun greater then the earth; and that as spherically, and every way habitable. On the contrary if a man contemplate on abstract things and consult onely with reason without the testimony of sense, he will be rapt away with meer phantasies, and create himself a new world: like the Platonick and Aristotelick, &c. Lastly, they that heed the Scripture onely, and hearken neither to sense nor reason are either carried away beyond the world (by the sublimity of their conceptions;) or else involve things they understand not with the Colliers faith; or following the letter, propound unto themselves things, though never so absurd and superstitious, to be believed; as
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Papists do in that most absurd transubstantiation of theirs, &c. So then *the principles of knowing*, must be conjoyned, that divine *Revelation* may afford us belief; *Reason*, Understanding, *Sense*, *Certainty*. And they must be used in this order (in naturall things I say) as that we begin with sense, and end in revelation (as it were the setting to the seal of God:) for by this order every subsequent degree will receive receive from the antecedent, both *Evidence* and also *Certainty*, and *Emendation*. For as there is nothing in the understanding which was not first in the sense: so there is nothing in the belief, which not first in the understanding. For he that believes, must know what is fit to be believed. Hence the Scripture frequently invites us to hear, see, tast, consider; And affirms that faith too comes by hearing. I said *Certainty* too. For by how much the nearer Reason is to sense (that is by how many
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many the more experiments of the senses it may be demonstrated) it is so much the more real: and on the contrary again, the further it recedes from sense, by so much the more vain speculation and naked imagination it hath. But by how much the neerer divine Revelation may be reduced to understanding, and the testimonies of experience, so much the more strength it findes.

I said further, that the precedent degrees were corrected by the subsequent: and so it is. For where sense fails or mistakes, it is supplied and corrected by reason: And Reason by Revelation. For example, when the sense judgeth the Moon to be bigger then *Saturn*, or an Oare to be broken under the water, &c. Reason rectifies it by certain documents of experience. So when Reason hath gathered any thing falsely of things invisible, it is amended by divine Revelation. Yet that emen-

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dation is not violent, and with the destruction of the precedent principle : but gentle , so that that very thing which is corrected , acknowledgeth, and admits it of its own accord, and with joy, and soon brings something of its own, whereby the same corrected truth may become more apparent. For example, Reason brings nothing to correct sense, whereof it is not soon ascertained by sundry experiments, and affirmes it self, that so it is, (as that an Oare is not broken under water , the Touch teacheth : also the sight it self, looking on it after it is drawn out.) Faith holds out nothing, which is contrary and repugnant to Reason, (though it bring that which is beyond and above Reason:) But all things such as Reason not onely yields being overcome by authority , but also finds of a truth to be in things, and so seeks and finds out something of its own, which may serve to
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confirm and illustrate the same truth. Therefore let it be taken for true; That Sense is not onely the fountain of knowledge, but also of certainty, in naturall things: But that the understanding is the Organ not onely of knowledge, but also of certainty in revealed things.

Let us come then to the purpose. Some deny, that holy Scripture is to be drawn to Philosophie, because it teacheth not the speculation of outward things, but the way of eternall life, I confess, that the Scripture was given by inspiration of God, to teach, reprove, correct, and instruct in righteousness: That the man of God may be perfect, throughly furnished unto all good works. (2 Tim. 3.) I confess, I say, that this is the ultimate end of the Scripture. Yet who knows not, that there are for the most part more ends of one thing? even in humane things, much more in divine, where the wisdom of our adored God hath wholly wound up it self, with an artifice

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scarce to be found out of us. Truly, if wee finde that artifice all o-
vernature, (and so it is) that every
creature, and part of a creature, and
part of a part, serves for severall uses:
I see no reason why we should deprive
the Book of God of this character of
the highest Wisdome. But I see reason
why we ought to determine, that most
sufficient complements of all things,
whereunto Sense and Reason were in-
sufficient (and yet wee were concerned
to know them) are extant in that most
holy Book. For did not God bring
man into the School of the World, to
contemplate his manifold Wisdome?
Did not hee command him to behold
his invisible things by these things that
are seen? (*Rom. I. v. 20.*) Surely this
must beacknowledged to be the end
both of making the World and plac-
ing man therein. Now it is cleere
through all Nature, that, to whatsoe-
ver end God hath ordained any thing,
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he hath conferred means upon it to be
in it. Hee hath therefore conferred
means upon man to contemplate his
wondrous things: Which as wee must
acknowledge that they are sense and
reason, so we must needs acknowledge
that they are not every where suffici-
cient. For our senses leave us in the
knowledge of eternall things, and
those things which are placed quite
out of sight, and done when we are not
present. But where Sense fails, Reason
fails also: Being that this is nothing ^B
but an universall knowledge of things,
gathered from particulars acts of sense,
that this or that is, or is done, either so
or so. When as therefore both Sense
and Reason doe very ordinarily fail us,
shall we believe, that the most graci-
ous Father of Lights, would not sup-
ply this defect some other way? His
most liberall and in every respect ap-
proved bounty towards us, will not
permit us to suspect that. But if God
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have some way or other provided for us, let it be shewen what it is, or where it is to be sought for, if not in that sacred volume of Oracles? And I pray, was it in vain, or onely in respect of our eternall salvation, that God gave us his Law. *This is your wisdom and understanding in the sight of the Nations, which shall heare all these statutes and say. Surely this is a wise and understanding people. (Deut. 4. 6.) Or did David boast in vain? I have more understanding then all my teachers; because thy testimonies are my meditations (Psal. 119. 99.) Or the sonne of Sirach say in vain: The Word of God most High is the fountain of wisdom? (Eccles. 1. 5. Or was it in vain that Salomon call'd God, the guide unto wisdom, and the corrector of the wise? Wisd. 7. 15.)* see here a correctour! But how doth he correct, but by dashing over our vain cogitation with his word? And to what purpose, I pray is all that is frequently mention'd

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tion'd concerning the beginning of the World and the order of the Creation, and properties of the creatures, If the parent of nature, who is also the Dictatour of the Scriptures, meant to teach us nothing of nature? *They say it is to this end, that we may learn to know and admire, love and fear the Maker of all things.* Right: But how the Maker without his work? Does not any one so much the more admire and praise the ingenuity of the Painter, if he be excellent, by how much the better he understands the art of painting? Surely yes. A superficial knowledge will never raise either love or admiration. And then I demand, those things, which wee meet with in the Scriptures concerning the creatures (by similitudes also drawn thence) are they true or false? If true (for who can determine otherwise without blasphemie) why may we not conferre them with those things that are

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manifest by sense & reason: that so we may finde out that harmony of truth, which is in things, and in the mouth of the Author of things? *Truly, if the words of the wise are as goades and nails fastened*: (as Salomon testifies, Eccles. 12.11.) What shall we think of the words of the all-wise God? But this, that though they raise us up with another end, and by the by, yet they contain nothing but most solid truth and all manner of wisdom. In vain therefore may some one say: *I finde no mention in the Scriptures, much less precepts of Grammar, Logicke, Mathematicks, Physicks, &c.* For there is as much distance betwixt divine writings and humane, as betwixt God himself and man. Man that is limited with time, place and objects, at one time and in one place can do but one thing: but God that is æternall, omnipresent, and omniscient, at once sees, rules and governs all things, always and every where.

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where. And the same Character do their writings retain on either part. Humane writings do some one thing with expresse endeavour, handling one object in one place, and that in such a way as is most pleasing to mans understanding: but divine writings like an universal treasury of wisdom stay not upon one particular matter, (unlesse it be in things pertaining to Theologie) but contain variety of matter under severall sayings. Whence a Divine, a Moralist, a Politician, a Householder, a Philosopher, a Philologer, &c. may take out every of them, what each hath use of. And this breadth & depth of the Scripture is its prerogative before humane writings, that so it may be in truth an inexhaustible fountain of all wisdom. For whatsoever matter is to be handled, the Scripture affords always, either a rule, or some sayings or examples: as *John Henrie Alsted* (sometimes my honoured

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red Master) shews in his *Triumphus Biblicus*, and much more might be discovered by a very accurate diligence: which that so it is, for a good part of it, shall appear also in these our Physicall meditations. Rightly therefore said *Cassiodorus*: the Scripture is an heavenly school, wherein we learn whatsoever we are either to learn or to be ignorant of.

And piously *T. Lydiat*: It is most absurd, that heathen Philosophers should seek for the principles of all arts in one Homers posse, and that we Christians should not do the same in the Oracles of God, which are a most plentiful and most clear fountain of wisdom. (About the end of his Physiological disquisition.) Those most Christian Philosophers are therefore deservedly to be praised, who have endeavoured to render unto God the Parent of things that praise that is due unto him, *Franc. Valesius*, *Lambert Danaus*, *Levinus Lemnius*, *Thomas Lydiat*, *Conradus Astacus*, *Otto Casman-*
nus;

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1116; who have not doubted to asseverate, that the seeds of true Philosophy are contained in the holy Book of the Bible, and to derive their maximes of Philosophy from thence (though with different successe.)

Let it stand therefore, that Philosophy is lame without divine Revelation. Whence wee have this consequence, *that Aristotle is not to be tolerated in Christian schools, as the onely Master of Philosophie: But that we should be free Philosophers, to follow that which our senses, Reason, and Scripture dictate.* For what? Are not we placed as well as they in Natures garden? Why then do we not cast about our eyes, nostrils and ears as well as they? Why should we learn the works of nature of any other Master, rather then of these? Why do we not, I say, turn over the living book of the world instead of dead papers? wherein we may contemplate more things, and with greater delight
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and profit then any one can tell us. If we have any where need of an Interpretour the maker of nature, as we have said, is the best Interpretour of himself. If a Monitour or Suggestour, we have more and better then *Aristotle*, experience (of the various and occult Mæanders of nature) being multiplyed in the processe of so many ages. For as all humane things get up to perfection from rude beginnings, so Philosophy hath had its growths too. In *Aristotles* age it was scarce out of its infancy: In the ages that followed after, (especially in ours) it was so increased stil with new observations, that the Aristotelick tenets favour of obscurity & uncertainty in cōparison of these, nay, they hold out open falsities. Be it then (writes *Rod. Goclenius* to *Nic. Taurellus*) that nature hath shewed all the acutenesse of humane ingenuity in *Aristotle*; let *Aristotle* be a man that hath deserved well of all humane wisdom beyond and above all other mortall men besides;

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sides ; let him be the Father and Captain of our wisdom ; let him be the supream Dictatour of wisdom, the Generalissimo of Philosophers, the eagle of the Philosophicall Kingdome, wisdom and praise of literature ; let him be the Hercules, the Prince, the Tribunall of truth ; let him be the deity of Philosophers ; let him be lastly a man greater then all praise, and above all calumny ; which titles *Julius Scaliger* sets him out with : yet this miracle of Nature is not the R U L E O F T R U T H , seeing that hee hath not every where traced Truths footsteps. Thus *Goclenius*. Now hee that will may see *Campanella* and *Verulamius*, (for it may suffice, to have shewed these Hercules, who have happily put to their hands to the subduing of Monsters, and cleansing *Augias* stables ; and to have opposed them to those, whom the authority of *Aristotles* vainly swelling Philosophy holds bewitched :) and feel how farre *Aristotles* assertions are
often

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often from the truth, and this is the cause why it seems convenient, that *Aristotle* with all his heathenish train should be excluded from the sacred Philosophy of Christians; least they should any more entangle the truth in errors, and involve and obscure those things with intricate disputations, which are of themselves plain by the lamp of the Word of God, and of sound reason. For is it not very absurd, that Christians, who are trained up in the true knowledge of the true God, and taught by his holy voice, concerning the originall causes, end, and manner of subsistence of all things visible and invisible; to whom also the very mysteries of æternity are revealed; whom the anointing of God teacheth all things; to whom Christ hath imparted his mind (*1 John 2. v. 27. 1 Cor. 2. 10.*) that they, I say, should seek for the truth of things amongst the heathen, that are destitute of all these,
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and have no other helps, but those of reason, and of the senses, which are common to us with them? Is it so indeed that there is not a God in *Israe*l, that we go to enquire of the gods of *Ekron*? Is the light of *Hierusalem* so put out, that we must needs borrow lamps at *Athens*? It is well known that *Origen* was the man that first of all joyned heathen Philosophy with Christian Religion: with no ill intent perhaps, but sure it is with very bad event. The good mans purpose without doubt was to put some externall splendour upon Christian Religion, as then contemned by reason of its simplicity, that so Christians might be well appointed to buckle with the Gentile Philosophers at their own weapons. But whither or no came this perswasion from him, that hath called us out of darknesse into his marvellous light, and commanded us to beware of vain Philosophy after the tradition of men, after the

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rudiments of the World, and not after Christ. (Gal. 5. 8. 1 Pet. 2. 9. Colos. 2. 8.)
And indeed the most sad estate of the Church a little after shews what fruit we had in coupling *Aristotle* what Christ; when all was full of the noise of disputations, (for slippery questions, and an itching desire of controversie is the very soul of Peripateticisme) and hæresie sprung out of hæresie, till at length the fumes of humane opinions had so quite darkned the brightnesse of the divine wisdom, that all things degenerated into Antichristianisme. Where in forging articles of faith, and ordaining rules of life, *Aristotle* had an æquall share with Christ, that I may not say he had the sole dictatourship: of which thing our School divinity will give us a very cleer sight. If *Origen* then a man of so sublime a wit, in vain attempted to piece out Christian religion with that same heathen Philosophy;

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phy; and *Thomas Scotus* nor no man else had any better successe, why then do we tolerate it? Why do we not slip our wits out of those snares? why do we not throw away those spectacles which present us with fancies instead of things?

Some are afraid, least, if they should let go Peripatetick Philosophy, they should have none at all. As if when *Hagar* were cast out, there would have been none to bless *Abraham* with issue! Or that the *Israelites* would have been sterved with hunger, when they had left the *Ægyptian* flesh pots; or that *Moses* must needs have grown blockish, when he was out of the company of the wise men of *Memphis*! Nay rather, that promised Grace will come at length, at length that heavenly *Manna* will rain down, at length we shall be truly θεοδιδαντοι taught of God, when turning away our ears from humane opinions, we shall hearken to God alone

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speaking by Nature, and by his Word. And then how solid, easie, and delightfull will all things be! when as the whole course of Philosophy will not consist in opinions but in truth.

But greater care was to be had of method: that all things should be delivered to the learners in such a way, that they may finde knowledg to flow into them, not to be stuf in; always beginning with those things that are best known, and ending in things no lesse known then they. For why should we think that impossible in Physicks, which is so excellently atchieved in *Mathematicks*? where all Demonstrations (*N.W.*) are brought to the very sight: and all is so contrived together of things that go before and are better known (always beginning with such common things that it is tedious to the unskillfull to heare them) in such an order, as that which is in the midst is never skipt over, nor place given to that which is more unknown,
whence

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whence it comes to passe, that you must of necessity assent as well to that which is last, as to that which is first. And truly there is reason to wonder why the like hath not been yet assayed in Metaphysicks, Physicks, and Theologie, (for Ethicks and Politicks concern more contingent things.) I am not ignorant that there is more evidence in Numbers, Measures and Weights, then in Qualities, by which Nature puts forth its strength after a hidden manner: yet I will not say that there is greater certainty in them, seeing that all things are done alike not without highest reason, in a continued order, and as it were by an æternall law. And yet in Mathematicks all things are not alike plain, yet they are assayed sundry wayes till they can be reduced to *autopsia*, or very sight, as I said before, and delivered scientifically. *For he sayes nothing in Philosophicall matters that proves nothing: and he proves nothing that doth*

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not-so demonstrate it, that you cannot con-
tradict it. And now I beseech you let this
be our businesse, that the schools may
cease to perswade, and begin to demon-
strate : cease to dispute and begin to spe-
culate : cease lastly, to believe, and begin
to know. For that *Aristotellicall* ma-
xim; *Discentem oportet credere*, A learner
must believe is as tyrannicall as dange-
rous; and that same *Pythagorean* *αὐτὸς*
ἔφα' ipse dixit. Let no man be compell'd
to swear to his Masters words, but let
the things themselves constrain the in-
tellect : Nor let a Master have any more
credit given him, then hee can demon-
strate in very deed, that hee is to have.
For in a free Common-wealth there
ought to be no *Kings*, but *Dukes* or *Ge-*
neralls; no *Dictators*, but *Consuls*. And
those that profess the art of instructing
men, are the Fathers of men, not the
carvers of Statues. O when shall we see
that day ! that all things which ought
to be known shall offer themselves so to

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a mans understanding, that there wil be nothing but what may be understood for the very cleerness of it, nothing call'd in doubt for certainty: the truth of things making such an impressiion upon the senses with its light. For hee doth not see truly, who must yet be perswaded by arguments to make him believe that hee sees: as wee have been hitherto dealt with for the best part.

I could not choose, because I seemed to see light in the light of God, but assay calling God to my aid, to reduce these new hypotheses of naturall things into a new method, and dictate them to the schollers of this school. And thence sprang this, which I now offer, representing a draught of the lineaments of some new, (and as I hope truly Christian) Philosophie. Not that I would crosse the design of great *Verulam* (who thought it the best way to abstain from Axiomes and method, till full inductiions could be made, of all and every

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thing throughout all nature:) but to make an experiment in the mean time, whether more light might be let into our minds by this means to observe the secrets of nature the more easily, that so *praise might be perfected to God out of the very mouth of infants, and confusion prepared for the gainsaying enemy*; as *David* having comprised the summe of *Physicks* in a short hymne for the use of the unlearned) speaks. (*Psal. 8.*) I have entituled it a *Synopsis of Physicks reformed by divine light*: because *Philosophy* is here guided by the lamp of *divine Scripture*, and all our assertions are brought to the attestation of the senses and reason, with as much evidence as could be possible. Now both those come under the name of *divine light*. For as *David* said, *THY WORD is A LANTHORNE unto my feet*: so said *Salomon* *THE SPIRIT or mind OF A MAN is THE CANDLE of the Lord searching all things.*
(*Psalme*)

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(*Psalms 119.105. and Proverbs 20.27.*

If any one object: That these things here delivered, are not yet of that certainty or evidence, as to be preferred before *Aristotles* so long received doctrine; I will answer, that is not my drift at present: but onely I propound this as an example, that a truer way of Philosophie may be set out, by the Guidance of God, the Light of Reason, and the Testimonie of Sense, if Philosophers would labour more after God and the Truth, then after *Aristotle* and Opinions. In the mean time, these should be the more acceptable, and had in more reverent esteem of us, if it were for nothing but this, that they are taken from the Oracles of God, and aime at a more abundant knowledg of God. For my part truly I had rather (in that mind I now am: and that it may so continue, strengthen me, ô God) I had rather I say erre, having God for my guide, then having *Aristotle*: that is, I had rather

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rather follow the voice of God, though not thoroughly understood yet, so I follow it, then be carried away from the sacred testimonies of my God, to the devices of the brain of man.

I confesse my self, that something more were to be desired here yet, to that rule of certainty and evidence which I spake of before: yet because I trust that these things may be brought to a fuller *exactness* [exactnesse] by reiterated meditations, (of mine own or some others,) I doubted not to follow the counsell of great *Acontius*: *If thou hast made any rare observation, sayes he, which never any one before made (whither the thing be a new invention, or some new way of former inventions) although much be wanting as yet, which is above thy strength, nevertheless if thou shouldest not make it publick, it would argue either too much cowardize, or too much haughtinesse of thy mind, and however that thou art no lover of the Common Wealth. And why*

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why should not these things be accounted as new inventions; *That ternarie of principles so clearly demonstrated from Scripture, Reason, and Sense? Why not that admirable scale of substances, by a septenarie gradation? Why not the doctrine of spirits (as well separate as incorporate :) of motions also and qualities, laid down more accurately and plainly then ever before, & letting in a quite new light into the knowledg of naturall things?* To say nothing of smaller matters scattered all over the book. Every of which in particular though I dare not defend tooth and nail, for some things perhaps are still the reliques of common tradition: and others it may be, not yet sufficiently established upon the foundations w^{ch} we have laid down) yet I am perswaded that they are the groundworks of unmoved truth, and avail much to the more exact observation of particular things. And that I may speak in a word, I hope there

is

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is so much light in this method of Physicks here delivered, that very little place is left to doubts and disputations: so that it makes something towards the taking away the controversies of Authors, the opinions of all (whatsoever of truth either *Aristotle* hath; or *Galen*, the *Chymicks*, *Campanella* and *Verulamius* do reasonably alledge against him) being reduced to an harmony; which may be made plain by the example of the principles of which they make bodies to consist, (which *Aristotle* would have to be *the four Elements*; the *Syagyricks Salt, Sulfur and ☿*. Nay more, that by this means a gate is opened in a new kinde of way, not onely to the understanding of Arts and humane inventions, but also to multiply them: which could never be, unless the foundations of truth were found. Perhaps I speak more, then the Reader will think he finds in my Writings. But if he saw but the streams (the delineation of
that

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that *Pansophia Christiana*, which wee have in hand) that are derived from this fountain , as also from that of our Didacticks and Metaphysicks , hee would not hold it vainly spoken. But because those are not yet brought to light, I set down this as a law for these that are: *If any thing be not sufficiently deduced from Sense, Reason, and Scripture; If any thing cohere not harmoniously enough with the rest; If any thing be not evident enough with its own perspicuity, let it be taken as not said at all.*

Which law standing in force it may be lawful for my self & all others, both to doubt always, and every where whether every thing be so as it is delivered to be: and also to enquire why it is, as it is found to be; by which two courses, that the lowest foundations of truth, will in time be discovered no body needs to doubt.

Therefore let none of vs seeke after any thing else, but how the truth
may

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may best be maintained on all hands which if it happen not to be on our side, and that we are deceived with appearances of truth, (as it is very usuall in humane affaires,) I beseech all those that are more sharp-sighted, for the love of truth courteously to shew us our way, which we have lost, and where our demonstrations come not together. But if these favour of truth something neer, that then they would not disdain to joyn their endeavours with ours for the illustration thereof: that all of us being the children of truth may compose and sing Hymnes of prayse together to God the Father of Truth. Thou therefore

*O Christ the Fathers glory bright,
Of this great World the onely light;
On us some beams of light bestow,
That are thy servants, thee to know.*

Amen, Lord make me to see ! here indeed

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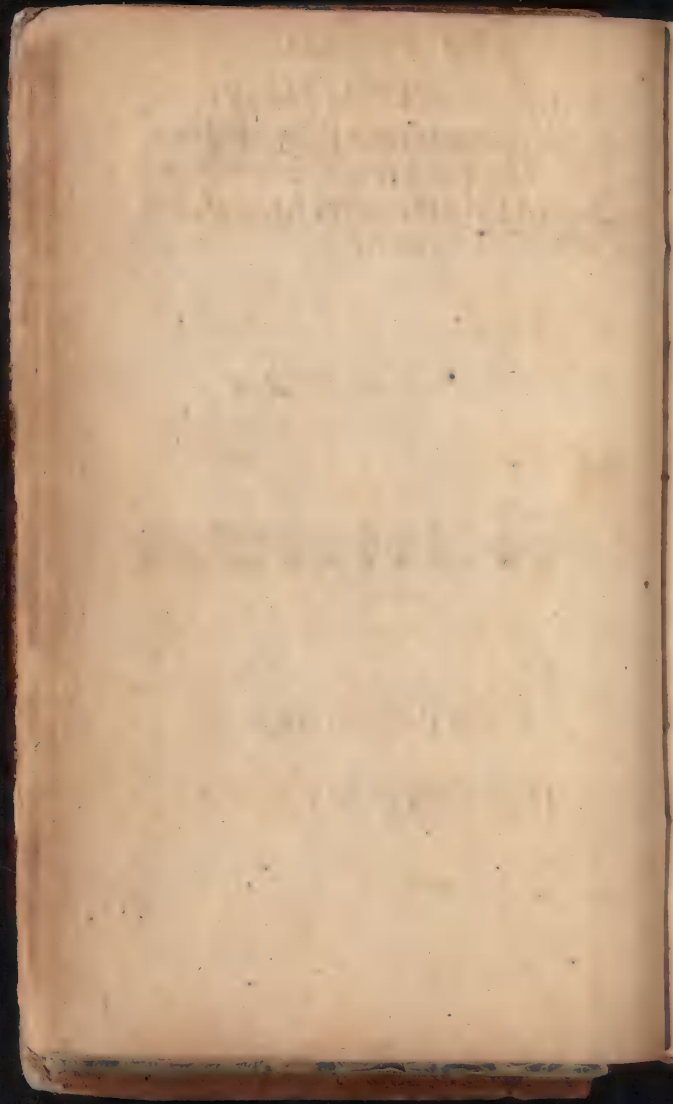
deed thy externall light shining upon,
and internall informing thy creatures,
but there in [in heaven] æternall and
uncreated ! *Amen, Amen.* And so Chri-
stian Readers farewel.

F. A. C.



March the 12th. 1650.

Imprimatur *Johes Downame.*





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Errata.

Page 53. for softness read saltness, p. 63. for
softness r. saltness, p. 247. line 12. for run
r. noisome, p. 250. l. 4. for veins r. reins, *ibid.* l. 28
dele by.

PRO-



PROLEGOMENA.

*Touching the nature, foundation and use of
Physick.*

I *Physick is the Scientiall Knowledge of
naturall things.*

II *That thing is naturall, which is by Na-
ture, not by Art*



Or whatsoever this visible
World hath, comes all, ei-
ther from Nature or from
Art. those things are from
Nature which God brought
forth in the beginning, or wh^{ch}

are to this very time begotten: by a virtue im-
planted in things, as, the Heavens, the Earth,
the Sea, Rivers, Mountains, Stones, Metals,
Hearbs, living Creatures, &c. those
things are from art which men have shaped,
by putting a new form upon natural things;
as, Cities, Houses, Ponds, Channels, Statues,
Coines, Garments, Books, &c. that is by the
work of mans ingenuity and hands. Physicks
have nothing to do with these things; these
are put over to the arts.

Now seeing that nature is before art: ye that art imitates nothing but nature, for as much as it doth nothing but by the strength of nature: it necessarily follows, that nature is to be laid for a foundation to arts, and that nature must first be knowne by those that are studious of arts, what things, and by what vertue it operates every where. for when this is known, the secrets of all arts open of their own accord, without this in arts and prudenials all wil be blinde, dumbe, and maimed: therefore Physick is so necessary to be premised before the Mathematical, and Logical, and also the prudeniall Arts, that they who do otherwise, may be thought to build castles in the air.

III *The nature of things is, the law of being born and of dying, of operating and of ceasing, which God the Workmaster hath laid upon all things that are.*

For all things are born and die: all things operate somewhat, and all things cease again: in an order and manner proper to every creature. which order and manner being that it is with most excellent reason, could not be disposed, but by the supream wildome, inasmuch as it is found constantly to be imposed by way of a law upon things

now

now it took the name of nature from the first degree of mutation, of every thing, which is, to be borne.

IV *The knowledge of nature is to be obtain'd by searching into Nature it self.*

By *searching* I say. For no one should spend his time in Physicks, to that end, that he might have his mind taken up with anothers conceits; but that he may put forward himself to the through and intimate knowledg of things, otherwise the intellect will not be illustrated with the nature of things, but obumbrated with the speculation of phantasms in naturall things, therefore we are to seek for guides who may make us scholars, not of themselves, but of nature, and exhibite unto us not their own fond reasons, but nature.

V *To search Nature, is to contemplate, how, and wherefore, every thing in nature is done.*

To *contemplate* I say. For as we do not see the Sun, but by looking on the Sun; so we do not learn nature, but by looking into nature; which is that the Scripture counsels us. *Ask the beasts, and they shall teach thee, and the fowls of the aire, and they shall tell thee, or talk with the earth, and it shall an-*

swer thee, and the fishes of the sea shall declare unto thee. (Job 12.7.) therefore the learners of naturall Philosophy, cannot be more happily and easily instructed, then if they be taught by ocular demonstration, where-soever it is to be had: *I say to contemplate every thing*, that so we may sift out the reasons and causes of all things every where. For it is certain that nature doth nothing in vain, even in things of least moment, yea sometimes in the very least things much wisdom lies stored up. And which is more, we cannot attain to the knowledg of great things, but by the knowledg of lesser things, which the following Aphorisme will teach us.

V-I Nature unfolds her self in the least things, and wraps up her self in the greatest things.

That is, in the more excellent creatures many things are wound up and woven together with such an occult artifice, that neither the beginning nor the endings of actions and accidents can easily be discerned, but in all courser creatures, all things are clearly manifest, which is the cause why the nature of compounds cannot be knowne, unlesse the nature of simples be

be first known : so consequently we are to begin with these speculations, and to proceed by degrees from simpler things to the more compound : which very order we shall see that the Creator himself observed, in producing and twisting together the nature of things.

VII *Wee are to studie naturall Phylsophie by the guide of sense , and light of the Scripture.*

For sense is the beginning not onely of knowledge, but of certainty and wisdom ; for as there is nothing in the intellect which was not first in the sense, so if there be any thing obscurely or doubtfully in the intellect, we are to have recourse to the sense for evidence and certainty. but wheresoever sense or reason faileth, (as in things remote either in place or time) we are indebted to the grace of God, that he hath deigned to reveale many things unto us exceeding sense and reason. For example, the first production of the world, and the constitution of things invisible.

He that neglecteth either of these principles is easily intangled in errors : for by how much the more of imagination any thing hath, by so much the more vanitie it

hath, and is the more remote from the truth: again, by how much the lesse any thing participates of revealed wisdom, by so much the lesse it partakes of the truth. and such for the most part is the Philosophy of the Gentiles, and therefore vain and barren, we will follow the guidance of *Moses*, (who described the generation of the world by the command of God :) yet always heedfully observing the attestation of the senses, and of reason. For wisely doth *Lud. Vives* (as we have set down under the title of this book) recall Christians from the lamp of the Gentiles, which yeilds an obscure and malignant light, to that torch of the Sun, which Christ the light of the World brought into the world, attributing much wit indeed, but little profit to the inventions of *Aristotle*. nay further *Campanella* and *Verulamius* most Christian Philosophers (that are acquainted with that way of Philosophy from sense and Scripture) have demonstrated, that all *Aristotles* doctrines are nothing but a nurserie of disputations, (that is, of obscurities, hæsitancies, contradictions, strifes, and wranglings) and fighting hood-winckt, and that they hinder rather then advance our meditation of things, and withall have afforded

us a light, whereat we may kindle more clear torches of inquiring out the truth. following vvhose footsteps. (yet laying strong foundations from the Scripture) vve vwill dresse out a little Theatre of nature, not for disputation, but for speculation; and vve vwill go through nature silently, yet not vwithout our eyes, and that again according to the counsel of great *Vives*: *Here is no need of disputations, (saith he) but of a silent contemplation of nature: the Scholars shal enquire and ask rather then contend: If any be more slow they wil need more ful commonstration not disputation, and a little after, again I say, here is no need of wrangling but of looking on, so this study wil be the delight of the rich, and a refreshing of the mind to those that deal either in publike or in private affairs: for when shal we easily find any other delight of the senses, to be compared with this, either in the greatnes or in the variety, or in the continuance of it; for when we bestow our labour upon this contemplation, wee need not seek for any other recreation, nor desire sauce for this meat, the walk it self, and the quiet contemplation is both a School and a Master, as that which always affords something, which thou mayest admire, wherein thou mayest delight, which may increase thy knowledge.*

There-

Therefore let us resolve upon this, vve
 that view naturall things, to rest upon no
 other authority besides that of the Work-
 master of nature, and of nature her self (as
 she holds forth her self to be touched
 and felt) the Scriptures, sense and rea-
 son, shal be our Guides, Witnesses
 and Dictators, to the Testi-
 monies of vvhich he that as-
 sents not, shewvs him-
 selfe very foolish
 and vain.

CHAP.

C H A P. I.

An Idea of the World to be created and created.

THe eternall Deitie, our God that is to be adored, after the infinite glories which hee enjoyes in his immense eternity, was of his exceeding *goodnesse* propense to communicate himselfe out of himself; and by his exceeding *Wisdome* saw that his invisible things might be expressed by certain visible images; and to execute that, had his *Omnipotencie* at hand, he decreed not to envie entitie to those things, wherein he might be expressed, and wherein his *Power, Wisdome and Goodness* might be revealed: therefore he produced intelligent creatures, by whom he might be known & praised *Angels and men*: both after his own image: but the first pure minds, the other clothed with bodies for whom he built a dwelling place, and as it were a school of wisdome, this universall World with other creatures of inferiour degree almost infinite: all and every of which, cry out after their manner, *hee made us, and not wee our selves.* Now then we go about to unfold in what

order so great a work proceeded, and with what art, all things were contrived, and with what strength they are held together, yet by his guiding who alone is able to testifie of himself and of his works; for thus, says he, by his Secretary *Moses. Gen. 1.*

I *In the beginning God created the heaven,* (v. 1.) That is, the heaven of heavens with the Angels: whom as morning stars first produced, he made spectators of the rest of his works. (*Joh. 38. v. 7.*)

II *And the earth*) that is this visible world, which notwithstanding he did not finish in the same moment, therefore it is said.

II. *And the earth was void, & without form, and darknesse was upon the face of the deep. v. 2.* that is, the matter of this world was first produced, a certain *Chaos* without form and darke, like a black smoake arising out of the bottomlesse pit of nihilitie, by the beck of the Almighty, and this was matter, the first principle of this visible World.

IV *And the Spirit of God moved upon the water,*) that is a certaine strength was introduced by the spirit or breath of God into that same darke, and of it selfe confused matter, whereby it began to stirre. hereby then is understood the second principle of the

the World, that is, the spirit of life diffused throughout, whereof the Universal World is hitherto full; which insinuating it selfe every where through all the parts of the matter, cherishes and rules it, and produces every creature, introducing into every one its own form, but being that this work-master had need of fire to soften and to prepare the matter, variously for various uses, God produced it. For,

V *God said let there be light and there was light, ver. 3.*) this is described, as the third principle of the World, meerly active, whereby the matter was made visible and divisible into forms, the light, I say, perfecting all things which are, and are made in the World, therefore it is added.

VI *And God saw the light that it was good, ver. 4*) that is, he saw that all things would now proceed in order. for that light being produced in a great masse, began presently to display its threefold virtue (of illuminating, moving it selfe, and heating,) and by turning about the World, to heat and rarifie the matter, and so to divide it. for hence followed first of all from the brightnesse of that light the difference of nights and days.

VII *He divided the light from darkness, and called*

called the light day, and the darknesse he called night, and the evening and morning were the first day, ver. 5.) that is, that light when it had turn'd it self round, & compassed the World, with that motion made day and night.

The second effect of light was from heat, namely, that which way soever it pass'd, it rarified and purified the matter, but it condensed it on both sides, upward and downward. whence came the division of the Elements, this *Moses* expresses in these words.

VIII *And God said, let there be a Firmament, that it may divide betwixt the waer above and the waters below, ver. 6.*) God said, that is, he ordained how it should be. let there be a Firmament, that is, let that light stretch forth the matter, and let the thicker part of the matter melting and flying from the light thereof, make waters on this side and on that above, as they are the term of the visible World; but below, as they are a matter apt to produce other creatures, under which the earth as thick dregs came together. that was done the second day.

XI *Therefore God said, let the waters be gathered together under heaven into one place; and let the dry land appear. and it was so; and God called the dry land, earth, and the gathering together*

ther of the waters he called seas, and he saw that it was good. ver. 9, 10.) and so on the third day, there came the foure greatest bodies of the World out of the matter already produced, *Aether*, (that is, the Firmament or Heaven) *Aire*, *Water* and *Earth*; all as yet void of lesser creatures. therefore said God.

X *Let the earth bud forth the green herb, and trees bearing seed or fruit every one according to his kinde ver. 11.*) this was done the same third day, when as now the heat of Cœlesti-
all light having wrought more effectually began to beget fat vapours on the earth, whereinto that living spirit of the World insinuating it self, began to cause plants to grow up in various formes, according as it pleased the Creator. this is the truest original and manner of generation of plants hitherto, that they are form'd by the spirit with the help of heat. but as the heavens did not always equally effuse the same heat, but according to the various form of the World, one while more mildly, another while more strongly; the fourth day God disposed that same light of heaven, otherwise then hitherto it had been, namely, forming from that one great masse thereof divers lucid Globes, greater and lesser, which (being called

called stars) he placed here and there in the Firmament higher and lower, with an unequal motion, to distinguish the times, and this *Moses* describes v. 14, 15, &c. thus.

X I *And God said, let there be light made in the Firmament of heaven, that they may divide the day and the night, and may be for signes, and for seasons, and for days, and for years, that they may shine in the Firmament, and enlighten the earth, therefore God made two great lights, and the starres, &c.*) This done, then after, all the face of the World began to appear beautifull, and the heat of heaven more temperate, began to temper the matter of inferiour things together, after a new manner; so that the spirit of life now began to form more perfect creatures, namely moving plants, which we call animals, of which *Moses* thus.

X II *God said also, let the waters bring forth creeping things, having a soul of life, and flying things upon the earth, &c. v. 20.*) the waters were first commanded to produce living creatures, because it is a softer Element then earth: first reptiles; as earth-wormes, and other worms, &c.) because they are as it were the rudiment of nature, also swimming things, and flying things, that is, fishes and birds, animals

mals of a more light compaction ; that was done on the first day with a most goodly spectacle to the Angels ; but on the sixth day, God commanded earthly animals to come forth, namely of a more solid structure, which was presently done, when the spirit of the World distributed it self variously through the matter of the clay : for thus *Moses.*

XIII God said, let the earth produce creatures, having life according to their kind, beasts, and serpents, and beasts of the field, and it was so. *iv. 24.*) So now the heaven of heavens had for inhabitants, the Angels ; the visible heaven, the starres, the air birds, the water fishes, the earth beasts, there was yet a ruler wanting for these inferiour things, namely, a ratioll creature, or an Angel visibly clothed, for whose sake those visible things were produced. Therefore at the last when God was to produce him, he is said by *Moses* to have taken counsel ; in these words.

XIV Then God said, let us make man after our own image, and likenesse, who may rule over the fishes of the sea, and the fowls of the air, and beasts, and all the earth, &c. Therefore he created man out of the dust of the earth, and breathed in his face the breath of life, &c. *v. 26.* and
chap.

cap. 2. v. 7.) so man was made, like to the other living creatures by a contemperation of matter, spirit and light; and to God and the Angels, through the inspiration of the mind, a most exquisite summarie of the world. and thus the structure of the Universe ought to proceed, so as to begin with the most simple creature, and end in that which is most compound but both of them rationall; that it might appear, that God created these onely for himself, but all the intermediate for these. Lastly, that all things are from God, and for God, flow out from him, and reflow to him. But that all these things might continue in their essence, as they were disposed by the wisdom of God, he put into every thing a virtue, which they call *Nature*, to conserve themselves, in their essence, yea, & to multiply, whence the continuation of the creatures unto this very day, and this *Moses* intimated, adding touching animals.

XV *And God said, increase and multiply, v. 22.)* by the virtue of which command and words, *let there be made, let it produce, let it put forth, &c.* Things are made and endure hitherto, and would remain (if God would) without end unto æternity. Gods omnipotence.

tency concurring no longer immediately unto particular things, (as before) but nature it self, always spreading forth her vertue through all things. which thing derogates nothing from the Providence of God, nay rather it renders his great power, wisdom, & goodnes, more illustrate. for it comes from his great goodnes, that the greatest and the least things are so disposed to their ends, that nothing can be, or be made in vain; from his wisdom, that such an industry is put into nature to dispose all things to their ends, so that it never happens to erre, unlesse it be hindred: lastly, from his power, that such an immutable durability can be put into the universe, through such a changeable mutabilitie of particulars, so that the World is as it were æternall.

Therefore the veins of the strength, artifice and order of this nature must be more thoroughly searched; that those things which we have here in few words hinted out of *Moses*, may be more illustrated by the constant testimony of Scripture, reason and senses, and a way made to observe one thing out of another.

An Appendix to the first Chapter.

We have said that it may be gathered out

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of

of those words of *Moses*. In the beginning God created the heaven: that the invisible World was the beginning of the works of God, that is the heaven of heavens with the Angels. Now that by this heaven is to be understood the heaven of heavens, and the Invisible, or Angelicall World appears plain.

I. *Out of Scripture*, which 1 mentions the heaven of heavens every where; but their production no where, unlesse it be here. 2 *Moses* testifies that the invisible heavens were stretched out the second day, and the fourth day adorned with starres. therefore another heaven must necessarily be understood in this place; namely a heaven that was finished in the same moment, for that the particle *autem* inferres, hee created the heavens and the earth; *terra autem*, but the earth was without form, &c.

III This reason evinces the same, those things which are made by God are made in order, now an orderly proceffe in operation, is this, that a progresse be made from more simple things, to compound things, therefore as the most compound creature man was last produced; so the most simple and immateriall creatures, (*Heaven and the Angels*) first of all.

III *And what would we have more?* God himself testifies expressly; that when he made the earth, the Angels stood by him as spectators, for so saith he to *Job*; *Where wast thou when I founded the earth, when the morning starres sang together, and all the sonnes of God shouted.* (*Job.* 38. 4, 7.) calling the Angels morning starres, because they were a spirituall beam, and that newly risen: sonnes of God, because they were made after the image of God. therefore when we hear, that the earth was founded the first day, it must needs be that the Angels were produced before the earth: And if the Angels, then certainly the dwellings of the Angels, the heaven of heavens; and that in full perfection, with all their hosts, as it were in one moment, and this is the cause why *Moses* speaks no more of that heaven, but descends to the forming of the earth, that is the visible World: (how the Creator took unto himself six dayes to digest it) as we will also now descend.

CHAP. II.

*Of the visible Principles of the World,
matter, spirit and light.*

WE have seene . God shewing us, how the World arose out of the Abyffe of nihilitie ; let us now see how it standeth, that so by seeing we may learn to see, and by feeling to feel, the very truth of things.

And here are three principles of visible things held out unto us, matter, spirit, and light, that they were produced the first day, in three great but rude Masses, and out of those variously wrought, came forth various kinds of creatures, therefore we must enquire further, whether these three principles of all bodies, have a true being, and be yet existent. least any errour be perhaps committed at the very entrance, by any negligence whatsoever, but now seeing that no more doubts of matter, and light, this onely comes to be proved, that by that spirit which hovered upon the face of the waters, a certain universall spirit of the world, is to be understood, which puts life and vigour into all things created.

for

for the newnesse of this opinion in physicks, and the interpretation of that place by Divines with one consent of *the person of the holy spirit*, give occasion of doubting. But *Chrysostome*, (as *Aslacus* cites him) and *Danaus* acknowledgeth, that in this place a created spirit, which is as it were the soul of the world, is more rightly to be understood; and it is proved strongly.

I *By Scripture*, which testifieth that a certain vertue was infused by God through the whole world, sustaining and quickening all things, and operating all things in all things; which he calleth both a *spirit* and a *soul*, and sometimes the *spirit of God*, sometimes the *spirit of the creatures*.

For example (*Psal. 140.29.30.*) *David* saith thus; *when thou receivest their spirit*, (that is the spirit of living creatures, and of plants) *they die, and return to their dust: but when thou sendest forth thy spirit* (that is the Spirit of God,) *again, they are recreated, and the face of the earth is renewed*, but *Job* (27.3.) saith thus; *as long as my soul shall be in me, and the spirit of God in my nostrils*; see the soul of man, and the spirit of God are put for the same! which place compared with the saying of *Elihu*, *the spirit of God hath*
C 3
made

made me, and the breath of the Omnipotent hath put life into me. (c. 33. v. 4.) opens the true meaning of *Moses*; namely that the spirit of God stirring upon the waters, produced the spirit or soul of the world, which puts life into all living things. Now that this is disposed through all things, appears out of *Ezechiel*: where God promising the spirit of life unto the dry bones, (*Ezech. 17. v. 5, 14.*) which he calls his Spirit, bids it to come from the four Winds (v. 9) therefore *Augustine*, (*lib. imperf. sup. Gen. ad lit.*) and *Basil* (in *Hexamero*) call this spirit, the soule of the world. And *Aristotle* (as *Sennertus* testifies) says that the spirit of life is a living and genitall essence diffused through all things but the testimony of *Elihu*, is most observable, who speaks thus. *Who hath placed the whole World? If he* (namely God) *should set his heart upon it, and should gather unto himself the spirit thereof, and the breath thereof* (or: his spirit and his breath: For the Hebrew affix is rendred both ways) *all flesh would die together, and man would return unto dust.* *Job 34. v. 13, 14.* So, if God should take his spirit out of the World, every living thing would die.

2 *By reason and sense*, it is certainly evident, that herbs and animals spring out of a humide matter, even without seed. But

whence had these life, I pray you, but from that diffused soul of the World? wee finde by experience, that bread, wine and water, yea aire, are vitall to those that feed upon them, but whence have they that vital force, I pray you, if not from this diffused soule? but now if a certaine spirit be diffused in that manner through all things, it follows necessarily, that it was created in the beginning in its whole masse, even as the matter & the light were first produced, in that its great and undigested masse: so that there was no need that any thing should be created afterwards, but be compounded of those three, and distinguished with forms. which God intimated, in *Esay* 42. v. 5. where declaring himself the Creator of all things, he divides them into three parts, namely, *into the heavens*, (that is light. *the earth*, (that is matter) and a quickning spirit, and just so in *Zachary* 12. v. 1. let us therefore hereafter beware to great an absurdity, (that I may not say blasphemy) as to put the person of the Holy Ghost amongst the creatures.

Now there may three reasons of this thing be given, why *Moses* called that quickning spirit, produced in the beginning, the Spirit of God. Namely, that it is taken in that sense, wherein elf-where it is spoken of the

mountains of God, (Psal. 36. v. 7.) and trees of God (Psal. 104. v. 16.) and Nimive was called a citie of God: that is, by reason of their greatness and dignity.

2 Because it was produced immediatly by God; not as now it is, when that spirit passeth from one subject to another.

3 Because it was a peculiar act of the holy Ghost.

For the Analogie of our Faith teacheth us to believe, that the production of the matter out of nothing, is a work of Gods Omnipotencie, and is attributed to the Father; that the production of light (by which the World received splendour and order) is a work of wisdome attributed to the Son; (John 1. v. 3, 4.) and lastly, that the virtue infused into the creatures, is a work of his goodnesse, which is attributed to the Holy Ghost. (Psal. 143. v. 10.) and so must that place (Psal. 23. v. 9 & 6.) be altogether understood, (for it will not bear any other sense) he spake and they were made; he commanded, and they came forth: the heavens were established by the Word of God, and all the virtue of them by the spirit of his mouth. Also wee must note, (Gen. 1. v. 1, 2, 3.) that three words are added to the three principles, he created, he said, and he moved himself; that they may be

signs of his absolute *Power, of his Word, and of his spirit*. Also we must note this, that in both those places the Holy Ghost with his work is placed in the midst; (as also in *Esay 40. v. 13.*) because he is the spirit, the love, and the mutuall bond of both, but this we speak after the manner of men

Let it stand therefore for certain, that all the principles were created the first day, every one in its masse; and that all things were afterwards composed out of them, which may be declared to children (for their more full understanding) by a similitude thus: an Apothecary or Confectioner being to make odoriferous Balls, takes Sugar in stead of matter; Rose-water, or Syrrup, or some other sweet liquour for tincture or conditure; last of all taking some of this lumpe thus made, hee imprints certain shapes upon his vwork. So also God first prepared his *matter*: then tempered it with a *living spirit*; then brought light into it, which by its heat and motion might mix and temper both together and bring it to certain forms. also even as a Mechanick must have matter, and two hands to work withall; the one hand, to hold; and the other to work with: so in the framing of the world, there was need,
first

first of matter, then of a spirit to frame the matter, and lastly of light, or heat to in-actuate the matter under the hand of the spirit. and what need many words? we see in every stone, hearb, and living creature: first a certain quantity of matter; secondly, a certain inward virtue, whereby it is generated, it groweth, it spreads abroad its savour, and its odour and its healing virtue; thirdly, a form or a certain disposition of parts with divers changes, which come from the heat working within. For,

Matter	} is a prin- ciple	} merely passive, merely active, indifferent, for in re- spect of the matter it is active; in respect of the light, passive.
Light		
Spirit		

The definitions of the principles.

Matter, is a corpulent substance, of it self rude and dark; constituting bodies.

Spirit, is a subtile substance, of it self living, invisible and insensible, dwelling and growing in bodies.

Light, is a substance of it self visible, and moveable, lucid, penetrating the matter, and preparing it to receive the spirits, and so forming out the bodies.

There-

Therefore by how much the more	} <i>Matter,</i>	} any thing hath it hath somuch & more	} Dulnes, obscuri- ty & immobili- ty: as the earth. Vigour and du- rability : as an Angell. Form, & mobi- lity : as the Sur.		
				} <i>Spirit,</i>	} it hath somuch & more

Note also ; that matter , is the first *entire* in the World ; Spirit, the first living thing ; Light, the first moving thing ; so that every body in the World is of the matter , by the light, in the spirit : which he would have to be his image, *from whom, by whom, in whom* are all things , *blessed for evermore* , Amen.
Rom. 11 v. 26.

Of the nature of matter.

TRuly said one ; *No diligence can be too much in searching out the beginning of things.* for when the principles are rightly set down ; an infinite number of conclusions will follow of their own accord , and the science wil encrease it self *in infinitum* ; which the creation of things doth also shew. For God having produced the principles the first day, and wrought them together with most excellent skil, made afterward so great variety of things to proceed from them , that both
men

men and Angels may be astonished. Therefore let us not thinke over-much, to frame our thoughts yet of all the principles of the World apart.

Let the following Aphorisms be of the matter.

I *The first matter of the World, was a vapour or a fume.*

3 For what means that description of *Moses* else? when he calls it *earth, waters, the deep, darkness, a thing void, and without form?* and it appears also by reason. for seeing that the lesser bodies of the World, Clouds, Water, Stones, Metals, and all things growing on the earth are made of vapours coagulated (as shall appeare most evidently hereafter :) why not the whole World also? certainly the matter of the whole can be nothing else, but that which is found to be the matter of the parts.

II *The first matter of the World, was a Chaos of dispersed Atomes, cohering in no part thereof.*

This is proved 1 *by reason*, for if they had cohered in any sort, they had had form: but they had not; for it was *Toku vaboku*, a thing without form and void. 2 *by sense*, which satisfies, that the Elements are turned unto

Atomes,

Atomes. for what is dust, but earth reduced
 into Atomes? what is vapour, but water re-
 solved into more subtile parts? the air it self,
 what is it but a most small comminution of
 drops of water, and unperceivable by sense?
 yea, all bodies are found to consist of most
 extream small parts, as trees, barke, flesh,
 skins, and membranes, of most slender strings
 or threds; but bones, stones, metals, of smal
 dust made up together, into which they may
 be resolved again. And this shews also, that
 those threds or haire, are of Atomes, as it
 were glued together, that when they are
 dried they may be pouldred. wherefore the
 whole World is nothing but dust, coagula-
 ted with various glutinous matters into such
 or such a form. 3 by Scripture for the æ-
 ternall Wisdom it self testifies, that *the be-
 ginning of the World was dust.* (Prov. 8. v. 26.)
 out of which foundation many places of
 Scripture wil be better understood: (as Gen.
 3. v. 14.) *dust thou art, and into dust thou shalt*
return. For, behold, man was made of the
 mud of the earth! yet God being angry for
 sin, threatens something more, then return-
 ing to dust, namely utmost resolution, into
 the very utmost dust, of which the mud of
 the earth it self was made: and wee see it to
 be

Dust
 a Atom

be truly so, that a man is dissolved not onely into earth, but into all the elements, (especially those that perish by fire) and is at last scattered into very Atomes. Read and understand, what is said (*Job 4.v.19.*) *Item 19.v.9. Esay 26.v.19. Psal. 104.v.29.*) therefore, *Democritus* erred not altogether, in making Atomes the matter of the World: but hee erred in that hee believed, 1 that they were æternall, 2 that they went together into forms by adventure, 3 that they cohere of themselves: by reason that he was ignorant of that which the Wisdom of God hath revealed unto us, that the Atomes were conglutinated into a mass, by the infusion of the Spirit of life, and began to be distinguished into forms, by the comming in of the light.

III *God produced so great a mass of this matter, as might suffice to fill the created Abyссе.*

For with the beginning of the heaven and the earth, that vast space was presently produced, wherein the heaven and the earth were to be placed, which place *Moses* calls the *Abyссе*, which no creature can passe through by reason of its depth and vastness. Now the Aphorism tels us, that all this was filled

filled up with that confused fume, lest wee should imagine any *vacuum*.

IV *The matter is of it self invisible, and therefore dark,*

For darkness is seen after the same manner when the eyes are shut, as when they are open; that is, they are not seen at all. and this is it, which *Moses* says: *and darknesse was upon the face of the Abyesse.*

V *The matter is of it self without form yet it is apt to be extended, contracted, divided, united, and to receive every form and figure, as wax is to receive every seal.*

For we have shewed that all the bodies of the World are made of these Atomes, and are resolved into them, therefore they are nothing else but the matter clothed with severall forms. which the Chymicks demonstrate to the eye, reducing some dust one while into liquour, another while into a vapour, another while into a stone, &c.

VI *The matter is eternall in its duration through all forms, so that nothing of it can perish.*

For in very deed, from the making of the World untill now, not so much as one crum of matter hath perished, nor one increased. for in that bodies are generated, and do per-

rish

rish that is nothing else, but a transmutation of forms in the same matter, as when vapour is made of water, of that vapour a cloud, of the cloud rain, and of the rain drunk in by the roots of plants an hearb, &c.

V I I The principall virtue of the matter of the world is, an indissoluble coherence every where, so that it can endure to be discontinued in no part, and a vacant space to be left.

Notwithstanding perhaps this virtue is not from the matter, but from the spirit infused: of which in the Chapter following.

V I I From this matter, the whole World is materiall and corporeall, and is so called.

For all the bodies of the World, even the most subtle, and the most lightsome, are nothing but form, partly coagulated, partly refined. Now after what manner it is coagulated or refined, shall appear in that which follows.

Of the nature of the Spirit, or soule of the World.

THE spirit of the World, is life it self infused into the World, to operate all things in all. for whatsoever any creature doth or suffers, it doth or suffers it by virtue of this spirit. for it is given to it.

I *To inhabite the matter.*

For as in the beginning it moved it self upon the waters, so yet it is not extant, but in the matter; especially in a liquid and subtile matter. Whence in the body of a living creature, those most subtile, sanguine vapours, and as it were flames, which are the charriot of life, are called spirits. And Chymicks, extracting a spirit out of herbs, metals, stones like a little water, call it the *Quintessence*, because it is a more subtile substance than all the four elements. But not water it self, as it is water, but that living virtue of the creature, out of which it is extracted, inhabiting in it. which being that it cannot be altogether separated from the matter, is preserved in that subtile form of matter. For how fast the spirit inhæres in the matter, shall be taught about the end. (*hap.* 9.10.

II *To move or agitate it self through the whole matter to preserve it.*

Hence it is, that no *vacuum* can be in the world. For all bodies, even the most subtile, (as water, air, the skie) being indued with this spirit, delight in contiguity and continuity. For as a living creature will not be cut, so also water, air, yea the world it

D

self;

self; by reason of that universall spirit, uniting all things in it, which also when a separation is made (as in the wounds of living creatures, in the cutting of the water, in the parting of the air may be seen) makes the matter close again. 2. that every creature putrifies, when that spirit is taken away, (as if you extract the spirit of wine out of wine, or suffer the spirit to evaporate out of an hearb, &c.) but is preserved, yea made better, if the spirit be preserved. For example; wine kept in any solid vessel under the earth, or water, though it be an 100 years; grows still the richer: the spirit stirring and moving it self in it, and by that meanes, still moulding the matter more and more, and more and more purifying it from crudities.

III *To keep the particular Ideas or forms of things.*

For one & the same spirit of the universe, is afterwards diduced into many particularities, by the comand of God; so that there is one spirit of water, another spirit of earth, another of metals, another of plants, another of living creatures, &c. and then in every kind again severall species. Now then that of the seed of wheat, there springs not a bean, much lesse, a walnut, or a bird, &c.

is from the spirit of the wheat, which being included in the seed, formeth it self a body according to its nature. From the same spirit is the custody of the bounds of nature. for example; that a horse grows not to the bignesse of a mountain, nor stays at the smalnesse of a cat.

IV To form it self bodies, for the use of future operations.

For example, the spirit of a dog being included in its seed, when it begins to form the young, doth not form it wings, or fins, or hands, &c. because it needeth not those members: but four feet, and other members, in such sort, as they are fit for that use, to which they are intended. Because some dogs are for pleasure, others to keep the house, or flocks, others for hunting; and that either for hares, or wild bores, or water fowl, &c. (namely, according as the Creator mingled the spirit of living creatures, that they should have Sympathy or Antipathy one with another) Every ones own spirit doth form it a body fit for its end. whence from the sight of the creatures onely, the use of every one may be gathered, as the learned think; because every creature beareth its signature about it.

Of the nature of light.

I T He first light was nothing else but brightnesse, or a great flame, sent into the dark matter to make it visible and divisible into form.

For in the primitive language, light and fire are of the same name אור and אור, whence also comes the Latine word *URO*. and verily the light of heaven, doth really both shine and burn, or heat.

I God put into the light a threefold vertue: 1 of spreading it self every way, and illuminating all things. 2 of moving the matter with it being taken hold of, by burning and inflaming. 3. of heating, and thereby rarifying and attenuating the matter.

All these things our fire doth also: because it is nothing else, but light, kindled in the inferiour matter.

I I. But when as that light could not extend his motion upwards and downwaras, (for it would have found a term forthwith) it moved it self, and doth still move in a round: whence came the beginning of dayes.

I V And because the matter rarified above heat being raised by the motion of the light, the grosser parts of the matter were compelled to fall downward, and to conglobate themselves in the midst of the Universe: which was the beginning of the earth and water. **V** The

V *The light therefore by this its threefold vertue, light, motion, and heat) introduced contrariety into the World.*

For darknesse was opposite to light; rest, to motion; cold, to heat: whence came other contraries besides, moist and dry, thin and thick, heavy and light, &c. of which. c. 4.

VI *From the light therefore is the disposition and adorning of the whole World.*

For the light is the onely fountain both of visibility, and of motion, and of heat. take light out of the World, and all things will return into a *Chaos*. For if all things lose their colours and their formes, in the night when the Sun is absent; and living creatures and plants die in winter, by reason of the Suns operation being not strong enough, and the earth and the water do nothing but freeze: what do you think would be, if the luminaries of heaven, were quite extinguished? *Therefore all things in the visible World throughout, are, and are made, of the matter, in the spirit, but by the fire or light.*

CHAP. III.

Of the motion of things.

THe principles of things being constituted, we are to see the common accidents of things : which are *Motion*, *Quality*, and *Mutation*.

For out of the congregate of the principles of the World, came first motion ; out of motion, came quality : and out of quality again, came various mutations of things : which three are hitherto in all created things, as it shall appear.

I *Motion is an accident of a body, whereby it is transferred from place to place.*

The doctrine of naturall motions, how many they are, and how they are made, is the key to the understanding of all naturall actions : and therefore most diligently to be observed.

II *Motion was given to things, for generation, action, and time.*

For generation : for nothing could be gotten without composition : nor composed without comming together : nor come together without motion. For

For actions: because there could be none without motion

For time: that it might be the measure of the duration of things. For take the Sun and the Starres out of the World; nothing can be known, what, where, when: all things will be blind, dumb, deaf:

III *Motion is either simple or compound.*

IV *Simple motion is either of spirit, or of light, or of matter.*

V *The motion of the spirit is called agitation, whereby the spirit agitates it self in the matter seeking to inform it.*

For the living spirit would not be living, if it should cease to agitate it self, and strive to subdue the matter in any sort whatsoever. This motion is the beginning of the generation, and corruption of things. For the spirit in every thing (in flesh, an apple, a grain, wood, &c.) doth by agitating it self, soften the parts, that it may either receive new life, or it may fly out, and the thing putrefie.

VI *The motion of the light is called diffusion, whereby the light and the heat diffuse themselves into all the parts.*

For fire, were not fire, nor heat, heat, if it should cease to diffuse it self, and liquifie
the

the matter And *from this motion of the fire, all the motion of the matter draws its originall:* as the experience of the senses testifies. For grosse and cold things, as wood, a stone, ice, &c. want motion of themselves, which notwithstanding when fire is put to them, they forthwith obtain, as it may be demonstrated to the eye. let there be a kettle full of water, put wood underneath it; behold all is quiet! but kindle the wood, you shall presently see motion: first in the wood, flame, smoak, and starting asunder the coals; by and by in the water, first evaporating, afterwards turning it self round, at length, boyling and galloping. but remove away the fire again, all the motion will cease again by little and little. so in a living body (an animall) take away heat, forthwith not onely motion, but also mobility will cease, the members waxing stiffe. Furthermore, although there be divers motions in things, yet the Originall is every where the same, heat or fire: which being included in the world is moved circularly: being kindled in the air, as it darts it self forth, this way or that way, as the matter is disposed, or the wind fits; included in a living creature, as the strength of the phantasie forceth it this way or that way. VII The

VII *The motion of the matter is eightfold of expansion, contraction, aggregation, sympathy, continuitie, impulsion, libration and libertie.*

Whereof the first two are immediately from the fire, the four following from some other bodies; the two last from it self, but by the mediation of the spirit of the universe. which if it seems harsh, will soon appear plain by examples.

VIII *The motion of expansion is, that whereby the matter, being rarified with heat, dilates its self of its own accord, seeking larger room.*

For it is not possible that the matter being rarified, should be contained in the same space: but one part thrusts another, that they may stretch forth themselves, and gather themselves into a greater sphere. you shall see an example, if you drop a few drops of water into a hogs bladder, and having tied the neck thereof, lay it over a furnace, for the bladder will be stretched out, and will swell: because the water being turned into vapour, by the heat seeks more room.

IX *The motion of contraction is, that whereby the matter is contracted, betaking it self into a narrower space by condensation.*

For

For example ; if you lay the foresaid bladder from the furnace into a cold place ; for the vapour will return to water, and the swelling of the bladder will fall. or if you put a thong into the fire, you shall see it wil be wrinkled and contracted because the softer parts being extracted by the fire; the rest must needs be contracted : from the same reason also, the chinks and gapings of timber and of the earth come.

X *The motion of aggregation is, when a body is carried to its connaturals.*

For example, our flame goes upward, a stone goes downward : for the flame perceives, that its connaturals (that is subtile bodies) are above ; a stone that its (that is heavy things) are here below. *Note well*, that they commonly call this motion *naturall*, who are ignorant of the rest. But though it appear most in sight, and seem to be most strong and immutable, yet indeed it is weak enough ; because it gives place to all the rest that follow, and puts not forth it self, but when they cease : which will of it self appear, to one that meditates these things diligently. yet I will adde this. A drop of ink fallen upon paper, defends it self by its roundnesse ; yet put a moist pen, to it, you shall

shall see the drop run up into it. See, it goes not downward, (as it should by reason of its heaviness) but upwards, that it may joyn it self to a greater quantity thereof.

XI *The motion of sympathy, and antipathy, is that, whereby a like body is drawn to its like, and driven away by its contrary.*

Now this similitude is of the spirit that inhabits in it. this motion is very evident in some bodies, (as in the loadstone, which draws iron to it, or else leaps it self to the iron) in others weak, and scarce sensible, as for example in milk, the cream whereof separates it self by little and little, from the wheyie parts, and gathers it self to the top) in some things, it is as it were bound; unlesse it be losed some way or other, that appears in melted brasse: wherein metals are separated one from another, by the force of the fire, and by the virtue of sympathy every thing gathers it self to its like, (lead to lead, silver to silver,) and flows together in a peculiar place.

XII *Motion of continuity is, that whereby matter follows matter, shunning discontinuity.*

As when you suck up the air with a pipe, putting one end thereof into the water, the
wa-

water will follow the air, though it be upward For we said before, that the world as a living creature would not be cut, the living spirit uniting all things.

XIII *The motion of impulsion (or cession) is that whereby matter yeelds to matter, that presseth upon it.*

So water yeelds to a stone that comes down into it, that it may sink; so a stone, to the hand that thrusts it, &c. for a body will not endure to be penetrated, it had rather yeeld, if it can. If it cannot all, the parts yeeld, as wee may see it happen in every Breake, Bruise, Rent, Wearing, Cutting; for the weaker yeelds every where to the stronger.

XIV *The motion of libration is, that wherein the parts wave themselves too and fro, that they may be rightly placed in the whole.*

As when a ballance moves it self, now this, now that way.

XV *The motion of liberty is, that whereby a body or a part thereof, being violently moved out of its place, and yet not plucked away, returns thither again.*

As when a branch of a tree bent forcibly and let go again, betakes it self to its posture.

A SCHEME of Motions.

Spirit }
Light }

which is called the motion of }
agitation.
diffusion.

Motion

therefore
is of

Matter
which is
caused
by

the fire and is called }
expansion.
contraction.

draw- }
ing by }
connaturalitie, as of aggregation.
a secret virtue, as of sympathy.
connexion, as of continuitie.

thrufing or inforcing, as of impulfion

it self, (that it may be }
well with it self) }
as the motion of }
liberation.
libertie.

An example of all these motions in the formation of the Macrocosme or great World.

First, the spirit moved it self upon the waters with the motion of *Agitation*. then the light being sent into the matter, penetrated it every way with the motion of *Diffusion*. by and by the matter above, where the light passed through, being heated and rarified, dilated it self with the motion of *Dispansion*; but below, it coagulated it self with the motion of *Contraction*. And all the more subtile parts gathered themselves upwards, the grosser downwards, with the motions of *Aggregation* and *Sympathy*: (for a more occult Sympathy and Antipathy was put into things afterwards.) and whither soever one part of the matter went, others followed by the motion of *Continuity*: or if one rushed against others, they gave way by the motion of *Impulsion*. but the grosser parts did poise themselves, (flying from the heat which came upon them from above) about the Center, to an exact Globosity, with the motion of *Libration*. there was no motion of Liberty, because there was no externall violence, to put any thing out of order.

An example of the same motions in the Microcosme, or little World.

In man, (and in every living creature) the food that is put into the belly, grows hot with incalcescency ; here you have the motion of *Expansion*. then by the motion of *Sympathie* every member attracts to it self, that which is good for it : but by the motion of *Antipathy* superfluous things are driven forth, as unprofitable and hurtfull to them. then the blood is distributed equally to the whole body upwards and downwards by the motion of *Libration*. and being assimilated to the members, it is condensed, that it may become flesh, a membrane, a bone, &c. by the motion of *Contraction*, lastly, the air in breathing drawn in and let forth, shews the motion of *Continuity*, and *Contiguity*. (For when the lungs are distended, the air enters in, (least their should be a *vacuum*;) but when the lungs contract themselves, the air gives way:) the motion of *Liberty* will appear, if you either presse down, or draw up your skin : for as soon as you take away your hand, it will return to its situation. lastly, if you fall from any place, there will be the motion of *Aggregation*, for you will make toward the earth, as being weight and earth your self.

XVI If motions be infolded, they either increase or hinder one anothers force. You

You have an example of the first, if you cast a stone towards the earth, for here the motion of Aggregation and Impulsion, are joynd together. Of the latter, if you cast a stone towards heaven: for here the motion of Impulsion striveth against the motion of Aggregation, in which strife, the stronger at length, overcomes the weaker; the naturall that which is but accessory.

XVII *Compound motion is in living creatures, when they doe of their own accord, move themselves from place to place.*

Namely, birds by flying, fishes by swimming, beasts by running: of which we shall see Chap. 10. how every one is performed.

Also, naturall Philosophers call that a compound motion, when a thing is wholly changed, either to being or not being, or to another kind of being, though it continue in the same place, but we call these mutations, and they are to be handled in a peculiar Chapter, the third from this.

CHAP. IV.

Of the Qualities of things.

THe matter is variously mingled with the spirit, & light, by these various motions, and from this various mixture, come various qualities, so that this thing is called, & is such a thing, that such a thing, again, another such, or such a thing: which we must now consider; & these talities, or qualities, are some of them generall, common to all bodies; others speciall, proper to some creatures only. the first are to be laid open here together for all once, the other hereafter in their places.

I *A quality is an accident of a body, in regard of which every thing is said to be such or such.*

II *There are qualities in every body, as well intangible, spirituell, and volatile, as grosse, tangible, and fixed.*

For a body is (as we saw cap. 2. in the description of matter, *Aphor. 8.* and of the spirit *Aphor. 1.*

E either

either { Intangible, or Nolatile, which they
 also call spirituall, ■ breath, air.
 Tangible } water, and all fluid
 namely, } things.
 earth, and all consistent
 things.

The qualities therefore, which we will treat of, shall be common to all these. For it may be said, both of a stone, and of water, and of air, and of the spirit that is inclosed in a body, that it is fat or raw, hot or cold, moist, or dry, thick or thin, &c.

III *The qualities are the grounds of all forms in bodies.*

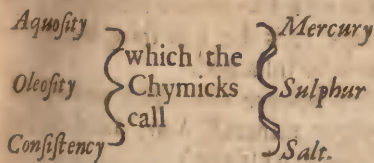
For the former causes a living creature to differ from a stone, a stone from wood, wood from ice, and the forme consists of qualities. Therefore the doctrine of qualities is exceeding profitable, and ■ it were the basis of naturall science; which because it hath been hitherto miserably handled, the light of physicks hath been maimed, and by that means obscure.

IV *A quality. is either intrinsecall, and substantiall, or extrinsecall and accidentall.*

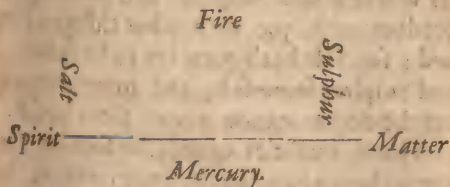
*Of the substantiall qualities, Sulphur,
 Salt, and Mercury.*

V *A substantiall quality arising from the
 first*

first mixture of the principles is threefold.



N. 1 These flow immediately from the combination of the first principles.



For as in the beginning the spirit conjoyned with the matter, produced the moving of the waters ; so *Mercury* is nothing but motion, the first fluid thing, which cannot be fixed, nor contained within a limit ; and *salt* is dry and hot, and uncorruptible, just as spirit and fire ; it is preserved by fire, it is dissolved with water, or *Mercury*, but turns neither to flame, nor smoak, though it is a most spirituall creature, and every way incorruptible.

And *Sulphur*, what is it but matter mixt with

with fire? for why doth it delight in flame, but that it is of a like nature? and in compound things, it is the first thing combustible, or apt to be inflamed.

N. 2. But beware that you understand not our vulgar minerall *Salt*, *Sulphur*, and *Mercury*, (or quicksilver.)

For these are mixt bodies: salt earth, sulphurie earth, Mercurial water: (that is, matter wherein Salt, Sulphur, and *Mercury*, are predominant, yet with other things adjoyned; for Salt hath parts apt to be inflamed, and Sulphur some salt, and some *Mercury*, but the denomination is from the chiefest.)

Those qualities cannot be seen as they are in themselves, but by imagination; but they are in all things, as Chymicks demonstrate to the eye: who extract crude and watery parts out of every wood, stone, &c. and other fat and oily parts; and that which remains, is salt, that is ashes; so the thing it selfe speaks, that some liquor is mercurious; (as vulgar water and flegme) other sulphury; (as oil and spirit of wine) other salt and tart (as *aqua fortis*) also we find by experience, in the benummings and aches of the members; that some vapours are crude, others sharp.

VI God produced the qualities intrinsecally, that the substance of every body might be formed. For

♀	Sulphur Salt	} giveth into things	} fluidity, coition, crudity. softness, cleaving together, fatness. consistency, hardness, aptness to break.	} and from thence	} incōbustibility. inflammability incorruptibility.

That Mercury giveth fluidity, and easie coition of the matter, appears out of quicksilver, which by reason of the predominancy of Mercury, is most fluid: so that it will not endure to be stoped or fixed. It is also most crude, so that it can neither be kindled nor burned: but if you put fire to it, flees away into air.

Now that the coagulation of bodies is from sulphur, as it were glue, appears from hence that there is more oil, in dry, solid, and close, bodies, then in moist bodies; also because ashes (after that the Sulphur is consumed, with fire (if you power water on them clear not together in a lump, but with oil or fat, they cleave together. Now Chymicks extract oil out of every stone, leaving nothing but ashes, no part cleaving one to another any longer.

And that salt gives consistency, appears by the bones of living creatures, out of which Chymicks extract meer salt, also all dense things leave behind them much ashes (that is salt.)

God therefore with great counsel tempered these three qualities together in bodies. for if *Mercury* were away, the matter would not flow together to the generation of things: if *salt*, nothing would consist together, or be fixed; if *sulphur*, the consistency would be forced, and yet apt to be dissipated. Lastly, if there were not sulphur in wood, and some other matters, we could have no fire, but Solar, on the earth (for nothing would be kindled) and then what great defects would the life of man endure?

Of the accidentary or extrinsecall qualities of bodies.

So much of the substantiall qualities: the accidentary follow.

VII *An accidentall quality is, either manifest, or occult.*

VIII *A manifest quality is, that which may be perceived by sense, and is therefore to be called sensible.*

As heat, cold, softnesse, roughnesse.

IX An occult quality is, that which is known only by experience, that is by its effect, (as the love of iron in the loadstone, &c.) therefore it is called insensible.

N. The manifest qualities proceed from the diverse temperatures of the elements, & substantificall qualities; the occult immediately from the peculiar spirit of every thing.

X The sensible quality is five-fold, according to the number of the senses, visible, audible, obfactive, gustatile, tangible: that is colour, sound, odour, savour, tangour.

Let not the unusuall word tangour, offend any; it is feigned for doctrines sake; and analogy admits it, for if we say from Caleo, Calor; from Colo, Color; from sapio, sapor; from amo, amor; from fluo, fluor; from liquo, liquor; from clango, clangor; from ango, angor? why not also from tango, tangor?

Of the tangible quality.

XI The tangible quality (or tangour) is such, or such a posture of the parts of the matter in a body.

XII The copulations thereof are twelve; for every body in respect of touch, is, 1 rare or dense, 2 moist or dry. 3 soft or hard. 4 flexible or stiffe. 5 smooth or rough. 6 light or heavy. 7 hot = cold.

Of every of which, we are to consider accurately, what and how they are.

XIII *Rarity, is an extension of the attenuated matter through greater spaces: density on the contrary, is a straighter pressing together of the matter into one.*

For all earth, water, air, and spirit, is sometime more rare, sometime more dense; and we must note that there is not any body so dense, but that it hath pores nevertheless; though insensible. That appears in vessels of wood and earth, which let forth liquors in manner of sweat; also in a bottle of lead filled with water, which if it be crushed together with hammers, or with a presse, sweats forth a water like a most delicate dew.

XIV *Humidity (or humour) is the liquidnesse of the parts of the body, and aptnesse to be penetrated by one another; siccity on the contrary is a consistency, and an impenetrability of the parts of the body.*

So a clot hardned together either with heat or cold, is dry earth, but mire is moist earth, water is a humid liquour, but ice is dry water, &c.

XV *Softnesse is a constitution of the matter somewhat moist, easily yeilding to the touch:*
hard-

hardnesse is a drynesse of the matter not yeelding to the touch.

So a stone is either hard or soft, also water, spirit, air, &c.

XVI Flexibility, is a compactiō of the matter with a moist glue, so that it will suffer it self to be bent: stifnesse is a coagulation of the matter with dry glue, that it will not bend but break.

So iron is stiffe, steel flexible. so some wood is flexible, other stiffe, but note that the flexible is also calld tough, the stiffe brittle.

XVII Smooth is that which with the equality of its parts doth pleasantly affect the touch: rough is that which with the inequality of its parts doth distract and draw asunder the touch.

Note, in liquid things, the smooth is called mild, the rough tart; so marble unpolished is rough; polished it is smooth. Water is rough, oile is mild; a vehement and cold wind is rough and sharp; a warm air is mild. So in our body, humours, vapours, spirits, are said to be mild or sharp.

XVIII Lightnesse is the hasting upwards of a body by reason of its rarity and spirituosity: heavinesse is the pronenesse of a dense body downwards: as that appears in flame, and every exhalation, this in water and earth.

N. W. 1 how this motion is made upwards and downwards by a love of fellowship, or of things of the same nature, hath been said *cap.* 3.

2 The inæquality of heaviness or ponderosity, is from the unequall condensation of the matter. For look, how much the more matter there is in a body, so much the more ponderous it is: as a stone more then wood, metals more then stones, and amongst these gold, quicksilver and lead most of all, because they are the most compacted bodies.

3 Amongst all heavy things, gold is found to be of greatest weight: spirit of wine, or sublimated wine of least. and the proportion of quantity betwixt these two, is found not to exceed the proportion of 21 parts: so that one drop of gold is not heavier than one and twenty drops of spirit of wine.

XIX Heat is a motion of the most minute parts of the matter reverberated against it self, penetrating and rending the touch like a thousand sharp points: but cold is a motion of the parts contracting themselves.

N. W. 1 It appears that heat and cold, are motions and fixed qualities: 1 because there is no body found amongst us perpetually

ally hot or cold, as there is rare and dense, moist and drie, &c. but as a thing heats or cools; the which is done by motion. 2 because sense it self testifies, that in scorching the skin and members are penetrated and drawn asunder, but in cold they are stopped and bound, therefore it is a motion. 3 because whatsoever is often heated, (though it be metall) is diminished both in bignesse and in weight, till it be even consumed, and whēce is that, but that the heat casting forth a thousand atomes doth weare and consume away the matter?

Now it is called a motion of parts, and that reverberated against it self: for that which is moved in whole, and directly (not reflexedly) doth not heat; as wind, a bird flying, &c. but that which is moved with reverberation, or a quick alteration, as it is in the repercussion of light; in the iterated collision of bodies, in rubbing together friction, &c.

3 But we must distinguish betwixt *Calidum*, *Calefactivum*, and *Calefactile*, *Calidum* or *Calefactum*, is that which is actually hot, and scorcheth the touch, as flame, red hot iron, seething water, or air (which also receiveth amost violent heat,) &c.

N. W. among all things that are known to us, fire is *most hot*; we have nothing that is *most cold* but ice; which notwithstanding is farre off from being opposed in its degree of cold to the degree of heat in fire.

Calefactivum is that which may stirre up heat; as motion, and whatsoever may procure motion; namely fire; and pepper, and all sharp and bitter things, taken within the body: for motion is from fire, and fire from motion, and heat from them both. For as fire cannot but be moved (else it presently goes out,) so motion cannot but take fire; as it appears by striking a flint, and rubbing wood something long. Therefore both are calefactive, but fire is further said to be actually hot, calefactive things are commonly called *hot in potentia*.

Calefactile is that which may easily be heated as air, and after air fat things (oile, butter,) then wood, then water. For in these because the parts are somewhat rare, they are the more easily moved to agitation. stones and metals because they have their matter compacted, do not easily admit of heat; but retain it the longer after it is admitted, because it cannot easily exhale by reason of the straight pores. and this is the cause

cause, why all things consisting of small particles, feathers, hairy skins, and all rough things, (yea, and all sorts of dust) do either alwayes retē heat, (by a certain agitation of the aire inclosed) or at least easily receive it, by some transpiration raised only from a living body.

4 We must also note, that all these tactile qualities, may be said of the same body in a diverse manner; namely, in respect of another body, as water in respect of air, is a dense and heavy body; in respect of earth, or a stone, rare and light; yea and by reason of the touch thus and thus disposed, it seems to be on this, or that manner; for example, warm water seems cold to a hot hand, hot to a cold hand.

5 The diverse effects of heat, are to be considered also according to the diversity of the object.

The

The perpetuall effect of heat is attenuatiō : but after different manners in a matter that is

Liquid

Sulphury, which it kindleth, turnes to flame, and snatcheth upward.

Mercuriall, which it rarifies, and stretcheth forth, as may be seen in the evaporation of water: also in the desiccation or drying up of earth, wood, &c. in which all the humour & moisture that is, turnes and evaporates into air.

Glutinous or Sulphury, it forces them to melt, as may be seen in suet, wax, metals.

Consistent which if it have parts that are

Ashy or salt, it forces them to be condensed, by the drying up of the moisture: and also to break if you force them the more; as wood, a clot, a tile, &c. (and so hardning is an effect of heat by accident.)

Of

Of tastes.

XX The gustatile quality is called savour
or taste; which is a tempering of the first qua-
lities by heat and cold.

For



Salt



Of its own nature.
Combust.
Indifferently
cooled.

Extreamly cooled.



giveth



Softness.
Sharpness.
Soverness.
Bitterness.
Austerity.



For the
Mordai-
ry of all
these, ar-
gues Salt.



Temperate



Sulphur



giveth



Sweetness.



Bitterness.

It appears therefore, whence herbs, fruits, parts of living creatures, and minerals have their favours; namely, from *salt* and *sulphur*, diffused every where, whereof every creature sucketh in more or lesse according to its nature. Mercury is of it selfe without taste; (as we note in flegme) but the others are soaked thereby, as also by the severall degrees of cold or heat, so that they are more or lesse sweet, bitter, salt, &c.

Of smells.

XXI *The olfactile quality is called odour; which is a most thin exhalation of the taste.*

Yet sulphury things yield more smell then salt things; and hot things more then others; because heat attenuates, and spreads into the air. Hence gardens and ointment boxes, are so much the sweeter, by how much the hotter the air is; yet by how much the sweeter they are, so much the sooner they lose their smell, that odiferous sulphureous quality being exhaled by little and little.

Of sounds.

XXII *The audible quality is called sound; which is a cleaving of the air sharply stricken, flowing every way.*

Every motion of the air doth not give sound, but that motion whereby the air is sudden-

suddenly divided and parted. Now a sound is either acute or obtuse; pleasing or displeasing; according as the body, that smiteth the air, is acute or obtuse, smooth or rough.

The naturall kinds of sound are: *tinkling*, when the air blows through some sharp thing. *Murmur* of running water: *ratling* of thunder: *rustling* of leaves: *bellowing* or *lowing* of Oxen: *roaring* of lions; *hissing* of serpents: and the voices of other living creatures.

Of colours.

XXIII *The visible qualitie is called colour; which is light diversly received in the superficies of bodies, and tempered with the opposite darknesse, as whitenesse, blacknesse, greenesse, &c.*

Obsr. I. That colour is nothing in it self, but light diversly reflected from things, appears; 1 because as it is not seen without light, so it is not found to be any thing by any other sense, or by reason: neither is it therefore. 2 because colours as well as light diffuse themselves through the aire, and are in the eyes of all beholders. Now we saw before, that the diffusive motion was proper to the light, therefore colour is in-

deed nothing, but light diversly tinct with the diverse superficies of things. .3 because light being reflected after severall manners in the same matter, produceth severall colours. We see that, for example sake, in a cloud, which is in it self like it self, yet it appears to us sometimes whitish, sometimes blackish, sometimes ruddy, according as it is opposed to the light. In like manner we see in the Rainbow (which is nothing else but the resolution of a cloud into most small drops of water) yellow, green, flame and sky-colour, as it appears also in Chrystall dust turned towards the light; which shew plainly, that *colour* is nothing else but a different tincture of light from the different incidencie thereof. But there (in the Rainbow and glasse) the colours passe through; because the matter it selfe is fluid and transparent: in fixed bodies, colours are also fixed; but after a way known to God, rather then to us.

Obser, 2. That from the receptibility of colours, a body is called *Pellucid*, or *Opacous*. *Pellucid* (Transparent and Diaphanous) is that which gives the light a passage through it, and is therefore neither coloured nor seen, as air: and in part water, glasse,

glasse, chryftall, a diamond, &c. (that air is not coloured, that is tinct with light, appears in a room close shut up on every side, if you let in a beam of the sun at a hole, for that will passe through the whole room, and yet will appear no where, but on the opposite wall or pavement: or unlesse you interpose your hand or some other dense thing: or the dust be raised, and the atomes of it flie in that quantity as to reflect the light.) *Opacous* is that which doth not give the light a passage, but reflects it, and therefore it is coloured and seen: as earth, wood, a stone, gemme, and waters coloured: and *this light reflected from an Opacous body, is properly called colour*: of which there are six kinds, *white, yellow, green, red, skie-colour, black.*

White, is light reflected with its own proper face.

Yellow is light tinct with a little darknesse.

Green, is light in a middle, and most pleasing temperature of light and darknesse.

Red, is light more inclining to darknesse.

Skie-colour, is light more then halfe dark.

Black, last of all, is the non-repercussion
F 2 of

of the light, by reason of a dark superficies.

Every of these colours hath under it diverse degrees and species, according to the various temperature thereof with the others ; which we leave to the speculation of *Opticks* and *Painters*.

XXIV *There remains a quality which is perceived by two senses, touch and sight, namely FIGURE ; whereby one body is round, another long, another square, &c. but the consideration of this is resigned to the Mathematicks.* *Of an occult quality.*

XXV *An occult quality is a force of operating upon any other body, which notwithstanding is not discovered, but by its effect.*

For examp. that the *loadstone* draws iron : that poisons assaile, and go about to extinguish nothing but the spirit in bodies : that *antidotes* again resist poison, and fortifie the spirit against them ; that some herbs are *peculiarly* good for the brain, others for the heart, others for the liver, and such like. Such kind of occult qualities as these God hath dispersed throughout all nature, and they yet lie hid for the better part of them, but they come immediately from the peculiar spirit infused into every creature. For even as one and the same matter of the world,

world, by reason of its diverse texture, hath gotten as it were infinite figures in stones, metals, plants, and living creatures; so one and the same spirit of the world, is drawn out as it were into infinite formes, by various and speciall virtues, known to God, and from these occult qualities sympathies and antipathies of things do properly arise.

CHAP. V.

Of the mutations of things, generation, corruption, &c.

From the contrarities of the qualities, especially of cold and heat, (For these two qualities are most active) those mutations have their rise, to which all things in the world are subject: which we shall now see.

I Mutation is an accident of a body, whereby its essence is changed.

Namely, whither a thing passe from not being to being; or from being to not being; or from being thus to being otherwise.

II *All bodies are liable to mutations.*

The reason, because they are all compounded of matter, spirit and fire: which three are variously mixed among themselves perpetually. For both the matter is a fluid and a slipperie thing, and the spirit restlesse, always agitating it self; and (heat raised every where by light and motion) doth eat into, rent, and pluck asunder the matter of things. From thence it is, I say, that nothing can long be permanent in the same state. All things grow up, increase, decrease, and perish again. Hence also the Scriptures affirm, that the heavens wax old, as doth a garment, *Psal. 103. v. 27.*

III *The mutation of a thing, is either essentiall or accidentall.*

IV *Essentiall mutation, is when a thing begins to be or ceases to be: the first is called generation, the other corruption.*

For example; snow, when it is formed of water, is said to be generated, when it is resolved again into water, to be corrupted.

V *An accidentall mutation of a thing is, when it increases or decreases, or is changed in its qualities: the first is called augmentation, the next diminution, the last alteration (which we are now to view severally how they are done)*

Of the generation of things.

VI *Generation is the production of a thing, so that what was not, begins to be.*

Thus every year, yea every day infinite things are generated through all nature.

VII *To generation, three things are required, Seed, a Matrix, and Moderate Heat.*

These three things are necessary in the generation of living creatures, plants, metals, stones, and lastly of meteors, as shall be seen in their place.

VIII *Seed is a small portion of the matter, having the spirit of life included in it.*

For seed is corporall and visible; therefore materiate, and it is no seed, except it contain in it the spirit of the species, whose seed it should be: For what should it be formed by? therefore seeds out of which the spirit is exhaled, are unprofitable to generation.

IX *The Matrix is a convenient place to lay the seed, that it may put forth its vertue.*

Nothing is without a place, neither is any thing generated without a convenient place; because the actions of nature are hindered. Now that place is convenient for generation, which affordeth the seed. 1 a soft site. 2 circumclusion, least the spirit should evaporate

porate out of the seed being attenuated. 3
veins of matter to flow from elsewhere. *N.*
W. And there are as many matrixes or laps,
as there are generations, the *aire* is the
matrix of meteors; the *earth* of stones,
metals, and plants; the *womb* of living crea-
tures.

*X Heat is a motion raised in the seed, which
attenuating its matter, makes it able to spread it
self by swelling. For the spirit being stirred up by
that occasion agitath it self, and as it were
blowing asunder the attenuated parts of the
matter, disposeth them to the forme of its na-
ture.*

This is the perpetual processe of all gene-
ration, and none other. From whence here-
after (under the doctrine of minerals, liv-
ing creatures, plants) many things will ap-
pear plainly of their own accord. yet we
must observe that some things grow without
seed, as grasse out of the earth, and worms
out of slime, wood, and flesh putrified: yet
that is done by the vertue of the spirit diffu-
sed through things; which wheresoever
it findeth fit matter, as a matrix, and is affi-
sted by heat, presently it attempts some new
generation, (as it were the constitution of a
new Kingdom). But without heat (whither
it

it be of the sunne, or of fire, or the inward heat of a living creature it matters not, so it be temperate) there can be no generation, because the matter cannot be prepared, softened, or dilated, without heat.

Of the augmentation of things.

XI *Everything that is generated, increaseth and augmenteth it self, as much as may be: and that by attraction of matter, and assimilation of it to it self.*

For wheresoever there is generation, there is heat: and where there is heat, there is fire; and where there is fire, there is need and attraction of fuel. For heat, because it always attenuateth the parts of the matter which exhale, seeks and attracts others wherewith it may sustain it self: (as we see it in a burning candle) and a portion of matter being attracted and applyed to a body, taketh its form by little and little, and becomes like unto it, and is made the same. For by the force of heat, of heterogeneous, things become homogeneous: the spirit of that body, in the mean time, attracting also to it self somewhat of the spirit of the universe, and so multiplying it self also. So stones minerals, plants, living creatures, &c. grow.

of

Of diminution

XII *Whatsoever hath increased, doth at some time or other cease to increase, and begin to decrease and that for and through the arefaction of the matter.*

Namely, for because the heat increased with the body, increasing, doth by little and little and little consume the thin and fat parts thereof, and dry up the solid parts, so that at last, they are not able to give assimilation to the matter flowing in, and that for want of gluten, and therefore the body fadeth, and withereth and at length perisheth.

Of the alteration of things.

XIII *No body doth always retain the same qualities, but changeth them variously.*

For example, wood when it grows, is thin and soft, afterward it is condensed & hardened, especially being dried: fruit on the contrary, as it ripens grows rare and soft, changing its colour, flavour and smell. For it is the law of the universe to be subject to vicissitudes: as also to corruption, of which it here follows.

Of the corruption of things.

XIV *Every body is liable to corruption.*

Because compounded of a decaying matter,

ter, and an agitable spirit; which may be disposed according to the mutation of the heat. Therefore seeing that alterations cannot be hindred, neither can perishing. And hence perhaps every materiall thing is called *CORPUS*, as it were *corruptus*, because it is subject to corruption.

XV *All corruption is done, either by arefaction or putrefaction.*

For we speak not here of violent corruption, which is done by the solution of some continued thing, (as when any thing is broken, rent, bruised, burnt, &c.) but of natural corruption, which brings destruction to things from within, it it is manifest that this can be done no way, but by arefaction or putrefaction.

XVI *Arefaction is when afflux of matter is denied to a body, and the heat included, having consumed its proper humour, dries and hardens the rest of the parts, and at length forsakes them.*

So Hearbs, Trees and living creatures, &c. wither.

XVII *Putrefaction is when the spirit is exhaled from a body, and the parts of the matter are dissolved, and return into their heterogeneous parts.*

For

For then the watery parts are gathered to themselves (therefore putrefied things give an evill sent) the oily parts to themselves, whence putrefied things have always some unctuosity) the dregs to themselves (whence that confusion in putrified things and unpleasent tast, &c.) and hence it is easie to finde the reason, *why cold, salt and drying hinder putrefaction?* namely, because cold stops the pores of a body, that the spirituall parts cannot go out and exhale: but dried things are exhausted of these thin parts, which might be putrefied: salt last of all bindeth the parts of the matter within, and as it were holds them with bands, that they cannot scape, & let forth the spirit. Again, it may easily be gathered from hence, *why hard and oily things are durable?* namely, because hard things have much salt, which hindereth putrefaction; but they are destitute of humidity (the provocation of putrefaction.) And oily things, because they do not easily let go their spirit, by reason of their well nourishing and gentle usage of it: (*suet and fat* putrifie, because they have loose pores, and some aquosity.)

N. W. We must neverthelesse observe, that not onely soft things (herbs, fruits, flesh)

flesh) putrifie, but also the hardest bodies, namely, stones and metals. For the rust of these is nothing else but the rottenesse of the inward parts, spreading it self abroad through the pores,

XVIII *Out of that which hath been said, it may be gathered, that the world is eternall potentially.*

For seeing that not any one crum of matter can perish, nor the spirit be suffocated, nor the light be extinguished, nor any of them fly forth out of the world, and must of necessity be together, and passe through one another mutually, and act upon one another, it is impossible but that one thing should be born of another, even without end. For that old *Axiome* of Philosophers is most true; *the corruption of one is the generation of another.* the *Architect* of the World in that manner expressing his æternity.

CHAP. VI.

*Of the Elements; Skie, Air, Water,
Earth.*

WE have hitherto contemplated the generall parts of the world; namely, the *principles* with the common *accidents* thereof: now follow the species of things, which are derived from the said principles by divers degrees. Where first elements come to be considered, which being framed of the first congregate of the principles, are as it were the bases and hinges, of the whole order of the world.

I *An element is the first and greatest body in the world of a simple nature.*

A body, or a substance, for though we called matter; spirit, and light substances also, (cap. 2.) because they are not accidents; yet because none of them existeth of it self, and apart, but do joyntly make up other substances, the elements and the creatures that follow may with better right be so called. Now an element is said to be of a simple nature, in respect of the substances,

stances following, which have compound natures, as it shall appear.

II *The constitution of the elements is made by light.*

For light being sent into the world, by its motion and heat began to rouse up the Chaos of the matter of the world; and when it turned it selfe round, (as yet it turnes) it purified part of the matter, and made it more subtile, the rest of the matter of necessity setling and gathering it selfe into density elsewhere.

III *There are foure Elements, Skie, Air, Water, Earth.*

That is, there are four faces of the matter of the world reduced into formes, (for at the first it was without form) differing especially in the degree of rarity and density. Note. *The Peripateticks put the sublunary fire, for skie, and call the skie a Quintessence.* But that same sublunary fire is a meer figment; the heaven it selfe, furnished with fiery light, is the highest element of the world; as after the Scripture the senses themselves demonstrate. He that is not satisfied with these of ours, but seeks more subtile demonstrations, let him see *Campanella, Vernanius,* and *Thomas Lydiat* of the nature

ture of heaven, &c. and he will acknowledge the vanity of this Aristotelicall figment.

IV *The skie is the most pure part of the matter of the world, spread over the highest spaces of the world.*

It is vulgarly called the visible and starry heaven, and by an error of the Greeks (who, thinking that it was of a solid substance, like Chrystal, called it *σφαιρα*) the Firmament: but little agreeably to the truth. More conveniently *σφαρις* from the Hebrew *אור* & *אש* that is, light and fire, *קמיש* *על* *אש* (that is fire above) and so from *burning*: as *אש* is derived of *אש* to burn. For it burneth with an inextinguishable light of the stars, whereby it is also purified. The notation of the Hebrew word favours this, *אש* of *אש* and *אש* fire and water. The nature of the heaven is to be liquid in the highest degree volatile and hot.

V *Air is a part of the matter indifferently pure, spread over the lower spaces of the world.*

The nature of it is to be breathable and passable every way.

VI *Water is a grosser part of the matter of the world reduced into fluidity.*

The nature of it is to be fluid and moist-
ning.

VII The

VII *The earth is the most grosse part of the matter, as it were the dregs and setling gathered together at the bottom.*

The nature of it is to be dry and *immoveable*.

VIII *The elements therefore are all one matter of the world, distinguished by degrees of density and rarity.*

For where the light is wheeled about, there the matter is most rarefied and pure: below that more grosse, then grosse and fluid, at length in the bottome dregs and a thick setling. Therefore this is a meer gradation. For earth is nothing else but thickned and hardned water: water, nothing but thickned air: air; subtilized water: water, liquified earth.

But from this difference of density & rarity there ariseth another *difference* of the same elements, namely, *in regard of motion and rest, heat and cold*. The water is moveable. (For it flows) the air more yet (for it transfuseth it self here and there;) the skie doth nothing but whirl about most swiftly, & that perpetually. Also the heaven by reason of its perpetuall motion is hot, (yea burneth) perpetually; the earth by reason of its perpetual rest is cold perpetually: except where it is warmed by the fire of heaven coming upon it, or inclosed in it.

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IX *The*

IX *The elements are transmutable into another.*

That is, because the heat raised in the matter may extend and condense it. In the water and air we see that come daily to passe. For who knoweth not, that water doth evaporate, and is turned into air? that water is made again of vapour, the rain teacheth us. But we may also procure the same mutation in our hand: or in vulgar Alembicks in which waters or wines are distilled. Let theie be an Alembicks void of all matter, filled onely with air. To the long pipe of this that hangeth out apply some narrow mouthed glasse, and stop the pipes mouth carefully, that no air may any way get forth: you shall see that when it cannot dilate it selfe locally, it will be coagulated into water in the utmost and coldest corner of it; (that is in the glasse.) You shall see (I say) that glasse sweat and distill drops, into which the air heated and rarified in the Alembick contracted it selfe. But remove away the fire, you shall see those drops vanish by little and little, and return into air.

X *Aristotle thought that the Elements were in a tenfold proportion to one another;*
but

but later men have found them near an hundred-fold

That is, that of one drop of earth is made by rarification ten drops of water ; and of one of water ten of air. The truth of the latter assertion is easie to be demonstrated, thus. Let one take a bladder (of an oxe or an hog) and having cleansed it, anoint it with oile to stop the pores, that the air may not get out. To the neck of this (but having first crushed out all the air) let him tie the neck of some little glasse, with about an hundreth part of the water which the bladder might contain. Let this instrument be set in the hot sun, or in a very hot stove, where the water is by the heat turned into air, it will appear that the bladder will be full. But bring the same bladder swelled with air into the cold, you shall see it (the vapour turning again into water) fall again. *Note.* The same hundreth proportion, or near upon, is also observed among colours, for one drop of ink or red will colour an hundred drops of water, not on the contrary ; and that because blacknesse represents the earth in density ; whitnesse the heaven in rarity. But this very proportion varies, because the air is in

it selfe somtimes thicker and grosser, somtimes more rare and thin.

XI *The matter of all the elements, as it is made up of Atomes, so it is turned again into Atomes: by so much the more subtilly as it is the more subtle in its masse.*

For example, the earth and every dry and hard thing, is brought into a dust almost indivisible, which may be sifted through a sieve, but cannot penetrate. The water may both be strained and penetrate. For example, through vessels of earth and wood, yea, and of lead as *chap. 4. aphorisme 13.* we have set down an example. Air and fire penetrate also through thicker bodies: as heat through furnaces.

XII *The elements are the four greatest bodies of the world, of which others are generated.*

That the lesser bodies of the world, which are infinite in number, and in forms, are really compounded of the elements, resolution shewes. For when they are corrupted, they return into the elements. And sense teacheth. For all things have some grossnesse, from the earth; some liquour from the water; some spirituosity from the air: some heat from heaven; and because
all

all things that live, are nourished by these, they are thence called *Elementa quasi Alimenta*, as if you should say nourishment, as in *Bohemian žiwel* or *žiwent*.

XIII *The Elementary matter occupiess a place in the world according to its degree of density and rarity.*

For the earth resteth at the bottome: the water swims upon that: the air fleets above the water: and lastly the skie is in the highest place: you shall see the like spectacle if you pōur clay, water, wine, (especially sublimated) and oile into a glasse: for every one of these, will occupie a place according to its nature.

XIV *Therefore the Elements make the four visible regions or spheres of the world.*

For the earth is a globe; which the water naturally encompasseth round; the air it: the skie the air: after the same manner as in an egge the yelk is encompassed with the white; and that with the skin and shell.

XV *Of the Elements there are two extreames, the skie and earth; as many mean, air and water.*

They are called extreame and mean both in regard of their sites, and of their acci-

dents. For the skie is in the highest place, most thin and hot: the earth in the lowest, most thick and cold: Skie the first moveable; earth the first resting. The air and water as they partake of the extreame, so of their accidents: being sometimes either lesse thick or thin, moving or still, hot or cold.

XVI *But because the Elements were prepared not for an idle spectacle, but for strong operation upon one another; the Creator did somewhat change that order, and commanded two sorts of water to be made, and two sorts of fire.*

XVII *For part of the water is placed above the highest part of the skie: and on the contrary, part of the fire is taken from the skie, and shut up into the bowels of the earth.*

Both these may seem paradoxes: and therefore need demonstration. And as touching the waters it is manifest by the testimony of *Moses*, That God made (the second day) the Expansum of the heaven, which might divide betwixt the waters which are under the Expansum, & the waters above the Expansum, *Gen. 1. 6, 7, 8.* What can be more clear? now whereas some modern Divines interpret it of the waters of the clouds, that is too cold. They say that *Jer. 10. 13.* The rain waters
are

are signified by the name of the water in heaven; and therefore here also. But I answer. 1 That the *waters in heaven* are one thing, and the *waters above heaven* another: Rain might be called *water in heaven*: because the air was by the Hebrews called the first heaven: but it cannot be called the *waters above heaven*, as these of which *Moses* speaks. 2 That the waters of the clouds are not waters in act, but vapours: but *Moses* speaks of waters. For he sayes expressly, *that in the first seven dayes there was no rain.* (*cap. . ver. 5.*) but he sayes that those waters above the *Expansum* were presently made the second day; therefore they are some thing else then rain water. 3 He sayes, that the waters were seperated from the waters, but the waters of the clouds are not separated from the waters of the sea, and of rivers. For they are perpetually mingled: vapours ascending, rain descending. 4 He sayes, that the *Expansum* was in the middest betwixt the waters and the waters: but how can that be said of the clouds, which are below the *Expansum*, and reach not to the thousandth part of its altitude? Lastly, *Psalm. 148* placeth the waters above the heaven, next of all to the Heaven

of Heavens, v. 4. but reckons up clouds and rain afterwards, among the creatures of the earth, ver. 8. what need we any other interpretation?

Reason perswades the same thing most strongly. For setting down the principles of the world in that order, wherein we see them set down by *Moses*; it was necessary, that the matter being scattered by the light rolling about; should flie hither and thither, and coagulate it selfe at the termes of the world on both sides, that in the middle where the light went, (and goes yet) there should be pure skie; but that on both sides above and below, the mat- hardning it self, should grow thick. We see it done here below: why not above also? especially God himself intimating it. Let it be so, because naturally it cannot be otherwise.

But that there is fire included in the earth 1 the eruptions of fire in *Aetna, Vesuvius, Hecla, &c.* do shew. 2 the springs of hot waters every where, 3 the progeneration of metals, even in cold countreys: and other things which can come from nothing else but from fire, which shall be looked in- to in that which follows. 4 lastly there is a testimony extant in the book of *Job chap.*

28.v.5. *Bread commeth out of the earth, and under it is turned up as it were fire. Let the Reader see Thomas Lydiats disquisition concerning the originall of Fountains, and there he shall see it disputed at large, and very soundly.*

XVIII *The waters above the heaven are there placed for ends known to God, but the use of fire under ground, is well enough known to us also.*

Yet we may say something of these waters by conjecture. As namely, that it was meet, that there should be visible termes of the visible World: and that the heat of the frame ever rolling, had need of cooling on the other side also: and the like. But that of the fire under ground, mountains and valleys, and caves of the earth are produced, and also stones, metals, and juyees generated, and many other things we shall see in that which follows: for without heat, there is no generation, because there is no motion.

Of the Skie in specie.

XIX *The Skie is the highest Region of the most vast world, the dwelling place of the stars.*

XX *The Skie is the most liquid part of the whole world, and therefore transparent, and most moveable.*

For

For by the motion and heat of the Sun always present, it is perpetually attenuated to an exceeding subtlety.

XXI The whole skie is moved about, because that burning and ever flying light of the stars, hurries it about with it.

That appears, 1 by reason: for if the starres were moved in the heaven immoveable (after that manner that birds are carried in the air, and fishes in the water) that penetration of the heaven would not be without violence; neither could it be performed with so great celerity, nor with so æquable a course, by reason of the resistance. Therefore the starres are carried in heaven in all respects, as clouds in the air, that is, with their charriot. 2 by sense, for we see that our fire carries away with it the matter which it hath caught and attenuated, namely, vapours, smoaks, flames: why not the heavenly fire also? which comets also shew to the eye, of which we shall see more: *chap. 8. 3* The same is to be gathered out of *Moses* words accurately considered. (*Gen. 1.v. 14. & 17.*

Of the air.

XXII The air is the lowest Region of the Expansum, the abode of the clouds and birds.

In

In Scripture, it is signified by the name of the first heaven. Yet it penetrates water and earth, to fill up their cavities because there is no *vacuum*.

XXIII *The air is of a middle nature betwixt the heaven and the water, in respect of site and qualities.*

Yet it is thicker where it joyns to the earth and water; and thinner towards heaven. Therefore in the highest tops of some mountains, neither men can live, nor trees grow, because of the thinnesse of the air, by reason of which it is neither sufficient for the breathing of living creatures, nor for the growth of plants.

XXIV *The air neer the earth in summer is hot, (by the vehement repercussion of the Suns verticall beams :) in winter, (by reason of the obliquity and obtuse reflexion of the beams) it cannot be heated: above it is always cold, yet most in summer, when it is pend in on both sides with the heat of the heaven, and of the earth.*

Of the water.

XXV *Water is thickned air. Washing and moistning the earth; the abode of fishes.*

XXVI *Water of its own nature is onely moist and fluid: to the rest of the qualities indifferent.*

Ob-

Obf. 1. The fluidity of the water is fuch, that if you give it never fo little declivity, it runs. But the humidity is unequall according to the degree of rarity and density. For a ſhip ſinks not fo deep in the ſea, as in a river : becauſe the ſea water is thicker and drier.

Obf. 2 They adde commonly, that water is naturally cold, by a twofold argument 1 becauſe it cooleth. 2 becauſe it extinguifheth fire, but I answer it cools not by its coolneſſe, but by its credity. But it quen- cheth fire after the ſame manner, as hot water and wine, do, though they be hot, not becauſe they are contrary to fire, but becauſe fire is nourifhed with the thinner parts of the wood, but if abundance of water be caſt on (or any fluid thing, even oyl) the pores are ſtopped, and the fire is quenched. Otherwiſe fires are made of *Bitumen*, (which is not a porous matter) that burn in the very water, which we ſee done alſo in lime. Laſtly, great fires are nourifhed with water. We ſee alſo that there is ſome- time hot, ſometime cold water, not onely in rivers, but alſo breaking out of fountains, ac- cording as it is affected ; yet it may not be diſſembled in the mean time, that air is more
prone

prone to heat, by reason of its rarity; water to coldness by reason of its thickness.

XXVII *The water at first covered the earth round about; but (on the third day of the creation, it was gathered into certain channels, (which are called Seas, Lakes, Pooles, Rivers, &c.)*

That this was done at the command of God. *Moses* testifies in these words. Let the waters be gathered together into one place, that the dry land may appear *Gen. I. v. 9.* but *David* (relating the process of the creation) describes the manner also. *Pf. I c 4 v 6, 7, 8, 9.* *That thunders were raised, by which the Mountains ascended, the valleys descended, but the waters were carried steep down into their channels: and that in this sort, a bound was set them, that they might not return to cover the earth.* Whence it is very likely, that that discovery of the surface of the earth, was made by an earthquake: but that the earthquake was produced by the fire sunk into the earth; which giving battle to the cold there conglobated, shook the earth, and either caused it to swell variously, or rent it asunder. Whence those risings and fallings in the surface of the earth (that is mountains and valleys) were made: but
within

within caves and many hollow places. This done, the waters of their own accord betook themselves, from those swelling eminencies to the low and hollow places. This pious conjecture will stand so long, as no more probable sense can be given of this Scripture. And what need many words? common sense testifies, that mountains are certainly elevated, valleys and plains depressed. therefore of necessity that was sometime so ordered; but not in the first foundation of the earth the second day; for then the grosser parts of the matter flowing about poised themselves equally about the center, therefore it was about the third day, when the face of the earth appeared, and the waters flowed into their channels. But besides perhaps God doth therefore permit earthquakes yet to be sometimes, and by them mountatians and valleys and rivers to be changed, that we may not be without a pattern, how it was done at the first.

XXVIII *The water then is divided into Seas, Lakes, Rivers and Fountains.*

XXIX *The sea is an universall receptacle of waters, into which all the rivers of the earth unburthen themselves.*

Which very thing is an argument that
the

the sea is lower then the earth : for rivers run down, not up again.

XXX The sea is one in it self ; because it insinuates it self into the Continent here and there, as it were with strong arms, it hath gotten severall names in severall places.

That great sea encompassing the earth is called, the Ocean, those armes dividing the Continent, Bayes , or Gulfs. For all those gulfs are joyned to the Ocean, except the *Caspian* or *Hyrceanian Sea* in *Asia*: yet that is thought to have channells within the earth, whereby it joyned to the Ocean.

XXXI The Sea is of unequal depth commonly from an hundred, to a thousand paces : yet in some places they say, that the bottome cannot be found Hence the sea is called an *Abyssse*.

It is probable that the superficies of the earth covered with the water, is as unequal as this of ours standing out of the water, namely, that in some places are most spacious plaines, in other places valleys and depths, and in other places mountains and hills, which if they stand above the water are called *Islands*, but if they be hidden under the water shelves.

XXXII The water of the Ocean faileth not,
 be-

because huge rivers and showres continually flow into it; neither doth it, overflow because it doth always evaporre upwards in so many parts of it.

Of the earth.

XXXIII *The earth is the most dense body of the world, as it were the dregs and settling of the whole matter.*

And therefore gross, opacous, cold, heavy.

XXXIV *It hangeth in the middle of the universe, encompassed with air on every side.*

For being that it is on every side encompassed with the heaven, and is forced by the heat thereof on every side, it hath not whither to go, or where to rest, but in the *equilibrium* of the universe.

XXXV *The earth is every way round.*

For the forme which at the first it received from the light of heaven wheeling about it, it yet retaineth: except that in some places it is elevated into mountains and hills, by the thunder which was sent into its bowels the third day, in other places again it is pressed down into valleys and plains, for the running down of the rivers: but that doth not notably hinder the globosity thereof.

XXXVI *The better part of the superficies of the earth is yet covered with water: the lesser*

lesser part stands out of the water, where it is called dry land, or continent: or if it be a small portion, an Island.

There are seven Continents of the earth; Europe, Asia, Africa, America Peruviana, America Mexicana, Magellanica, (or Terra Australis) and Terra Borealis: but there are Islands innumerable.

XXXVII The earth is in its outward face in some places plain, in others mountainous: but within in some places solid; in others hollow.

That appears in Mountains and Mines of metal, where is to be seen here stones or clay very close compact, there dens and most deep caves, and endlesse passages, which must needs be thought to have been the work of the thunder, sent into the earth the third day of the creation, (which penetrating and piercing its bowels so tore them.) Now there are in the earth not only spacious caves and holes, but an infinite number of straighter veins, and as it were pores, which is plain enough by experience.

XXXVIII The cavities of the earth are full of water, air, fire.

For being that there are cavernes, passages and pores, they must needs be filled;

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and

and that with a thin matter. Of air no man will doubt. But that there are waters in the caverns under ground, appears in the mines of mettall; and is proved by the testimony of the Scripture, which in the history of the deluge, saith that all the fountains of the great deep were broken up; (*Gen. 7. v. 11.*) Lastly, that there is fire under the earth, we have already seen Aphorism 16. which it is credible, is the relicks of the lightning raised within the bowels of the earth the third day of the Creation, (*Psalms. 104. v. 7.*) lest there for the working of minerals; but nourished with sulphureous and bituminous matter, spread through the bowels of the earth.

CHAP. VII.

Of Vapours.

IF the Light of Heaven had wrought nothing else upon the matter, but melt it together into the formes of the Elements, as it was variously rarified or densified, the world had remained void of other living creatures. But it ceaseth not passing through the Elements themselves to scorch

scorch them, and scorching them to attenuate them, and attenuating them, to resolve them into *vapours*: of which condensed again, many severall species of things are progenerated. Now then the nature of vapours shall be laid open in the following Aphorismes.

I *Vapour is an Element rarified, mixed with another Element.*

For example; the vapour of water, what is it but water rarified and scattered in the air? smoak, what is it, but an exhalation of wood or other matter resolved?

II *Vapour is generated of the grosser Elements, earth, water, air; as of all mixt bodies.*

Of water the matter is evident. For being set to the fire it evaporates visibly; set in the sun it evaporates sensibly, because even whole Pools, Rivers, Lakes are dried up by little and little, by the heat of the sun. That the earth exhales, you may know by sense, if you put a clot into a dish, (of earth or pewter) and pour in water so oft upon it, and let it evaporate with the heat, till there is nothing left, neither of the water, nor of the clay. For what is become of the clot? it is sure enough turned

into aire, with the parts of the water.

The vapour of air is invisible; yet it appears, that there is some. 1 In a living body, where all acknowledge that there are evaporations through the skin and the hair. For then the vapours that go out, what are they but the vapours of the inward vapours, far more subtle then the vapours of water? 2 Fruits, herbs, spices, &c. dried, yea very dry, spread from them an odour, now an odour what is it but an exhalation! But not (in this place) a watery exhalation (being that there is not any thing watery left in them :) therefore airy.

That mixt bodies do vapour is without doubt: forasmuch as the Elements of which they do consist do vapour. Understand not only soft bodies (sulphur, salt, herbs, flesh, &c.) but the very hardest. For how could 3 thunder-bolt be generated in the clouds, if stony vapours did not ascend into the cloud? and it is certain that stones exposed to the air for some ages, (as in high towers) grow porous: how, but by evaporation? and what is the melting of metals, but a kind of vaporation? for though the metall return to its consistency, yet not
in

in the same quantity, because something is evaporated by putting to the heat.

III *Heat is the efficient cause of vapour; which whithersoever it diffuseth it selfe, attenuating the matter of bodies, turns it into vapour.*

For this is the perpetuall virtue of heat, to rarifie, attenuate, and diffuse.

IV *All is full of vapour throughout the world.*

For heat, the begetter of vapours, is nowhere wanting: so that the World is nothing else but a great Vaporarie, or Stove. For the earth doth alwayes nourish infinite store of vapours in its bowels: and the sea boiles daily vvith inward vapours, and the air is stuft full of them every vvhere. And vve shall see hereafter, that the skie is not altogether free from them. But living bodies of Animals and Plants, are nothing but shops of vapours, and as it vvere a kind of Alembeks perpetually vvorping, as long as they have life or heat.

V *Vapours are generated for the progenerating of other things.*

For all things are made of the Elements, as it is vvell known, Stones, Herbs, Animals, &c. but because they cannot be made

unlesse the Elements themselves be first founded, they must of necessity be melted ; vvhich is done vvhhen they are resolved into vapours, and variously instilled into things, to put on severall formes. And hence it is that *Moses* testifies, that *the first seven days of the world, when there was yet no rain, a vapour went up from the earth, to water the whole earth*: that is all things growing out of the earth. *Read with attention, Gen. 2. ver. 4, 5, 6.*

V I Vapours are the matter of all bodies.

For vvho knoweth not, that vvaters and oiles are gathered out of the vapours of Alembicks? vvho seeth not also, that smoak in a chimney turns into soot, that is black dust? yea that soot gets into the wals of chimneys, and turnes into a stony hardnesse? After the same manner therefore that clouds, rain, hail, stones, herbs, are made of the condensed vapours of the Elements, and living creatures themselves, (and in them bloud, flesh, bones, hairs) are nothing but vapours concrete, vvill appear more clear then the light at noon day.

V II Vapours then are coagulated, some into liquid matter, (as water, spittle, flesh or pulp) some into consistent matter, (as stones, bones, wood, &c.)

That

That appears, because those liquid things may be turned into vapours, and consistent things into smoke. which they could not, if they were not made of them, for every thing may be resolved into that onely, of which it is made.

VIII *The motion of vapours with us is upwards, because among the thicker elements, they obtain the nature of thinner.*

For certainly the vapour of water is thinner then water, it self, yea, thinner then the very air : which though it consist of smaller parts, yet they are compacted. And therefore vapor suffers it self to be prest neither by water nor air, but frees it self, still getting upwards, & hence it is, that plants grow upwards, because the vapour included spreading it self, tends upwards.

IX *One vapour is moist, another dry; one thin, another thick; one mild, another sharp, &c.*

For those qualities which are afterwards in bodies, are initially in their rudiments, that is vapours; which we may know by experience. For dry smoak pains the eyes: which a humid vapour doth not: there you have sharpness: smells also, (which are nothing but exhalations of things) do not they
suffi-

sufficiently manifest sharpness, sweetness, &c? and *Chymicks* gather *Sulphur*, *salt*, and *Mercury* out of smoak. Therefore all qualities are in vapours more or lesse: whence the bodies afterwards made of them, get such or such an habit or figure.

X Vapours gathered together, and not coagulated, cause wind in the air, trouble in the sea, earthquake in the earth.

Of winds.

X I Wind is a fluxe of the air, ordained in nature for most profitable ends

For winds are 1 the besomes of the world; cleansing the elements, and keeping them from putrefying. 2 the fan of the spirit of life, causing it to vegetate in plants and all growing things. 3 the charriots of clouds rains, smels, yea, & of heat & cold, whether soever there is need that they should be conveyed. 4 Lastly, they bestow strong motions for the uses of men (as grinding, sailing)

X II The ordinary cause of wind is store of exhalations one where, enforcing the air to flow elsewhere.

We may in our hand raise a kind of wind four manner of ways; namely by forcing or compressing, rarifying and densifying air, (which shall be shewed by examples by

by and by) and so many wayes are winds raised in the world, yet they are all referred to that first cause, vapours, as shall be seen by and by. I said that wind may be raised by us by forcing, compressing, rarifying, or densifying; that may be shewn to children by ocular experiments, for if you drive the air with a fan, doth it not give a blast? if you presse it when it is drawn into the bellows, doth it not breath through the pipe? if you lay an apple or an egge into the fire, doth not the rarified humour break forth with a blast? but this last will be better seen in a bowle of brasse (which hath but one hole) put to the fire: especially if you drop in some drops of water. For the air shut in with the water, when they feel the heat, will presently evaporate, and thrust themselves out with a violent blast. Which may be also seen, if you put a burning wax candle into a pot well stopped (having a small hole left at the side) &c. The fourth way is by condensation of air: if for example, you lay the foresaid bowle of brasse very hot upon ice, and force the thin air included to be condensed again with cold, you shall perceive it to draw it again from without, to fill up the hollownesse of the bowle. Therefore

fore so many ways winds are made under heaven; either because the air is rarified with the heat of the Sun, and spreads it self; or because it contracts it self with being cold, and attracts from elsewhere to fill up the spaces; or because a cloud scattered, or falling downward; or else blasts somewhere breaking out of the earth compresses the air, and make it diffuse: or lastly, because one part of the air being moved, drives others before it, (for here you must remember what was said before. 1 that a drop of water turned into air, requires an hundred times more space. 2 that the air is a very liquid and moveable element: and therefore being but lightly pushed, gives back a long way.) but yet it is plain that all those motions of the air take their first rise from vapours. Now because the world is a great globe, it affordeth great store of blasts also, both the heat of the sun-above, and the parching of the fire under ground, begetting various vapours.

Hence it is understood, why after a great fire there arises a wind presently, (even in the still air?) namely, because much solid matter, (wood and stone, &c.) is resolved into vapours, and the air round about is attenuated

renuated by the heat of the fire, that it must of necessity spread it self, and seek a larger room.

XIII *Winds in some countreys are certain, comming at a certain time of the year, and from a certain coast; others are free, comming from any place.*

Note they call these *ετησιας*, which is as much to say as annuall: which are caused either by the mountainousnesse of the tract neer adjoyning, wherein the snows are then dissolved; or to be sure some other causes, by reason of which vapours are then progenerated there in great abundance. But you must note, that those etesian winds are for the most part weak and gentle, and yield to the free winds.

Note 2 There is also another kind of set wind, common to the whole world; namely a perpetuall fluxe of the whole air, from the east to the west. For that there is such a wind. 1 they that sail about the æquator testifie. 2 in the seas of *Europe*, when a particular wind ceaseth; they say also that a certain gentle gale is perceived from the east 3 and therefore Marriners are constantly of opinion, that the navigation from east to west is speedilieft performed. 4 lastly, with
us

us in a clear and still skie, the highest clouds are seene for the most part to be carried from East to West. therefore wee need not doubt of this generall wind, if so be any one will call it a wind. For it proceeds not from exhalations, but from the heaven, which by its wheeling round, carries the air perpetually about, swiftly above, here nigh the earth (where the clouds are) almost insensibly, yet under the æquator (as being in a greater Circle) very notably. Whence this Probleme may be profitably noted, why the *East wind dries, but the West moistens?* namely, because that being carried along with the air attenuates it the more; but this striving against the air condenseth it.

XIV *A gentle wind is called aura, a gale; a vehement wind overthrowing all it meets with procella, a tempest; if winded into it self turbo a whirlwind.*

It is plain that fundry vvinds may arise in fundry places together, according as matter of exhalations is afforded here and there, and occasion to turn it self hither or thither. Therefore if they flow both one vvay, the wind doubled is the stronger; if sideways, or obliquely, the stronger carries away the weaker with it, and there is a change of the vvind

wind which we see done often, yea daily, but when they come opposite to one another, and fall one against another, they make a storme or tempest; vvhich is a fight of the vvinds till the strongest overcome, and is carried vvith a horrible violence bearing down all before it. But contrary vvinds of æquall strength make a vvhirllvwind, vvhen neither vvill give sidevvay, but both vvhirll upvvards, vvith a violent gyration.

Of the sea-tide.

X V *The sea-tide is the daily fluxe of the sea to the shore, and refluxe back again.*

The sea hath its fluxes lesse unconstant then the air, for it flows onely to the shores, and back again the same vvay: and tvvice a day it flowes up, and twice it ebbs again. The end thereof vvithout doubt is, to keepe the vvaters of the Sea from putrefying by that continuall motion. But the efficient cause thereof heretofore accounted amongst the secrets of nature comes novv to be searched out of the truest grounds of naturall Philosophy, and more accurate observations.

X VI *The cause of the sea-tide, are vapours within,*

within, wherewith the sea swelling diffuseth it self, and falling settles down again.

For this tide is like to the boiling of vwater, seething at the fire ; vvhich is nothing but the stirring of the vapours raised in the vvaters by the force of the heat. For it is impossible that the vvater should not be resolved into vapours by the heat : impossible that the vapours should not seek a passage (upvvards) to their connaturals. yet impossible that they should have an easie passage out of the vvater, (being that the superficies of the vvater, yea the vvhole masse thereof, being a diffused liquor like liquid glasse, hath fewer pores than the earth or wood, or a stone :) therefore it is impossible that the water should not swell, rise up, dash it self against the sides of the kettle, and at length break in a thousand openings, and give the heat dancing & evaporating a passage out, by reason of the vapour raised & multiplied vvithin, and striving upvvard : all vvich vve see in a boiling pot. In the same manner the sea swells, by reason of the vapour that is multiplied in the bottome of its gulfes, and lifts up it self into a tumour, & of necessity spreads it self to the side, neither doth it make any thing against this, that the vvater
of

of the sea boiling is not so hot as the water of a boiling pot. For here the vast quantity doth not admit of so great heat over such deep gulfes. For the water of a kettle heats at the bottome, but the superficies begin to swell and turn about before they heat.

XVII *Vapours within the sea, are chiefly generated by the fire under ground.*

They referre it commonly to the celestiall fire, the Sun, and the Moon. But that is likely to be as true, as that we see a pot of water to boile, set in the sun, though never so hot. For who ever saw that the Sun may lick the superficies of the water, and so consume it by little and little, and turn it into vapour: but nothing can make it boil at the bottome, but fire put under it. Therefore the cause of the vapours within the sea, must of necessity be placed underneath: namely that fire under ground, which the whole nature of inferiour things, demonstrate to be shut up there.

XVIII *The vapours and tides of the sea are provoked by the heat of heaven, (the Sun.)*

A labouring man, or a traveller, sweats easily enough by his inward heat, (stirred
up

up by the motion of his body) but a great deal more easily in the heat of Summer, then in Winter; and all of us sooner in a bath then else-where: the outward heat provoking the inward. In like manner the sea vapours and boiles vvithin, but yet after the harmony of the superiour fire which is from the stars. Which harmony is seen also in yielding us vvater from the clouds and fountains. For in rainy vveather fountains flow more abundantly; in dry vveather they dry something, both which God intimated, *Gen. 7. v. 11.* and *Deut. 38. v. 23.* Now the cause is, *the harmony of fire to fire;* of the cælestiall to the subterraneous, &c. as it shall elsewhere appear.

X I X *The Sea flowes twice a day, according as the Sun comes and goes,*

For the Sun ascending to the Meridian, attracts the vapours of the sea, and causes the waters to be elevated and diffused: descending to the West, it suffers them to fall again. Now that the waters swell again at the Sun setting, and fall as he hastens to the East; the cause is the same which in boyling pots: where the hot water is seen to boile, and to be elevated, not only in that part which is toward
the

the fire, but also on the contrary ; but to fall again on the sides both wayes. So the Sea is a caldron, which the Sun (the worlds fire) encompassing, makes to swell up on both the opposite parts, but to fall in the intermediate parts ; so that this sea-tide following the Sun, goes circularly after a perpetuall law.

XX The fluxe and refluxe of the sea is varied according to the motion of the Sun and Moon, and the site of places.

For 1 in Winter it is almost insensible, the Sun but weakly raising the subterrane vapours. 2 When the Moon is in conjunction or opposition to the Sun, the seas swell extraordinarily ; the force of both luminaries being joyned together to affect the inferiour things (either joyntly or else oppositely.) Also the Moon encreasing the flowings are something retarded, decreasing they are anticipated : which gave occasion to the ancients to think that it was caused by the Moon alone. 3 Those sea fluxes and reflexes vary also according to the divers turnings and windings of Countries and Promontories, and the shorter or longer coherence of inlets with the Ocean ; which causeth them to be perceived in some pla-

ces sooner, in others later. But enough of the sea tide, the earthquake followes.

XXI *An earthquake is the shaking of the superficies of the earth in any countrey ; arising from subterrane exhalations, gathered together in great abundance, and seeking a passage out.*

Therefore it ceaseth not till the said exhalations are either scattered through the cavities of the earth, or else break forth.

XXII *Earthquakes are sometimes so horrible that they subvert Cities, Mountaines, Islands, with an hideous bellowing howling, and crashing.*

Which formidable effects cause us to suspect, that those vapours are then mixt, like to those by which thunders are caused in a cloud: and that not simply by the blast of the exhalations, but by their burning, so that they are a kinde of subterrane lightnings: yet I thought good to make mention of it here together.

CHAP. VIII.

Of concrete substances: namely, Stars, Meteors, and Minerals.

I **A** *Concrete thing is a vapour coagulated, endued with some form.*

For

For example, soot, clouds, snow, &c.
 Note that this name of *concrete*, and *con-
 creture* is new, yet fit to expresse this degree
 of creatures, which confers nothing but
 coagulation and figure.

II *The primary cause of concretion of va-
 pours is cold, which wheresoever it findeth a
 vapour, condenseth and coagulateth it.*

That appears in Alembicks, where the
 vapour raised by heat, and carried into
 the highest region of it where it is cold, re-
 solves it selfe again into water: and to that
 end Distillours now and then wash the
 uppermost cap of the Alembick with cold
 water, and make the pipes, through which
 the concrete liquour distils, to passe through
 a vessell of water. Yet heat helps the con-
 cretion of things, consuming the thinner
 part of the concrete, and compelling the
 rest to harden, which we see done in the ge-
 neration of metals.

III *Some concretes are Aethereall, others
 aereall, others watery, others earthly.*

Namely, because some are made in the
 skie, as *stars*: others in the air, as *clouds*,
&c. others in water, as a *bubble*, &c: o-
 thers in the earth, as *stones*, &c. every one
 of which come to be considered apart.

IV *Ethereal concretes, are stars and comets.*

V *Stars are fiery globes, full of light and heat, with which the skie glitters on every side.*

Both the ornament of the world required this, that hanging lamps should not be wanting in so lofty a palace : as also the necessity of the inferiour world, concerning which is the following Aphorisme. Now we reckon stars in the rank of *concretes*, because it is certain that they are made of matter and light.

Stars were produced in so great number upon very great necessity.

Namely, 1 To heat the earth with a various temperature. 2 To make the various harmony of times. 3 To inspire a various form into the creatures. For so great variety could not be induced into the lower world, without such variety in cœlestiall things.

VII *God placed the greatest number of stars in the highest heaven round about, that they might irradiate the earth on every side, and carry about their sphear with a rapid motion of heat.*

Of which starry sphear take these following Aphorismes.

1 That the motion of this sphear is finished in the space of twenty four hours.

2 And because that motion is circular, it

is said to be made upon two *hinges*, or immoveable points (in *Greek poles*) of vvhich the one is called the *Northern or Arctick pole*; the other the *Southern or Antartick*. Betwixt these two poles the heaven is turned: vvith its exact globosity, describing a circle (in the midst betwixt the two poles) vvhich they call the *Aequator*. Now that tract, vvhere the stars arise above the earth, is called the *East, or the Sun-rising*; the opposite to it vvhere they set, is called the *West or Sun-setting*; and these four angles of the World, are called the four *quarters* of the World, and the four *Cardinal Points*.

3 That the stars of the highest sphear, (commonly called the fixed stars) are globes of vvondrous greatnesse in themselves: the greatest of them exceeding the globe of the earth an hundred and seven times: and the least of them exceeding the same globe eighteen times.

4 That the numerable stars are found by us one thousand, twenty two: but God knowes the number of the innumerable. For the *Galaxias* or milky way (it is the whitest tract of heaven) is found by accurate perspectives to be a company of very sma

stars; and there are some other like tracts observed in heaven, though lesse, and of these the vvords of God, *Gen. 15. v. 5.* are to be understood.

5 That the visible stars reduced into certain figures, vvhich they call cœlestiall signs in number 69, 12 vvhereof about the Equator, are by a peculiar name called the Zodiaque. But this Zodiaque declines with one half of it toward the North, with the other part towards the south. the signes are comprehended in this distick.

1 2 3 4 5

Sunt *Aries, Taurus, Gemini, Cancer, Leo,*

6

Virgo:

7 8 9 10 11

Libraque, Scorpins, Arcitenens, Caper, Hydra,

12

Pisces.

1 2 3

The Ram, the Bull and Twins to th' Spring belong;

4 6 5

To Summer Crab and Maid and Lion strong.

7 8 9

Autumne hath Scales and Scorpion & the Bow:

10 11 12

Goat, Water-tanckard, Fishes Winter show 6

6 That the distance of this starry sphear from the earth is found above two hundred thousand semidiameters of the earth, and a semidiameter of the earth contains 3600 of our miles.

VIII *A very great portion of most ardent light is conglobated in the sun, so that it may seem the onely fountain of light and heat.*

For were it not for the sun we should have perpetuall night, for all the rest of the stars: forasmuch as at high noon, we are in darknesse presently, if the sun be but covered.

Now touching the sun these following Axiomes are to be noted.

1 That it was made so great as might suffice, both to illustrate the whole world, and to heat and vaporate the whole earth: that is 160 times greater than the earth.

2 That it is such a distance elevated from the earth, as might serve, so as neither to burn it, nor leave it destitute. *Psal. 19. v. 7.* for it is placed almost in the middle space betwixt the starry sphear and the earth.

3 That it is carried with a slower motion then the stars in their highest sphear. For whereas it seems to be turned about equally, as the starrie sphear is, yet it is every day

left behind almost a degree, (of which the whole circuit of the sphere hath 360) whence it comes to passe, that in 365 dayes, it compasseth the whole sphere as it were going back, and after so many dayes returns to the same star again. And this we call *the time of an year, or a solar year.*

4 And that it may serve all sides of the earth with its light and heat, (to wit by turns) that retardation is not made simply though the middest of the world under the *Aequator*: But under the *Zodiack*, bending to the North on this side: to the South on that side Whence comes the division of the year into four parts; (*Spring, Summer, Autumn and Winter*) and the inequality of dayes to those that inhabite without the equinoctiall. For when it declines to those on the North it makes summer with them, and the longest days, and so on the contrary. And by how much it is the more vertical to any part of the earth, it heats it so much the more, by reason of the direct incidence and repercussion of the rayes.

IX *And because it was not convenient that the sunne and stars should always operate after one and the same manner (for variety is both pleasing and profitable to all nature) there*

were

were six other wandring starres added over and besides, which running under the same Zodiague and by certain turns entring into conjunction one with another, and with the Sunne might variously temper his operation upon inferiour things.

These wandring starres are called *Planets*, of which there are seven, reckoning the sun for one.

X The *Planets* therefore are the suns coadjutors in governing the world: which differ in site, course, magnitude and light.

XI Three of the *Planets* Saturn (♄) Jupiter (♃) Mars (♂) are above the sun: Venus (♀) Mercury (☿) and the Moon (☾) below: so in a most decent manner, as it were compassing about the sides of their King.

It is probable, that the stars are carried higher or lower in heavē, for the same reason as clouds in the air, or wood in water, that is, according to their different degrees of density or rarity. For as thick wood swims under the water either with all or with half of its body covered, but light wood swims on the top: and watry clouds ascend not far from the earth, but dry and barren clouds very high: so the globes of the stars
are

are carried some higher than others according to the thicknesse of their matter and light.

XII *The upper Planes are bigger then the earth, but the lower are lesser.*

For it is found that		doth e-	91	} Globes of
		quall	95	
		doth cōtein	2	} part of the
		the	160	
			28	
			101	
			39	

XIII *By how much the higher any Planet is, and neerer to the highest sphear, so much the swifter it moveth; by how much the lower and neerer to the earth, so much the slower.*

For Saturn, because he is next to the eighth sphear, is rolled about almost equally with it, yet he also fals back by little and little: so that he runs through the Zodiaque moving backward in the space of almost thirty years: Jupiter in twelve years: Mars in almost two: the Sun (as was said) in a year: Venus encompasseth the Sun in five hundred eighty three dayes: Mercury in one hundred and fifteen dayes: the Moon because she is slowest of all, remaining behind every

every day 13 deg. measures the Zodiaque in 27 $\frac{1}{2}$ dayes.

XIV The higher Planets do so observe the sun, that approaching nigh unto him, they be-take themselves into the highest place; going from the sunne, they sinke lower towards the earth.

And for this cause both their magnitude and their motion vary in our eyes. for when they are neerer to the earth, they seem greater; but more remote lesser. Again, the higher they are, the slower they move, and then they are called *direct*; the lower they descend the swifter, so that they seem either *stationary*, (keeping pace for some weeks with the same fixed stars) or else *retrograde*, sometimes outstripping them in their course.

XV Venus and Mercury depart not from the sun, unlesse it be to the sides both ways: Venus 47 degrees, Mercury 23 degrees. So that sometimes they go before the sun, sometimes they follow him, sometimes they lie hid under his rays.

Note, Venus when she is the morning star and goes before the Sun is called *φωσφορος*, or *Lucifer*: when she is the evening star she is called *Hesperus*.

XVI As for their light, Mars is very fiery

*fery and calefactive: ♃ is pale and very frigid-
factive: ♃ and ♀ are of a benigne light: ♀
changeably sparckling: ♃ shines with a bor-
rowed light onely: of which more by and
by.*

Note. That the stars and planets do not sparkle by reason of their greater distance, (for then ♃ should sparkle more then *Mercury*: vvhereas we find the contrary) but by reason of their flaming. For fire or light cannot rest, therefore the polar stars, because they are least stirred with the common motion, twinkle most.

XVII *Because the Moon is near to the earth, and placed in a grosse air, she moves most slowly; and also her body is grosse and obscure, like a globous cloud.*

For it is not distant from the earth above 60 semidiameters of the earth.

The Moon by reason of her opacity doth not shine of her selfe, or else very weakly: but on that side that she is illuminated by the Sun, on that side she shines like a looking glasse, the other halfe being obscure.

Note. Because the Moon was to rule the night, a weak light, and that but borrowed was given her, and because she was appointed to shew lesser times (Months) a motion
diffe-

different from the Sun was given her, that by her departure from the Sun, and by her returning, she might designe the progresse of the moneths: and that it might be done more evidently, she was placed below the sun, that she might appear to us with her face enlightned after divers manners. For vwhen she runs with the Sun in the same signe of the Zodiack, she doth not appear to us; because her enlightned face is turned toward the Sun, but her obscure face to us. But when she is opposite to the Sun, we beholding her on the same side which looketh toward the Sun, see all her luminous face. Lastly, in the intermediate places we see her encreasing or decreasing in light; according as she turns her enlightned face to us, or turns it from us, by reason of the diversity of her position in respect of the Sun, and us.

XIX *When the Moon, at the change, comes directly under the Sun, she obscures him as to us; when at the full, she is directly opposite to the Sun, she enters into the shadow of the earth, and is her selfe obscured: and this they call the Eclipses of the Luminaries.*

Hence it appears that the Sun is not obscured after the same manner that the Moon

is. For the Moon is really obscured, that is deprived of light, as being fallen into the shadow; but the Sun is ~~not~~ deprived of light, but is only covered from us, that it cannot ~~then~~ enlighten the earth with his rayes; therefore the earth is then more truly eclipsed then the Sun.

Now God ordained Eclipses 1 That we might understand, that all our light is from the Sun. 2 That the magnitude of the Luminaries, and of the earth might be found out. 3 To finde the true longitude of countries; but that belongs to Astronomers, this last to Geographers.

Of Comets.

XX *Comets are accessory stars, which sometimes shine, and go out again: for the most part with tayles, or bushes of hair.*

We reckon them to the heaven and stars, not to the air and meteors: because they are not generated in sublunary places, (as *Aristotle* thought) but in the highest Heaven, even above the Sun: which 1 Their motion, swifter always then the Moon it selfe. 2 Their parallax, lesse then the Moons, sometimes none at all, do shew.

XXI *Comets are not vapours kindled; but a reflexion of the Suns light, in vapours so far elevated.*

The

The first is easily proved. For if a Comet were a vapour kindled, it could not last halfe an hour. (For nothing can be kindled but a sulphury matter, but that is consumed in a moment, as it appears in Gunpowder, Lightning, a Chasme, a falling star, &c.) but histories relate that comets have lasted three years. The second is shewed, because comets 1 Cast a taile from the Sun, as the Moon doth a shadow; (for those dry vapours are not an opacous body, like to the Moon, but semidiaphanous.) 2 They are eclipsed (as *Campanella* testifies) by the shadow of the earth, as well as the Moon: which would not be, if they burned with their own fire.

N. W. That which is reported of a sulphureous matter, or stone, which fell from a burning comet, if it be true, it is to be thought, that it was made of some fiery meteors, not of a comet.

XXII *The ends of comets are, that it may appear; 1 That the whole heaven moves, not the stars only. 2 That it is liquid and transmeable, not hard like Chrystall. 3 That vapours ascend so high, and that there are mutations every where in this visible world.*

Vapours, I say, whether exhaling from
this

this our inferiour world, or from the super-celestiall waters. For there is nothing to the contrary, why we should not hold, that they also exhale, and are spread abroad into the thinner region of the stars.

Of aëriall Concretés, that is, Meteors.

XXIII *By reason of the perpetuall conflux of exhalations in the air from all the Elements, many things are daily there concreted, but of small continuance.*

For the air is full of exhalations, even when it seemeth clear. For it cannot be so pure here near the earth, but it will have something watery, oily or salt alwayes admixt with it. Things concrete of these were anciently called Meteors, because they are made on high: for $\mu\epsilon\tau\epsilon\omega\rho\sigma$ signifies high.

XXIV *Of humid exhalations are made watery meteors: fiery of dry.*

XXV *Watery meteors are, mists, clouds, rain, hail, snow, dew, frost.*

We must see them every one apart, how they are made.

XXVI *A mist is a watery exhalation half concrete, which being that by reason of its density it cannot elevate it selfe, creeps on the ground.*

XXVII *A cloud is a gathering together of*
thin

thin vapours, and elevated upwards, in the highest of the air.

They are gathered together most of all over the sea, and standing waters, because there most exhalations are made, and from thence they are driven through divers parts of the world by the windes, and increased with exhalations arising elsewhere. Hence in every region, rain comes, most often from that part, which lies nearest to the sea; as with us from the West.

XXVIII *Rain is the resolution of a cloud into water, and the falling of it by drops.*

N. 1 That resolution is always made by the condensation of the vapour, but there is not always the same efficient cause of its condensation. For sometimes cold condenseth a vapour, as in the head and pipe of an Alembick (which must needs be cooled) we see: sometimes the very compression it selfe, or conspissation, as it is plain in the roof of baths, and the cover of a boiling pot. But neither of these causes is wanting to beget rain: being that the middle region of the air is cold, and the cloud being pressed together by the vapours always ascending, must of necessity be dissolved. And this is the cause, why the burning heat

of the air is a fore-teller of rain: because then it is certain that the air is thickned.

N. 2. That rain is better for fields and gardens then river water, because it hath a kind of a fatnesse mixt with it, from the evaporations of the earth, minerals, plants, and Animals, wherewith it gives the earth a most profitable tincture.

N. 3 Sometimes wormes, small fishes, frogs, &c. fall with the rain, which, as it is very likely, are suddenly generated within the cloud, of vapours gathered together of the same nature, by virtue of a living spirit admixt therewith; as in the beginning, at the Command of God, the waters brought forth creeping things and fishes in a moment.

XXIX *Hail is rain congealed.*

For when the Sun beams in the greatest heat of Summer, have driven away all cold from the earth into the middle region of the air, it comes to passe that that vehement cold doth violently harden the drops of rain passing through them, and forces them to turn to ice: and therefore haile cannot be procreated in Winter, the cold abiding then near the earth, not on high.

XXX *Snow, is a resolution of a cloud into mist*

most small drops, and withall. a thickning of them with a gentle cold.

N. 1 It falls only in Winter : because the vapours are not elevated by the weak rayes of the Sun, so far as the middle (that is the cold) region ; here then near the earth, the resolution is made in a milder cold, and withall the congelation is very mild. 2 The whitenesse of the snow is from the conjunction of the parts of the water : the same comes to passe in broken ice, and in the froth of water.

XXXI Dew is a thin vapour (or else the air it selfe) attracted by the leaves of plants; and with their coldnesse condensed into water.

For it is no where, but upon plants ; and that in the heat of summer, when the plants are colder then the air it selfe. Now this turnes to the great benefit of the plants ; for by that means they are moistned, at the very driest time of the year. And therefore they are produced also in those countries which know no rain.

XXXII Frost is congealed dew.

Therefore there is none, but in winter, when cold reigns by reason of the suns absence.

Of fiery Meteors.

Fiery meteors are those, which arise from fat fumes, kindled in the air: the principal kinds of which are seven; a falling star: a flying dragon: lightning: flying sparks: ignis fatuus: a torch: and ignis lambens.

XXXIII *A falling star is a fat and viscos fume, kindled (by an antiperistasis, that is an obstinency of the cold round about) at the upper end of it, the flame whereof following its fuell is carried downward, till it fail also and be extinguished.*

For they are to be seen every clear night, in winter more then in summer: and you may see the like spectacle, if you kindle the fat fume of a candle put out with another candle put to it above. This falling star is made of a grosse vapour; and by reason of its grossnesse hanging together like a cord. Therefore it burns so violently, that falling upon a man it burns through his garment. Look which way it tends with its motion, it foretels wind from that part.

XXXIV *A flying dragon, is a long, thick, fat fume, elevated in all its parts: for which cause being kindled, it doth not dart it selfe downward, bnt side-wayes like a dragon, or sparkling beam.*

This meteors is not so often seen: and therefore they that are ignorant of the naturall causes, think that the Divell flies.

XXXV *Lightning is fire kindled within a cloud, which flying from the contrary cold, breaks out with an horrible noise, and for the most part casts the flame as far as the earth.*

The World is the Alembick of nature, the air the cap of this Alembick: the sun is the fire: the earth, the water, minerals, plants, &c. are the things which being softened with this fire, exhale vapours upward perpetually. So there ascend, salt, sulphury, nitrous, &c. vapours, which being wrapped up in clouds, put forth various effects, for example, *When sulphury exhalations are mixt with nitrous,* (the first of a most hot nature, the second most cold) they endure one another so long, as till the sulphur takes fire. But as soon as that is done, presently their follows the same effect as in gun-powder, (whose composition is the same of Sulphur and Nitre) a sight, a rapture, a noise, a violent casting forth of the matter. For thence it is that a viscous flaming matter is cast forth, which presently inflames whatsoever it touches that is apt to flame, and smiting into the earth, it turnes

to a stone, and being taken out after a time, is called a *thunder-bolt*.

XXXVI *Flying sparks* are a sulphury fume scattered into many small parts and kindled.

It is seldome seen as likewise those that follow.

XXXVII *Ignis fatuus*, is a fat and viscos fume, which by reason of its grosse-ness, doth not elevate it selfe far from the earth, and being kindled, straggles here and there, leading travellers sometimes out of their way, and into danger.

XXXVIII *A torch* is a fume like it, but thin, and therefore elevated upwards: which being kindled, burnes a while like a candle or lamp.

XXXIX *Ignis lambens*, is a fat exhalation coming from a living body, heated with motion, and kindled at its head, or near about.

It sometimes befalls men and horses, vehemently breathing after running, that the ardent vapours sent forth, are turned into flames.

Of appearing Meteors.

Appearing Meteors, are the images of things in clouds, variously expressed by the incident light: of which sort there are observed

served seven: *Chasma, Halo, Parelius, Paraselene, Reds, Colours, the Rainbow.*

XL Chasma (a pit) is the hollownes of a cloud, making shew of a great hole.

It is by reason of a shadow in the midst of a cloud, the extremities whereof are enlightned. You may see the like almost in the night by a candle, on a wall, which hath any hollownesse in it, though it be whitish.

XLI Halo (a floor) is a luminous circle, when the vapours underneath the sun, or moon, are illustrated with the rayes of the luminary.

You may see the same by night in a bath, or any other vaporous place, about a burning candle. It is ofttest seen under the moon, because the sun with his stronger rayes either penetrates or dissipates the cloud.

XLII Parelius (a false sun) is the representation of the sun upon a bright cloud placed by its side.

After the same manner, if you stand upon the opposite bank of a river, you shall see two suns; the one, the true one in heaven, the other reflected in the water. There are sometimes three suns seen, if two of

those clouds are at once opposed to the sun; and our sight.

XLIII *Paraselene* (a false moon) is the image of the moon expressed after the same manner, upon a collaterall cloud.

XLIV *Rods*, are beams of the sun covered with a cloud, yet shining through the thin cloud, stretched towards the earth like rods.

XLV *Colours* are they that appear divers in a cloud, according as it is after severall manners turned toward the sun and us; so that the cloud seems sometimes yellow, sometimes red & fiery.

XLVI Lastly, the *Rainbow* is an *Halo* opposite to the sun or moon, in a dewy cloud, representing a bow of divers colours.

For there are Lunar rainbows also. Now that the Rainbow is an appearing Meteor, is plain, if it be but from hence, that it comes and goes backwards and forwards with the eye of the beholder; and so it appears to be in severall places, to those that behold it from severall places, even as the image or brightness of the sun, to those that walk up and down on the shore. I say that it is a Meteor like to an Halo, because it is alike circular. And as in the Halo, the center of the luminary, the center of the lightsome circle, and the center

ter of our eye are in one right line, so in a Rainbow: onely that in the first the luminary and the eye are the extreame, the *Halo* in the midst: here the luminary and the bow are the extreame, and the eye in the midst. Now there doth not appear a whole circle in the rainbow, because the center of it to us falls upon the earth, and so the upper halfe of the circle only appears. If any one could elevate himselfe into the cloud, or above the cloud, without doubt he would see the whole circle of the Rainbow. Hence also the reason is evident, *Why at the suns rising or setting there appears a whole semicircle elevated right up towards heaven; but when the sun is high, it appears low. Lastly, why there can be none at all when the sun is verticall.* The Lunar Rainbows are onely pale, as an *Halo*: the Solar shewes forth most faire clouds, from a stronger light diversly reflected from a thousand thousand drops, (of the melting cloud:) the colours being coordinate, as is to be seen in a *Chrystalline Prisme*: and certainly the Rainbow was given even for this, that we might learn to contemplate the nature of colours. There is also a *contra iris*, namely when the rainbow reflects

flects again upon another cloud underneath; and therefore it is lesse and of a weaker colour, and the order of the colours inverted; so that the highest is lowest, as in a glasse the right side answers to the left side, &c. but of Meteors enough.

Of watery Concretes.

XLVII Watery concretes are: a bubble, foame, ice, and severall appearances in the water: also the saltnesse of the sea, spring waters, and medicinall waters.

XLVIII A bubble is a thin watery skin, filled with air.

It is made when a small portion of air thrust down below the water is carried upwards: which the water, being somewhat faster in its superficies, suffers not presently to flie out, but covers it with a thin skin, like a little bladder. By how much the more oily the water is, by so much the longer the bubbles hold: as it is to be seen in those ludicrous round bubbles, which boyes are wont to blow out of water and sope, (which flie a great while through the air unbroken.) From the bubble we learn, to what a subtilty water may be brought. For the skin of a bubble is a thousand times thinner then the thinnest paper.

XLIX Foams

XLIX Foame is a company of very small bubbles, raised by the sudden falling of water into water.

The beating of the water into small parts causes whiteneffe in the foam; even as ice, waxe, pitch, and other things are whitish when they are beaten. The durability also of the foam is more in an oily liquour, as in beer, &c.

L Ice is water hardened together with cold.

LI Watery impressions are images of clouds, of birds flying over, of men, of trees, and of any things objected.

It is known, that water is the first mirror, receiving the images of all things: which is by reason of the evenesse of its superficies. For light coloured with things falling upon the water, cannot (as it comes to passe in another body of a rough superficies) be dispersed, but by reason of its exceeding evenesse is intirely reflected, and presents it selfe whole with that image to the eye of the beholder. This is the ground of all mirrors. But let us come to reall concretions in the water.

LII The saltneffe of the sea, is from the subterrane fire, which heating a bituminous matter, spreadeth salt exhalations through the sea.

Salt-

Saltneſſe ſomething bitter, with a kind of oleoſity was given to the ſea. 1 That the waters might not putrifie. 2 For the more convenient nutriment of fiſhes. 3 For ſtrength to bear the burdens of ſhips. Now the ſea is ſalt, not (as *Ariſtotle* thought) by reaſon of the ſun beams, extracting the thinner parts of the waters, and ſcorching the reſt. (For our fire would do the ſame, and the ſun in lakes and pooles, neither of which is done: yea, by how much the more, ſalt water is heated with our fire, the ſalter it is; but freſh water is ſo much the freſher) but by reaſon of the heat included within the bowels of the earth, and of the deep; which when it cannot exhale, it ſcorcheth ſharply the humour that there is, ſo that it turnes to urine: The very ſame we ſee done in our own body (and all living creatures) For urine and ſweat are alike ſalt.

LIII *Spring waters are made of vapours condensed in the cavernes of the earth; after the ſame manner, as drops are gathered together upon the covers of pots.*

It is certain that under the earth there lies a great deep, *Gen. 7. 11.* That is a mighty maſſe of waters, diffuſed through the hollows

hollows of the earth; which that it joynes with certain gulfes of the Ocean, this is an argument that the depth of the sea in some places is altogether insearchable. Therefore as vapours ascend out of the open sea into the air, which being resolved into drops distill rain: so the subterrane waters, being attenuated by the subterrane heat, send forth vapours, which being gathered together in the hollowes of the earth, and collected into drops, flow out which way [passage] is given them. And this is it which the Scripture saith, *All rivers enter into the sea, and the sea runneth not over: unto the place from whence the rivers come they returne, that they may flow again.* Eccles. 1. v. 7. Whence it is understood why springs yield fresh water, though they come from those bitter, and salt waters of the sea? namely, because they come by distillation onto the spring head. For they say, that the sea water being distilled (that is resolved first into vapours, then into drops in an Alembick) looseth its saltnesse: by the same reason then the deep under ground, evaporating salt waters sendeth them fresh out of fountains neverthelesse. And what need words? For clouds gathered of the vapours
of

of the sea : send down fresh showers. See how excellently the truth of things agreeth with it selfe still.

LIV *Medicinall Waters are made of the various tinctures of the metals and juices of the earth, (from which they receive the virtue of healing and savour.)*

For example, hot waters or baths, are made of bitumen burning within: Therefore they exhale sulphur manifestly; but sharpish waters relish of iron, coper, vitriol, allom, &c. of which earthly concretes it will be now time to speak.

Of earthly concretes, which are called Minerals.

LV *Minerals are earthly concretes begotten of subterrane vapours; as clods, concret juices, metals, and stones.*

These are called minerals from the Hebrew אֲבִנִּים and אֲבִנֵּי אֲרֶזֶל as if you should say *from the earth.* They call them also *Fossiles*, because they are digged: that all these are begotten of subterrane vapours, and subterrane fire, appears by the example of our body: wherein *bloud, choler, flegme, melancholy, urine, spittle, fat, flesh, veins, nerves, membranes, gristles, bone, &c.* yea, the *stone and gravell*, are made of the vapours of food

food concocted and digested as: shal be seen hereafter. Now as these parts of ours are formed within the body by the heat included; so minerals are generated in the bowels of the earth, not elsewhere. For the earth with its most deep passages and veins winding every way, where infinite vapours are generated, and perpetually distilled in a thousand fashions, is that great work-house of God, wherein, for the space of so many ages, such things are wrought, as neither art can imitate, nor wit well find out.

LVI *Clods are digged earths, infected only with fatnesse, or some colour, and apt to be soaked, as* 1 Clay. 2 Marle. 3 Chalk. 4 Red earth. 5 Paintings, or painters colours, (as lake, vermilion, oker, azure, or blem, verdigrease.) 6 Fullers earth in Greek, *σπίρτις*. 7 Medicinall earth, as sealed earth, Lemnian, Armenian, Samian, &c.

These colours seem to be nothing else, but the foot of the subterrane fumes, variously distilled; and those earths, nothing else but a various mixture of liquors distilled also variously, and brought to such or such a quality.

LVII *Concrete juices, are fossiles included*
with

with a savour, or some sharp virtue, apt to be dissolved, or kindled; as sulphur, niter, salt, allome, vitriol, arsenick, (which painters call orpiment) antimonie or stibium, & such like.

N. Those juices seem to be nothing else but the cream of subterrane liquors variously distilled.

LVIII Metals are watery fissiles, apt to be melted, cast, and hammered; as gold, silver, brasse, (or copper) iron, tin, lead, quick-silver.

N. 1. That they are progenerated of fire, this is enough to testifie, that they are oft times taken hot out of the veines, so that the touch will not endure them. For in winter when all herbs are white with frost, those which grow over the veines, admit of no frost, because of the hot exhalation within hindering concretion, so also trees, by the blewnesse of their leaves, shew the veines of metals.

2 Now that metals are made of vapours, this is an argument that they are wont also to be procreated in the very clouds. For examples are not unknown, even in our age of bodies of brasse, or iron, of no small weight falling from heaven.

3 That metals are made of watery vapours,

pours their liquabilitie shews; now they are coagulated by virtue of salt. Therefore the drosse of iron is salt and bitter.

4 Quicksilver alone is alwayes liquid, never consistent; as a perpetuall witnesse of the watery nature of metals. Other metals swim upon it, because it hath the most compacted substance of all, gold only excepted: which therefore it receives only into it selfe.

5 Whether metals differ in their species, or only in degree of purity and hardnesse, and in heat, we leave now in suspense.

LIX *Stones are earthly fossiles, hardly compacted, apt only to be broken in pieces.*

That stones are earth coagulated with water and fire, bricks and pots teach us; for here art imitates nature. Yet the severall formes of stones shew, that they are not earth simply concrete, but a masse concrete of divers most grosse earthly vapours, with a various temperature of humours.

LX *Stones are either vulgar, or precious.*

LXI *A vulgar stone is earth most hardly compacted: the principall kinds of which are seven. The gravell stone, the milstone, the pumice-stone, the flint, (to which I refer the Smiris wherewith glasse is cut,*

L

and

and iron polished the whetstone, and the touch stone, (or *Lapis lydium*) the marble, and the loadstone.

N. Every kind have their differences again.

2 A great stone is called *saxum* or a rock, a little one, *gravell and sand*.

3 Most mountains are stony, (and yield metals;) because the subterrane fire (on the third day of the creation) swelling the earth here, made it self many channels and passages, breathing through which, it doth variously exhale, melt, mix and boile the matter: which is not done so copiously under plains.

LXII *Pretious stones are are called gems, because they are the gums of stones sweating in the bowels of the earth.*

Hence comes their clearnesse and brightnesse, that is to say, from their most thin and accurate straining, even more then in the gums of trees; for wood hath looser pores then stones.

LXIII *All gems are transparent, and pellucid: but some onely transparent, as these three; the Diamond, the Chrystall, the Beryll. Others coloured with all, and those (according to the diversity of their colours) of seven sorts.*

■ Bright

1 *Bright and burning*; the Carbuncle the Chalcedon, the Chrysolite.

2 *Yellow*; the Jacinth and Topaze.

3 *Green*; the Emerald, and the Turquois.

4 *Red or purple*: the Rubie and the Granate: but the Carneolus and the Onyx are more pale.

5 *Skie-coloured*; the Saphir, and the Amethyft,

6 *Black*; the Morion

7 *Changeable*; as the Jasper, the Agat, the Chryfoprase.

N. 1. That Chryftall is never found unlesse it be Hexagonall, which is the miracle of nature. And that it is growes in arched cels under ground, dry and closed, where the wind enters not for some years, hath been experienced at *Kings Itra-deck* in *Bohemia*, Anno 1618. For elegant chryftals were found hanging from the stones of the arches, like *Isicles* of an exact Hexagonall forme, but in the silver mines of *Catteberge*, there are found far more. Of other gems we have nothing to say in particular.

N. 2. Stones that are wont to grow in some living creatures, are usually reckoned

ned amongst precious stones: as the pearl, in sea shell fishes: the Bezoar. the Chelidonium, the Alectorius, the Busenites, &c. also Corall, and Amber. But these two, are to be referred rather to the following chapter.

LXIV *The virtue which is in minerals, is called their naturall spirit: of which there are so many formes, as there are species of minerals.*

For there is one spirit of salt, another, of vitrioll, loadstone, and iron, &c. which distillers know how to extract.

CHAP. IX.

Of Plants.

THUS much of Concretes: here follow Plants, which beside their figure have life.

I *A plant is a vitall concrete, growing out of the earth: as a tree and an herb.*

Some concretes (stars, meteors, minerals,) want life, and lie or tarry where they were concrete: but plants endued with an inward vigour, break out of the earth, and spread themselves *in plano*: whence also they were called plants. II *Plants*

II *Plants are generated, both to be an ornament to the earth, and to yield nourishment, medicine, and other uses to living creatures.*

For what a sad face the earth would have if it were not cloathed every year with those diverse coloured tapistries of herbs, we have sufficient experience in Winter, and whence should living creatures have food, medicines, and pleasures, if we were destitute of the roots, leaves, seeds and fruits of plants? not to speak of the commodity of shade, and of the infinite uses of wood.

III *The essentiall parts of a plant are, the root, the trunk (or stalk) and the branches or leaves.*

N. W. The Elements, vapours, concrete things, consisted only of *similar* parts: for every part and particle of water, earth, vapour, a cloud, iron, &c. is called, and is water, earth, vapour, a cloud, iron, &c. But more perfect bodies, (of plants and living creatures) do consist of *dissimilar parts that is members*) every one of which hath both its office, and its name, differing from the rest. For example. In a plant, *the root* is the part sticking in the ground, and sucking in the juice of the earth: *the trunk,*

(or stalks) attracting the juice, concocting it: and sending it to the upper parts: the *boughes and branches*, are twigs, distributing the juice yet better concocted, to make seed and fruit: *the leaves* are the coverings of the fruits and boughes.

IV *The Spirit of a plant is called a vegetable, or vitall spirit; which puts forth its virtue three manner of wayes; in nutrition, augmentation, and generation.*

For here that universall spirit, (the spirit of life,) begins more manifestly to put forth its virtue, preparing a portion of matter so softly to its turn, that it may have it tractable to perform the offices of life: and is therefore called vitall in plants, namely, because of its more manifest tokens and effects of life. They call it also the *vegetative soul*

V *Nutrition is an inbred virtue in a plant, whereby sucking in juice fit for it, changeth it into its own substance*

For because the encompassing air dries up every body, and the heat included in a living body doth also feed upon the inward moisture; it were impossible that a plant should not presently fade away, unlesse new matter and vigour were continually supplied with
fresh

fresh nourishment, to make up that which is lost. and to this end every plant hath a body, either hollow, or else pithy, and porous, that the nourishing vapour may passe through and irrigate all the parts; yea whatsoever is in a plant, even the very haire or downe, is hollow and porous. Therefore in a man, the head is eased, when the haire is cut; because the fuliginous vapours of the braine, or the superfluties under the skin, do the more easily evaporate. For the same cause every plant rests upon its root, that sucking the moisture of the earth through the strings thereof it may be nourished: therefore it perisheth when it is pluckt up. the *humour* then, or *fat juice of the earth*, is a fit nourishment for plants: not dry earth, because it cannot passe through the strings and pores of a plant; nor water alone, because it cannot be concrete into a solid body. Therefore the moisture of the earth which is a mixture of Mercury, sulphur and salt nourisheth plants.

VI *Augmentation is a virtue of a plant, whereby it increaseth also by nourishing it self, which we call by a common terme growing.*

It is pleasant to contemplate what it is to grow, and how it is done. Now it is easily
 L 4 found

found out by the doctrine of motions already delivered. For first, when the spirit included in the seed, begins to diffuse it self, and to swell by reason of the heat that is raised, the thin shell of the seed must of necessity break: *by the motion of cession.* and because every body is moved towards a greater company of its connaturals, that vapour coming forth when the seed is warmed, tends towards heaven; but because the matter of the seed is fat and glutinous, the vapour being infolded therein carries it upwards with it, and brings it forth out of the earth, and *this is the originall of the stump and boughs.* now because that the outside of the plant hindereth the vapours ascending, there is a strife, and heat is raised, whereby the superficies of the small body is by little and little mollified, that it may yield and rise up. and this is done every day when the Sun is hot: but the tender parts which grow up are condensed and made solid with the cold of the night: by which successions of day and night the plants take increase, all spring and summer long. Now look how much moisture is every day elevated upward by the stump, so much again succeeds it by the *motion of continitie.* least there should be a

vacuum. but because every body loves an *aquilibrium*, and plants own their center in the joynt of the stump and root, it comes to passe by *the motion of libration*, that as much as the boughs spread themselves upwards, so much the roots spread downwards or side-ways.

Now there is a question, *why when a leafe or a bough is pluckt off, yea when the stock is cut asunder, the spirit doth not exhale, but containes it self, and growes still?* Answer 1 Because the spirit hath its proper seat fixed in the root, which it doth not forsake, though a passage be open through a wound received: nay more, fearing discontinuity, it gathers and conglobates it self, when it perceives an opening and danger of dissipation. 2 Because the wound is presently overspread with the moisture of the plant, which being hardened with the outward cold, covers the wound as it were with a crust, and prohibits a total expiration.

V II. *Generation is a virtue of a plant, whereby it gathers together and conglobates its spirit into a certain place of it; and makes a seed or kernell, (from which the like plant may afterwards grow.)*

The spirit of the plant foreseeing as it
vvere

were, that it shall not always have matter at command, which it may vegetate, turns but a part of it self into the nourishment of the plant, and gathers together the rest into a certain place (usually in the tops of plants) and makes a seed or kernell. Now the seed (kernell or graine) is nothing else, but the image of the whole plant, gathered together into a very small part of the matter; from whence, if need be, the same plant may be produced again: as we see done. *N. W.* That herbs are bred neverthelesse without seed, by virtue of the spirit infused into the elements. 1 The command of God proves, *Gen. 1. v. 11.* Let the earth bring forth, &c. which is yet in force. 2 Experience. For if you uncover the earth beneath all roots and seeds, yet in the years following vvhhen it hath been somewhat oft watered vvith rain vvater, you shall see it bud forth. vvhich is a notable argument of the spirits being diffused every where, but especially descending with the Sun and raine.

VIII. The outer, and inner bark, leaves, shells, downe, flowres, prickles, &c. are integrating parts of plants: serving to defend them, and preserve their seeds from the injurie of heat and cold.

IX. The

IX. The kernels are for the most part encompassed with a pulp for their thinner nourishment, and to defend them from injury, but yet this pulp when it is come to ripenessse, serves for food to living creatures; as it is to be seen in Apples, Peares, Cherries, Plummes, &c.

X. The proprieties of plants are, varietie, heat, and tenacity of their spirit.

XI. The variety of plants is so great, that the number can scarce be counted by any means.

The natural spirit in meteors and minerals makes certain species, and those easie to be counted, (as we see;) but the vitall spirit doth so diffuse it self, that the industrie of no man is yet sufficient, to collect the the species of herbs, and trees.

XII. The cheif kinds of plants are herbs, trees, shrubs.

XIII. An herb is, that which growes and dies every year

XIV. A tree is, that which rising up on high, growes to wood, and continues many years.

XV. A shrub is of a middle nature; as the alder, the vine.

N. W. I. Some trees live for many ages: to wit, such as have a compacted and glutinous

nous substance, as the oak, the pine, &c. vvaterie and thin plants, do soon grow and soon vvither; as the fallow, &c. 2 Some lose their leaves every year, namely, those that have a vvaterie juice: others keep them a trees of a rozenous nature. 3 Trees are either fruitful or barren: the first bear either *Apples* or *Nuts*, or *fruit like unto Pine Apples*, or *Berries*. 4 Porositie and airy-nesse is given to the vvood of trees, by reason of which they do not sinke, and that. 1 That they might take fire. 2 That they might the more easily be transported any vvither through rivers. 3 That ships might be made of them. Also *clamminesse* or *indissipability* vvvas given them, that they might serve for the building of houses: for vvhich end also their talnesse serves.

Other differences of plants may be seen else vvhere.

XVI. *All plants are hot by nature; but in proportion to our heat, some are called cold.*

For generation is not done but by heat; but that vvhich is below the degree of our heat, seemes cold to us. As for *Hemlock*, *Opium*, &c. they do not kill vvith cold, but vvith the viscosity of their vapours, vvhich
fill

fill up the cavities of the brains, stop the Nerves, and so suffocate the spirit: the same may be said of all poisonous things.

XVII *Vitall spirit* (as also naturall) holds so fast to its matter, that it scarce ever forsakes it.

This is demonstrated (besides that we see the spirit every year to be driven by the cold of winter out of the stocks, and to be hidden in the root: and to put forth it selfe again at the beginning of the spring) by four examples.

1 That how ever the matter of fruits or herbs be vexed, yet the spirit contains it selfe: as it is to be seen in things, smoaked, costed, roasted, soaked, pulverized, &c. which retain their virtue.

2 That being driven out of the better part of the matter, by the force of fire, yet it sticks in the portion that is left, and there it is congregated, and inspissated; so that it suffers it selfe to be thrust together into a drop, or a little poulder, rather then forsake the matter: as it appears in *distilled waters*, which therefore they call *spirits*.

3 That when its matter is somewhat oft distilled and transfused into divers formes through divers Alembicks, yet it doth not fly away

away. For example, when a goat or a cow eats a purging herb, and the nurse drinks her milk (or the whey of her milk) it comes so to pass, that the infant that sucks her will be purged.

4 And which is more, it doth not onely retein a virtue of operating: but also of augmenting it selfe, and forming a creature of its kind: which may be shewn by two examples. *Sennertus* relates, that *Hieremy Cornarius* caused a water to be distilled in June, Anno 1608. and that in the moneth of November a little plant of that kind was found at the bottome of the glasse, in all points perfect. But *Quercetanus* writes that he knew, A *Polonian* Physician, that knew how to pulverise plants so artificially that the poulder as oft as he listed would produce the plant. For if any one desired to have a rose or a poppy shewed him, he held the poulder of a rose or a poppy inclosed in a glasse over the candle that it might grow hot at the bottome; which done, the poulder by little & little raised it self up into the shape of that plant, and grew, & represented the shape of the plant, so that one would have thought that it had been corporeall: but when the vessell was cold sunk again into poulder. Who sees not here that the
spirits

Spirits are the formers of plants? who sees not that they inhere so fast in their matter, that they can \square it were raise it again after it is dead? who sees not that the spirit of \square minerall or a plant is really preserved in the forme of a little water, oile, or poulder? Thus the eternall truth of that saying is mainteined. *And the Spirit of God moved it selfe upon the waters.* As for the spirit of \square living creature, whither it may be preserved after that manner, and raised up to inform a new body, we leave it to be thought of: purposing neverthelesse to speak something of it towards the end of the next Chapter.

CHAP. X.

Of living creatures.

THus much of plants; here follow living creatures.

I *A living creature is \square moving plant, endued with sense: as \square worm, a fish, \square bird, a beast.*

For if a stone or an oak could move it self freely, or had sence, it would be a living creature also.

II *The principall difference betwixt a living creature and a plant, is $\alpha\upsilon\tau\omicron\iota\nu\nu\sigma\iota\alpha$, that is*

is a free moving of it selfe and fro.

For the better to expresse the power of the spirit of life, Gods Vicar in creatures, it was needfull that such bodies should be produced, which that spirit inhabiting, might have obedient unto all actions. Now seeing that the ground of action is motion, bodies were to be framed, which might performe a free motion; and these are called *Animalia* or *Animantia*, living creatures, from the soul which powerfully evidences life in them. 2 Therefore mobility is in all living creatures, but after divers manners. For some move only by opening and shutting, not stirring out of their place; as oysters and cockles. Others creep by little and little, as snails, earth-wormes, and other wormes: some have a long body which creeps with winding it selfe about, as snakes: some have feet given them, as lizards, beasts, birds: but these last have wings also to flie through the air. Which fishes do imitate in the water, performing their motion by swimming.

III *The moving principle in a living creature is the vitall soul: which is nothing else but the spirit of life, thick and strong, mightily filling, and powerfully governing the bodies which it inhabiteth.*

IV *The*

IV Now because a voluntary and a light motion cannot be performed, but in a subtle matter, living creatures have bodies given them far more tender then plants, but far more compound. For they consist of spirit, flesh, blood, membranes, veins, nerves, gristles, and lastly bones, as it were props and pillars, lest the frame should fall.

Understand this in perfect living creatures. For more imperfect living creatures in which we contemplate onely the rudiments of nature, have neither bones, nor flesh, nor blood, nor veins: but onely a white humour, covered with a skin or crust, as it were with a sheath, which the spirit included doth stir or move; as it appears in worms, snails, oysters, &c. But to perfect living creatures. 1 That they might have a more subtle spirit, blood and brains were given. 2 And that these might not be dissipated, they had vessels and channels given them, veins, arteries, nerves, 3 That a living creature might be erected, bones were given him. 4 And lest the bones, as also the veins, arteries, nerves, should easily be hurt, all was covered either with fat or flesh. 5 And that the members might move, tendons and muscles were interwoven

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through-

throughout. 6 And least in moving the bone, the bones should wear one against another, & cause pain in the living creature; a *gristle* which is a softer substance, being ■ it were halfe flesh, was put between the joints. 7 And lastly, that the frame might hang firmly together in its compofure, it was compassed with a *hide*, or *skin*, as also all the members with their membranes. Therefore ■ living creature consists of more similar parts then a plant: but of far more dissimilar parts or members: of which it followes.

V *The bodies of living creatures were furnished with many members: as with diverse organs for diverse actions. The head indeed is the principall member of a living creature, wherein the whole spirit hath its residence, and shews all its force: but because a living creature was intended for divers actions, it had need of besides.*

1 Vivifying organs, supplying the living creature with heat, life, and motion: that is, *brains and heart.*

2 Moving organs, that is, *feet, wings, feathers, &c.*

3 And lest one thing should run against another, or fall into precipices, it was necessary to furnish them *with sight*; also

also with a quick *hearing* and *touch*.

Lastly, because the earth was not to supply nutriment immediately to a living creature, (as to a plant fixed in the earth) but it was left them to seek: there was need of *smelling and tasting*, that they might know what was convenient to their nature. Hence *eyes, ears, nostrils, &c.*

4 Now because a living creature, was not to be fixed in the ground with a root, because of his free motion, more perfect organs of nutrition were requisite: for that cause there was given him *a mouth, teeth, a stomach, a liver, a heart, veins, &c.*

5 And because they were not to spring out of the earth as plants, by reason of the same motion to and fro. *Divers Sexes* were given them to multiply themselves, and distinct genitall members.

6 And because living creatures were to be alwayes conversant with others of their own, or of a divers kind, they had need of some mutuall token, even in the dark: they had a *tongue* given them to form sounds.

7 Lastly, because it could not be, but that a living creature should sometimes meet with contraries, they had as it were shields and armes given them. *Hares, bri-*

stles, scales, shels, feathers: likewise horns, claws, teeth, hoofs, &c.

V I Therefore the whole treatise concerning a living creature, is finished in the explication
 I Of the nutritive faculty. II Of the vitall. III Of the sensitive. IV Of the loco-motive. V Of the enuntiative. VI Of the defensive. VII. *And lastly, of the generative.*

For he that knoweth these seven, knowes the whole mysterie of nature in living creatures. For whatsoever is in the body of a living creature, serveth those faculties: if it do not serve them, it is in vain, and maketh a monster. It is to be observed also that the first three faculties are governed by so many spirits. *The nutritive faculty by the naturall spirit, the vitall by the spirit of life, the sensitive by the animall spirit: the other four by those three spirits joyntly.*

Of the nutritive Faculty.

V II Every living creature standeth in need of daily food, to repair that which perisheth of the substance every day.

For life consists in heat. And heat, being that it is fire, wants fuell: which is moist, spirituous, and fat matter. Heat in a living crea-

creature being destitute of this, sets upon the solid parts, and feeds on them. And hence it is that a living creature, as well as a plant, without nourishment pines away, and dies. But if it be sparingly fed, it therefore falls away, because the heat feeds upon the very substance of the flesh.

VIII That nourishment is convenient for a living creature, which supplies it with a spirit like its own spirit.

For seeing that life is from the spirit, the matter of it selfe doth not nourish life, but a spirituous matter. And indeed the spirit of the nourishment must needs be like the spirit of the living creature. Therefore we are not nourished with the elements, as plants are; for as much as they have only a naturall, not a vitall spirit; but we are nourished with plants, or with the flesh of other living creatures, because those afford a vitall spirit. Nay further, there is a particular proportion of spirits, by reason of which a horse chuseth oates, a swine barley, a wolfe flesh, &c. Nay, an hog hath an appetite to mans excrements also, because it yet findeth parts convenient for it.

IX Nourishment turneth into the substance of that which is nourished.

That appears 1 because he that feeds on dry meats, is dry of complexion: he that feeds on moist, is flegmatick, &c. 2 because, for the most part a man retains the qualities of those living creatures on whose flesh he feeds, as he that feeds on beefe is strong; he that feeds on venison, is nimble, &c. If any one have the brains of a cat or a wolfe given him to eat, he partakes the phantasies of those living creatures, &c.

X Nutriment must needs be assimilated that it may turn into the substance of a living creature.

For a thing is neither applied well, nor cohereth commodiously with that which is unlike to it; much lesse that one should turn it into the other. Therefore flesh or bone is not immediately made of meat or drink: but by many gradations, as it shall appear.

XI Assimilation is made by the transmutation of the nourishment taken so oft iterated, till it come to the likenesse of the substance nourished.

It is well known out of the Metaphysicks, that all action tends to this, that the Patient may become like to the Agent, which is every where evident in naturall things, but

but especially in the nourishment of bodies. For whatsoever is taken in, of whatsoever colour or quality, is wrought so at length, that it becomes like to that which is nourished, and is applyed to its substance: which should be diligently marked in that which follows.

XII The principall transmutation of the nourishment, is by progeneration of the four vitall humours, bloud, flegme, yellow choler, and black.

For the nourishment received, being that it is tempered together (as all the bodies of the world are) of the four elements, is resolved in the body of a living creature into four again; the fattest part of it is turned into *bloud*: a part into *spittle*, or *flegme*, a part into *yellow choler*, or *choler*; a part into *black choler*, or *melancholy*: *melancholy* by its grossnesse represents the earth: *flegme*, water: *bloud*, air: *choler*, fire. But they differ in colour and in savour; for *melancholy* is black and bitter; *flegme*, white and without taste: *bloud*, red and sweet: *choler*, yellow and bitter. Now it is to be noted, that amongst these four, *bloud* is most copiously generated, because it contains the very substance of the nourishment: to which

yellow choler addes onely a more easie penetrating through all: but black choler fixeth it again, and applieth it to the members: Lastly, flegme tempers the acrimony of them both, lest they should corrode with penetrating and fixing, and gently agglutinates the blood to the members: And hence it is that Physicians also with the vulgar speak oft of the blood, as if it were the only food of life.

XIII The progeneration of vitall humours is done by concoction.

For concoction doth alter the matter by the force of heat.

XIV Concoction in a living creature is done after the same manner as distillation in Alembicks: namely, by heating of the matter, and resolution of it into vapours, and mixing the said vapours togeth. r. and by a new coagulation of them again.

For every living body is a very alembick, full of perpetuall heat and vapours. For life is heat: and heat cannot but boile the matter that is put in, and by attenuation, turn it into vapours.

XV Now in every concoction, there is a separation of the profitable parts from the unprofitable: the first are digested and assimilated,
the

the other are voided and streined forth.

So in Alembicks, the more subtle and profitable parts, (that is the more fat and spirituous) being resolved into vapour are gathered again into drops: and into a thick substance: but the more grosse and impure parts, called the dregs and excrements, sink down, and are afterwards cast out.

XVI Every concoction leaves behind it unprofitable dregs; which are called excrements and drosse.

Thus we see it come to passe in the decoction of metals. *Now we must note that plants make little or no excrement: because they are nourished with a simple and uniform juice, which goes all of it into their nature: or if any thing remain, it sweats forth in gum. But living creatures; because they consist of very dissimular parts, have need of a compound nutriment, that is solid and soft, dry and moist, hot and cold, &c. that so the more solid parts may have nutriment also whence by a stimulation every part draws that which will profit its selfe, the rest must of necessity be streined out. Another reason is because plants are susteined with a little spirit, and that which doth not evaporate: but living creatures*

tures are full of spirit, (for otherwise so grosse a frame could not be sustained and weilded) and that is continually attenuated and spent. Therefore they have need of more spirit then matter for their nutriment: and when that is extracted out of the spirituuous parts, they void forth the rest.

XVII The principall concoction in a living creature is threefold, Chylification, Sanguification, and Membrification.

The first is made in the stomach: the second in the liver: and the last in all the members.

XVIII Every one of these concoctions hath three sorts of vessels. 1 of ingestion. 2 of digestion. 3 of egestion.

XIX The vessels of Chylification; were 1 the mouth, and the throat. 2 the stomach or ventricle. 3 the guts and the arse-hole.

For the food being received at the *mouth*, is chewed with *the teeth*, or jawes, and passed through the throat. It is boiled in the *stomack* as it were in a close Alembick for some houres. And from thence by evaporation it passeth into the entrals (for the mouth of the ventricle towards the throat is shut up) and becometh *Chylus*, that is, a certain ferment like pap, or white broth.

For

For it takes a white colour from the stomach by assimilation. The more subtle parts of this *Chyle* are attracted to the liver, as a matter fit for blood: but the excrements of this first concoction, are thick dregs, which are driven out by the guts and the back part, not by the simple motion of *Cession*, but by the motion of *Antipathy*, for the naturall spirits placed in the fibres of the guts, sucking forth that which is profitable, but turning themselves away from that which is unprofitable, and hateful to them, contract the nerves of the guts, and thrust forward those burdens towards the passage.

XX The vessels of Sanguification, are
 1 the *Mesenterie*. 2 the *Liver*. 3 the *Ureters*, the *spleen*, and the *gall*.

For the *Mesenterie* encompassing the entrals vvith its strings (which they call the *Mesaraicall veins*) sucks the best part of the *Chylus* out of the entrals; and carries them to the liver by the *Vena Porta*. Now the liver concocts and separates that liquor again, for it assimilates the sweeter parts in colour to it selfe, and turns *them to blood*, swelling vvith naturall spirit: vvith vvhich neverthelesse there is flegme and yellow choler,

choler, and black mixt. The excrement of this second concoction is urine : namely, a wheaie and salt humour which floweth from the liver by the ureteres to the bladder ; whence by the channell of the genitall member it is sent forth.

But because the 2^d. concoction ought to be far more subtile then the first, it is not sufficient that the blood is purged from its serosity. But both kinds of choler and flegme must of necessity also be purged from redundancy : the spleen therefore by sympathie attracts to it selfe vvhatssoever it perceiveth, that is too grosse and earthy in the blood, and by little veins sends it again into the entrals, and by that means disburdens it selfe of that dreggy humour ; and last of all the gall attracteth those parts of the blood that are too sharp and fiery, (vvhose little bag hangs at the liver) and by strings sends them again mixt into the entrals ; whence the bitternesse and ill sent of dung.

XXI The vessels of membrification, are
 1 veins. 2 every particular member. 3 pores.

For the veins proceeding from the liver spread themselves over all the parts of the body like boughs, and sending forth little branches, every way end in strings that are

are most tenacious; from which every member apart sucketh, and by a slow agglutination assimilates it to it selfe, so that the bloud flowing into the flesh, becomes flesh, that in the bones turns into bone; in a gristle, to a gristle; in the brain, to brains; just after the same manner as the juice of a tree is changed into wood, bark, pith, leaves, fruits, by meer assimilation. The *excrements* of this third most subtle concoction are subtle also, namely *sweat and vapour*, which alwayes breaths out through the pores. If any more grosse humour remains (especially after the first and second concoction not well made) it breeds scabs; or ulcers, or the dropsie.

XXII For the furthering of nourishment there is a spur added, that is appetite, or hunger, and thirst: which are nothing but a vellication of the fibres of the stomach, arising from the sharp sucking of the Chylus.

For the members being destitute of the juice, wherewith they are watered, sollicite the veins of bloud: and the veins (by the motion of continuity) sollicite the liver; the liver, the Mesenterie; that the entrals; the entrals the stomach: which, if it have nothing to afford, contracts and wrinkles it

it selfe: and the strings of it are sucked dry, from whence proceeds first a certain titillation, (and that we call *appetite* simply) and afterward pain (and this we call *hunger*) and if solid meat be taken, but dry, because coction, or vaporation, cannot be made by reason of drinesse, there is a desire that moisture should be poured on, and this we call *thirst*. It appears then *why motion provokes appetite? and why the idle have but little appetite, &c.*

XXIII The whole body is nourished at once together, by the motion of libration.

To vvit, after the same manner, as the root in a plant doth equally nourish both it selfe, and the stock, and all the boughes. Therefore no member nourisheth it selfe alone, but others vvith it selfe, and so all preserved. Otherwise, if any member rob the rest of their nourishment; or again refuseth it, there follows a distemperature of the vvhole body, and by and by corruption, at length death.

XXIV A living creature being thus nourished, is not onely vegetated, but also (as long as his members are soft and extensive,) augmented, the superficies of the members, yielding by little and little, and extending it selfe; but

■ soon as the members are hardened (after youth;) the living creature ceaseth to grow: yet goes forward in solidity and strength, so long as the three concoctions are rightly made. But when the vessels of the concoctions begin to dry up also; the living creature begins to wither away, and life grows feeble, till it fail, and be extinguished

Of the vitall faculty.

XXV Life in a living creature, is such a mixture of the spirits with the bloud and members, that they are all warme, have sense, and move themselves.

Therefore the life of living creatures consists in heat, sense, and motion; and it is plain: for if any creature hath neither motion, nor sense, nor heat, it lives not.

XXVI Therefore every living creature is full of heat, sometimes stronger, and sometimes weaker.

For every living creature is nourished. How it appears out of that which went before, the nourishment is not made but by concoction: but reason teacheth that concoction is not made but by heat and fire. It comes therefore to be explained, whence a living creature hath heat and fire? and by what means it is kindled,
kept

kept alive, and extinguished? which the two following Aphorismes shall teach.

XXVII *The heart is the forge of heat in a living creature, burning with a perpetuall fire, and begetting a little flame called the spirit of life; which it communicates also to the whole body.*

Hence the heart is said commonly, to be the first that lives, the last that dies.

XXVIII *The vitall spirit in the heart, hath for its matter bloud; for bellowes, the lungs: for channels, by which it communicates it selfe to the whole body, the arteries.*

Our hearth fire hath need of three things, 1 matter or fuell, and that fat. 2 of blowing or fanning, whereby the force of it is stirred up. 3 free transpiration whereby it may diffuse it selfe; the same three the maker of all things, hath ordeined to be in every living creature. For the heart seated a little above the liver, drinketh in a most pure portion of bloud, by a branch of the veins: which being that it is spirituou and oily, conceives a most soft flame; and lest this should be extinguished, there lies near to the heart *the lungs*, which like bellowes dilating and contracting it selfe, blowes upon, and fans that fire of the heart perpetually,

ally, to prevent suffocation: Now being that that inflammation of the heart, is not without fume or vapour (though very thin the said lungs by the same continuall inspiration exhaleth those vapours through *the throat*; and drawing in cooler air instead thereof, doth so temperate the flame of the heat, whence the necessity of breathing appears, and why a living creature is presently suffocated if respiration be denied it. And that flame, or attenuated, and most hot blood, is called *the spirit of life*; which diffusing it selfe through the arteries, (that accompany the veins every way) cherisheth the heat both of the blood (that is in the veins) and all the members throughout the whole body. Now because it were dangerous to have this vitall spirit destroyed, the arteries are hid below the veins, only in two or three places, they stand forth a little: that, so the beating of that spirit, (as well as of the heart it selfe, when the hand is laid upon the breast) may be noted, and thence the state of the heart may be known.

Of the sensitive faculty.

XXIX Sense in a living creature is the

N

per-

perception of those things that are done within and without the living creature,

XXX That perception is done by virtue of a living spirit; which, being that it is most subtle in a living creature, is called the Animall spirit.

XXXI That perceptive virtue consists in the tenderesse of the animall spirit: for because it is presently affected, with whatsoever thing it be wherewith it is touched.

For all sensation is by passion; shall appear hereafter.

XXXII The seat and shop of the animall spirits is the brain.

For in the brain, there is not only greatest store of that spirit residing, but also the whole animall spirit is there progenerated.

XXXIII The animall spirits are begotten in the brain, that is in bloud and vitall spirit. 2 purified with the fanning of respiration. 3 communicated to the whole body by Nerves. The excrements of the brain are cast forth by the nostrils eares, and eyes (that is by flegme and tears.)

For the strings of the veins and arteries, running forth into the brains, instill bloud and vitall spirit into them. And the bloud,
that

that turns into the substance of the brains by assimilation: but the vitall spirit, being condensed by the coldness of the brain, is turned into the Animall spirit: which the air, drawn in by inspiration, and getting into the brain through the hollownesse of the nostrils, and of the palate, doth so purifie with fanning every moment, that though it be something cold, yet it is most moveable, and runs through the nerves with inexplicable celerity. Now the *Nerves* are, *branches or channels, descending from the brain through the body.* For the marrow of the back bone, is extended from the brain all along the back of every living creature: and from thence divers little branches run forth, conveying the animall spirit, the architect of sense and motion, to all the members in the whole body.

XXXIV To know the nature of the senses three things are pertinent, 1 the things requisite. 2 the manner. 3 the effect.

XXXV The things requisite are 1 an object. 2 an organ. 3 a medium to conjoyn them. Or *Sensile, Sensorium, and the Copula.*

XXXVI Objects are sensible qualities inhering in bodies; Colour, Sound, Savour, Tangor.

For nothing is seen, touched, &c. of it selfe, but by accidents wherewith it is clothed. And if we would be accurate Philosophers, *N. W.* of the three principles of things, only light or fire is preceptible. For matter and spirit are of themselves insensible: *the light then tempered with darknesse, makes the matter visible. Motion, (which is from light) makes a sound; but heat (which is from motion) stirs up and temperates the rest of the qualities, odours, savours, tangors.*

XXXVII The organs of the senses are parts of the body, in which the animall spirit receives the objects that present themselves; namely, the eye, the eare, the nostrils, the tongue, and all that is nervie.

Nothing in all nature acts without organs: therefore the animall spirit cannot do it neither.

XXXVIII The medium of conjoyning them, is that which brings the object into the organ: in sight, the light; in hearing, the air moved with breaking: in smells, the air vapouring: in taste, the water melting: in touch, the quality it selfe inhering in the matter.

XXXIX The manner of sensation is the contact of the Organ with the object, passion, and action.

There

There is but one sense to speak generally, and that's the Touch. For nothing can be perceived, but what toucheth us either at hand, or at a distance. There is no sense at all of things absent.

X L Therefore in every sensation the Animall spirit suffers by the thing sensible.

That there is no sensation but by passion is too evident. For we do not perceive heat or cold, unlesse we be hot or cold; nor sweet and bitter, unlesse we become sweet or bitter; nor colour, unlesse we be coloured therewith. Our spirit, I say, residing in the organs, is touched and affected. Therefore those things which are like us, are not perceived: as heat like our heat, doth not affect us. But we must observe that the Organs, that they may perceive any qualities of the objects, want qualities of themselves; as the apple of the eye, colour; the tongue, savour; &c.

X L I Yet in every sensation the animall spirit doth reach upon the thing sensible: namely, in receiving, speculating, & laying up its species.

For the Animall spirit resident in the brain, what ever sensorie it perceives to be affected, conveys it selfe thither in a moment to know what it is: and having per-

ceived it, returns forth with, and carries back the image of that thing with it; to the center of its work-house, and there contemplates it, what it is, and of what sort: and afterward layes it up for future uses, hence the Ancients made three inward senses.

1 *The common sense*, or attention.

2 *The Phantase*, or imagination.

3 *The memory*, or recordation. But these are not really distinct: but onely three distinct internall operations of the same spirit. Now that those inward senses are in brutes, it appears, 1 Because if they do not give heed, many things may and do usually slip by their ears, eyes, and nostrils. 2 Because they are endued with the faculty of imagining or judging. For doth not a dog barking at a stranger, distinguish betwixt those whom he knowes, and strangers? yea sometimes a dog or a horse, &c. starts also out of his sleep: which cannot be but by reason of some dream. And what is a dream but an imagination? 3 Because they remember also, for a dog that hath been once beaten with a cudgell, fears the like at the sight of every staffe, or gesture, &c. And therefore it is certain, that every

every living creature, even flies and worms, do imagine. But of the inward senses, more at large, and more distinctly in the Chapter following.

XLII The effect of sensation is pleasure, or grief.

Pleasure, if the sense be affected gently and easily with a thing agreeable thereto, with titillation; griefe, if with a thing that is contrary to it, or suddenly with hurt to the Organ.

XLIII And that the Animall spirit alwayes occupi'd in the actions of sense, may sometimes rest, and be refreshed, sleep was given to a living creature; which is a gathering together of the animall spirits to the center of the brain, and a stopping of the Organs in the mean time, with the vapours ascending out of the ventricle.

Hence it appears. 1 *Why sleep most usually comes upon a man after meat?* or else after wearinesse, when the members being chafed do exhale vapours? 2 *Why careful thoughts disturb sleep?* that is, because that when the spirit is stirred to and fro, it cannot be gathered together, and sit still. 3 *What it is to watch, and how it is done?* namely, when the spirit being strengthened

in it selfe, scatters the little cloud of vapours already attenuated, and betakes it selfe to its Organs. 4 *Why too much watching is hurtfull?* because the spirits are too much wearied, weakened, consumed, &c.

Thus much of the Senses in general, something is to be said also of every one in particular.

X L I V The touch *hath* for its instrument the nervous skin: as also all the nervous, and membranaceous parts of the body.

Therefore haire, nailes, bones, do not feel, &c. though you cut or burn them: because they have no nerves running through them. Yet they feel in that part, where they adjoyn to the flesh, because they have a nervie substance for their gluten. Hence the pain under the nailes, and membranes of the bones, is most acute. Now being that *the skin* of the body is most glutinous, and altogether nervie, lest it should put the living creature to continuall pain and trouble, by being too sensitive, it is encompassed with a thin skin, called in Latine, *Cuticula* (which we see come of somtimes in members that are scorched and bruised) and void of sense, to restraine the violence of the sense.

XLV The taste hath the tongue for its Organ, a porous member, and alwayes moist, that so dry things also that touch it, may melt and give forth a savour, which penetrating the tongue by the nerves placed at the roots thereof, is by and by communicated to the brain.

When the tongue is dry (as in great thirst) the taste perceives nothing; and therefore God hath in his wise counsell provided, that in every perfect living creature, the vapours exhaling out of the ventricle, should be gathered together into spittle within the concavity of the mouth, and should water the tongue perpetually: for which purpose the porositie of the tongue serves very wel. Yet there were added over and above two little kernels, called *Tonsillæ*, spongious too, alwayes preserving spittle for the use of the tongue.

XLVI The nostrils are the Organs of smelling, and that cribrous bone placed over them; by which as through a sponge, the smell comming from things may enter the brain.

Therefore when the *Catarrhe* flowes and fills the nostrils, smelling is hindred. This is the most open way to the brain, and therefore most powerfull to affect the animal spirit, either immediately pleasing, or
recre-

recreating or strengthening it, or molesting and suffocating it. For hence it is, that grosse, fuliginous, impure vapours kill: but sharp smells raise a man, even out of a deep swoone.

XLVII. Hearing hath the ear for its Organ; which containes the hole to the brain, together with a gristly border winding about like the shell of a snail, adjoynd without to receive the motion of the aire when in is stricken, and turne it inward: but within at the center of the windings is a little drum, with a little bit of flesh standing by it, like a hammer; which being beaten with the aire that enters, beats the drum also, which the spirit perceiving, judges of the greatnesse or smalnesse, nearnesse or distance of the thing beaten with the aire: and by multiplied experience, knows what it is that moves the aire, and of what sort.

This wonderful Organ is easily corrupted within and without. Within, if the passages be stopped with flegme: & much more if the hammer or the drum be hurt with rottenesse. But without, if the ear, (that is that gristly border) be cut off: for then the sound slips by the ear, or being received in ordinate, makes only an inordinate noise. To help which the Creator gave living creatures two ears apiece. tures

Now it appears hence, 1 *Why too sharpe or too dull sounds offend, the temperate please us?* because they agree better with our spirit.

2. *Why a sound penetrates obliquely also?* because the aire moved, moves that which is next it round about by the motion of diffusion.

3. *Why a sound spread round about, failes by little and litle?* because it is just as when the water of a poole is moved with a stone falling into it. Excepting that the water quivers a good while in that whole circle: but the circle of the rain moved, passeth away together and at once: for the sound of a bell, doth not sticke in the aire, but is wheeled about in the sounding bell.

4. *Why when one hears all hear the same?* because a sound is a real commotion of the aire, which arrives at the ears of all those that are within that circle.

5. *What the Echo is?* namely a sound reflected from hollow places: after the same manner as the circulations of the water made in a vessel, after they have been at the sides, returne again toward the center.

XLVIII. *The sight hath the eye for us Organ; which is nothing else but a living look-*

looking glasse, receiving into it self the images of such things as present themselves, and transmitting them to the brain to be judged of.

The fabrick of the eyes is admirable. For beneath the fore-head of every living creature, God hath hollowed out in the skull two windows, into which the outmost membrane of the brain, sends two things like bags, filled with the humorus that come from the braine. In the midst of which there is a pipe woven together of an opacous thin membrane, yet full of a most pure chrystalline humor: they call it the *apple of the eye*, in which vision is properly made, this is encompassed with a net-work, full of a watery or glassie humor: And last of all, that membrane which the common sort call the *white of the eye*; but Philosophers (because it is hard and polished over like a horne) call *cornea*, and this is transparent over against the apple and the net-work, elsewhere it retains its whitnesse. Now under the root of the apple lies the *optick nerve*, by which the image of the thing perceived, passeth straight to the center of the braine,

X L I X. *No vision is without the ministry of light; for that reflecting from things and coloured with their aspect diffuseth it self every way*

way, and wheresoever it falls upon a glasse, it impresseth the image of the said things.

Whence it appears: 1. *Why only things that are coloured are seen?* because the light must of necessity rebound to the eye, but that which hath no colour is transparent as the aire, &c.

2. *Why those things that are to be seen must of necessity be enlightned?* because light is the resiliencie of the light from the object to the eye.

3. *Why the eye placed in the shade or in the dark sees the stronger?* because it receives the light reflected without any impediment. For if the eye it self be enlightned also the light reflected from it, meets with the other light (coming from things) and so there is a collision and a dissipation of them both.

4. *Why we see nothing, if there be any thing betwixt the eye and the object?* because the reflexion of the light is not made but in a right line.

5. *Why some living creatures see best in a strong light, others in an obscure light?* because the lucidity of the animal spirit is diversly proportionated. So Spiders and Flies see the smallest things, which passe our sight, ; (and much more the sight of a horse or an ele-

elephant, &c.) because there are more subtile spirits in a more subtile body.

6. *VV*hy whitenesse disgregates the sight, and if it be overmuch, dissipates and corrupts it? because it is the very light it self reflecting, whose nature is to penetrate, attenuate, part asunder and diffuse the object. For to that end it was sent into the world.

L. *V*ision is three-fold, streight, reflected, and refracted.

*R*ight or direct vision is that whereby the light is seen, suppose the Sun or fire: For here the light offers it self to the eye by a single line.

*R*eflected is, that whereby other things are seen in a free aire: for there the light reflected from things, comes to the eye by a second line (for by the first line the light falls upon the object, by the second from thence upon the eye.)

*R*efracted is that whereby things are seen through a double medium, and so by refracted lines: as when an oare or pole seems broken in the water. Also when a piece of mony in the bottome of a vessel full of water, seemes bigger and nearer the superficies, so that one may go back and see it.

Of the motive faculty.

L I. *Motion was given to a living creature.*

1. *To seek his food.*
2. *For those actions to which every one is destined.*
3. *To preserve the vigour of life.*

For a living creature being of a more tender constitution than a plant, would more easily putrifie and perish, if it were not quickned by most frequent motion. Therefore the Creator hath most wisely provided for our good, that we cannot so much as take our meat without labour and motion.

L II. *The moving principle is the animall spirit.*

Therefore a body without life, though never so well furnished with Organs, moves not: and when the braine, the seat of the animall spirits is ill affected (for example either with giddinesse or a surfet) the members presently fall, or at least stumble and totter. And when the nerve of any member is stopped, it is presently deprived both of motion and sense; as may be seen in the palsie and apoplexie.

L III. *Now*

LIII. Now the animall spirit moves either it self only, or the vitall spirit with it : or lastly the members of the body also.

LIV. The animall spirit moves it self perpetually, sometimes more, sometime lesse: namely, running out and into the Organs of the senses: or howsoever stirring it self in its work-house.

For from this inward motion of it, are perpetual phantasies or imaginations even in sleep; which then we call dreams.

LV. It carries the vitall spirit along with it, when at the sense of something, either pleasing or displeasing, it conveys it self to and fro through the body, taking that with it as it were to aide it; as it is in joy and sorrow; hope and feare; gratulation and repentance; and last of all in anger.

For joy is a motion, wherein the spirit poureth forth it self at the sense of a pleasant object, as though it would couple it self with the thing that it desireth. Thence that lively colour in the face of a joyful man from the vital spirit, flowing thither with a most pure portion of the blood. And this is the cause why moderate joy purifies the blood, and is helpful to prolong life. See *Prov. 15. v. 13. & 17. v. 22.*

Sorrow is a motion, whereby the vitall spirit at the sense of an object that displeaseth it, runnes to its centre; the heart as it were feeling a hurtful thing, thence pale-nesse in the face of those that are affrighted, and stiffnesse of the skin and haire; hence also danger of death, if any one be often and greatly affected with sorrow: the like motions are in *hope and fear, joy and sorrow*; that is, in the sense of good or bad, either present or past.

But *anger*, is a mixt motion, whereby the spirit for fear of injury flies to the center, and thence poures forth it self again as it were in revenge. Hence they that are angry, are first pale, and afterwards red, &c.

N.W. All these motions commonly called *affections, or passions of the minde*, are common to all living creatures: But according to more and lesse, for Sanguine creatures are merry; Melancholy, sad; Flegmatick, faint; Cholerick, furious, &c.

LVI. *The said animal spirit moves the members, but wuh the use of instruments; Tendons and Muscles, and the joynts of the bones.*

The puppets wherewith Juglers (a pleasant sight to children) shew playes, that
 O they

they may turne themselves about, as though they were alive, must of necessity have:
 1 *Joynts* of the members, that they may bow. 2 *Nerves* or strings with which drawne to and fro they are bowed. 3 Some living strength which may draw the nerves forward and backward; which the *neuro-spasta* that is hid under the covering supplies. Just so to the motion of a living creature, there are requisite: 1 *Joynts* or knuckles of bones. For bones were given to a living creature, that he might stand upright: But that he might bend also, his bones were not given him continued, but divided with joynts of limbs.

2. Certain ligaments fastned about the bones, wherewith attraction and relaxation might be made; therefore certaine *tendons* were given them as it were cords, being of a nervy and half gristly substance, which growing out of the head of one bone, and running along the side of another bone, grow to the lower head thereof; and when the tendon is drawne, the following bone is drawne, so as to bend it self. Now it is to be noted, that these tendons about the joynts of the bones are bare on both sides; but about the middle of them they are

are extended into a kinde of a membranceous purse stuffed up with flesh: Which flesh or fleshy purse they call a muscle, of which every member hath many: not only least that the tendons when they are drawne should depart out of their place; or the bones or tendons be hurt with oft rubbing against one another; or for the shape of a living creature only (for what a body would that be which consisted of meer bones, veins, nerves, and tendons? a *Skeleton*) but because there can be no motion at all without muscles: as it shall forthwith appear.

3. The *neurospasta* or invisible mover, is the animal spirit; which as it can at the pleasure of the phantasie, convey it self into the belly of this or that muscle, so it stretches or dilates it as it vvere a paire of bellows, and draws in that vvhich is opposite, from whence nothing can follow but the bending of that member.

Thence it appears: 1. *That the animall spirit can move nothing without an Organ*: For why doth no man bend his knees before? because there wants a knuckle above. Why doth no man move his ear? because that member wants muscles, &c.

2. It appeares also, *That by how many*
 O 2 the

the more muscles are given to any member, by so much the nimbler it is unto motion: by how much the bigger, so much the stronger; For example, in the hands and feet, that they might be sufficiently able to undergo the variety of labours and going. It appears also why they that are musculy or brawnie, are strong, but those that are thin, are weak?

3. It appears also that the animal spirit is most busie in motion, running to and fro at the command of the phantasie, most speedily through the nerves and arteries.

4. That the motion of a living creature is compounded of an agitative, expansive and contractive, impulsive and continuative motion. For the animal spirit conveys it self at the pleasure of the phantasie, into this or that muscle: and the muscle giving place to the spirit flowing in, stretcheth forth it self: then when the muscle is stretched forth in breadth, the length of it must be contracted of necessity: and the tendon follows the muscle contracting it self, and draws with it the head of the next bone by the motion of continuity; all with inexplicable quicknesse.

5. It appears also that this local motion (either of the whole living creature, or of some

some member) is made about something immoveable with various enforcings.

6. And because it is with enforcing, it cannot be without wearinesse.

7. And because it is vvith vvearinesse, there is sometimes needs of rest; vvhich is given in three kinds. 1 *Standing*. 2 *Sitting*. 3 *Lying*. *Standing* is a resting of the feet, but with an inclination of the body to motion: therefore it is done by libration. *Sitting* is rest in the middest of the body: whereby the other parts are the more easily preserved in *Æquilibrio*. *Lying* is a total rest. That is, a prostrating of the body all along: But as too much motion brings wearinesse, so too much rest causeth tediousnesse: because the spirit loves to stir it self. And the same position of the members a long while together by rest, is alike troublesome: both for that the lower members are pressed with the vveight of the upper, and also for that the spirit desires to move it self any way. Hence it is in that vve turne us oft in our sleep.

Of the enuntiative faculty.

That a living creature might give know-
ledge

ledge of it self by a voice , the animal spirit doth that , at the direction of the phantasie: but it hath these Organs , the Lungs , the rough Arterie , and the Mouth.

L VII. *To every living creature (fishes excepted) there was given lungs , to coole the heart , with a gristly pipe called the rough arterie . Which notwithstanding serves withall to send forth a voice : because that in the upper part of it , it hath the forme of a pipe , wherewith the aire being stricken may be divided and sent sounding forth .*

L VIII. *And that the voice might be both raised , and let fall , that pipe is composed of gristly rings ; the lowest of which , if it oppose it self to the aire as it passeth by , there is a deep repercussion , that is a grave voice ; but if the highest , there is an high repercussion , that is a shrill voice , every one may make triall of that in himself .*

L IX. *And that the sound may be articulate , (as in speech and the singing of some birds) that the tongue , beating the sound too and fro , also the lips , the teeth and nostrils , and the throat performe .*

Of the defensive faculty.

L X. *The animall spirit if it perceive any hostile thing approach unto it, hath presently recourse to its weapons, whereby either to defend it self (setting up its haire, bristles, scales, prickles) or to offend and hurt its enemies (using its hornes, nailes, wings, beak, hands, &c.)*

Which by vertue of what strength it is done, may already be known out of what hath been said before.

Of the generative faculty.

Seeing that living creatures as well as plants, are mortal entities: they must of necessitie be multiplied, for the conservation of their species; touching which marke the Axiomes following.

L X I. *Because that the generation of living creatures, by reason of the multitude and tenderresse of their members, could not commodiously be performed in the bowels of the earth: they had a different sex given them. And it was ordained that the new living creature should be formed in the very body of the living creature it self.*

As the sun by its heat doth beget plants in the wombe of the earth, so it may also those living things, whose formation is finished with in some few dayes, as wormes, mice, and diverse insects, (which is done either by the seed of the same living creatures falling into an apt matter scattered, or by the spirit of the universe, falling into an apt matter. But more perfect living creatures, which consist of many and solide members, and want much time for their formation (as a man, an horse, an elephant) it cannot beget. For being that the Sun cannot stay so long in the same coast of heaven, the young one would be spoiled before it could come to perfection. Therefore the most wise Creatour of things, appointed the place of formation to be, not in the earth, but in the living creature it self; having formed two sexes, that one might do the part of the plant bearing the seed, the other of the earth, cherishing, and as it were hatching the seed. This alone and none other is the end of different sexes in all living creatures. Wo be to the rashnesse and madness of men, which abuse them! as no beast doth. The members, whereby the sexes differ, are the same in number, site and form, and differ in nothing almost

almost unless it be in regard of *exterius* and *interius*: to wit the greater force of heat in the male thrusting the genitals outward, but in the female by reason of the weaker heat the said members containing themselves within: which Anatomists know.

LXII *The spirit is the directour of all generation, like as in plants; which being heated in the seed, first formes it selfe a place of abode, that is the brains and head: and thence making excursions, formes the rest of the members by little and little, and gently: and again retiring to its seat, rests and operates by turns: whence the original of waking and sleeping.*

Therefore the formation of a living creature doth not begin from the heart, as *Aristotle* thought, but from the head, for the head is as it were the whole living creature; the rest of the body is nothing but a structure of organs for divers operations. And that appears plain, for some living creatures (as fishes) have no heart, but none are without a head and brains.

Of the kinds of living creatures.

Thus much of a living creature in general; the kinds follow.

LXIII *A living creature according to the difference of its motion is* 1 Reptile. 2 Gressile.
3 Natatile. 4 Volatile.

LXIV Rep-

LXIV Reptile, or a creeping thing is a living creature with a long body, wanting feet, yet compounded of joynts (or gristly rings) by the contraction and extension of which it windes up and reacheth out it selfe: as are wormes and serpents.

LXV Gressile is, that which hath feet (two or more) and goeth; as a lizard, a mouse, a dog, &c.

LXVI Natatile is, that which passeth through the water by the help of finnes: it is called a fish: amongst which crabs also, and divers sea-monsters are reckoned.

LXVII Volatile is, that which moves it selfe through the air, by the shaking of its wings; and is called a bird.

The lightnesse of birds to flie, is from their plumosity. For every plume or feather, not only in the stalk, but through all its parts, and particles of its parts, is hollow and full of spirit and vapour. And for this cause no birds pisse: because all their moisture perpetually evaporates into feathers. It is impossible therefore for a man to flie, though he fit himselfe with wings, because he wants feathers to raise him: and those which he takes to him, are dead, and void of heat and spirit.

LXVIII *Small living things are by a speciall name called insects; as flies, wormes, &c.*

They are called insects, from the incisions whereby their bodies are cut off round as it were. These may be divided after the same manner. For wormes are *Reptile*, Lice, Fleas, Punies, Spiders, &c. *Gressile*, the water-spider, and the horse-leech, &c. *Natatile*, Flies and Gnats, &c. *Volatile*, and all those with infinite differences, so that here also there is not wanting a most clear glasse of the admirable wisdom of the Creatour; and a schoole to man, to learn virtues, and forget vices (of both which there are an expresse image in living creatures, which the Scripture oft inculcates.)

An Appendix.

Of the tenacious inherencie of the animall spirits in its matter.

WEsnewed toward the end of the ninth Chap, how fast the *naturall and vitall spirit* inhereth in its matter: we are now to give notice of the like in the *animall spirit*, how firmly it also abideth in its matter, that is the bloud, the understanding of which thing, will also adde much light to those

those places of Scripture, where it is said that the soule of every living creature is in the bloud thereof; yea, that the bloud of all flesh, is the life thereof, ¶ Gen. 9. v. 4. Levit. 17. v. 11. and 14. Deut. 12. v. 23.) And to certain secrets of nature, which they are astonished at, who are ignorant of the manner and reason of them.

I First, then it is certain that the animal, as well as the vitall spirit, may be bound into its seed with the cold, so ¶ that for a time it cannot exercise its operation. For as grains of corn kept all winter (either in a garner, or in the earth) do bud neverthelesse: so the eggs of fishes, frogs, pismires, beetles, scattered either upon the earth or waters, do bring forth young the year following.

II In bodies already formed the same spirit, compelled sometimes by some force, forsakes the members, and ceaseth from all operation: yet conglobates it selfe to the center of the body, and coucheth so close, that for many dayes, moneths, years, it lies as it were asleep, yet at length it awakens again, and diffuseth it self through the members, and proceeds to execute vitall operations as it did before. We find it so to
be

be in Flies, Spiders, Frogs, Swallows, &c. which in winter lie as though they were dead in the chinks of wals, or chaps of the earth, or under the water, yet when the Spring comes in, they are alive again. So flies choaked in water, come to life again in warm cinders: like as it is certain, that men strangled have been brought to life again after some hours, And besides there is an example commonly known of a boy killed with cold, and found four dayes after, and raised again with fomentes. Trances continued for some dayes are ordinarily known hence: some ready to be buried, as though they had been dead indeed, yea, and buried too, yet have lived again. Some Geographers have written, how that in the farthest parts of *Moscovia*, men are frozen every year with extream cold, and yet live again like swallows: which notwithstanding as a thing uncertain, we leave to its place.

III The third and the most strange is this, that the spirit flowes out with the blood that is shed, and yet gives not over to maintain its consent with the spirit remaining within the body: (whither the greater part thereof remain or only the relicks:)

sicks :) which is most evidently gathered from divers sympathies and antipathies, I will illustrate it with five examples.

1 *Whence is it; I pray you that an ox quakes, and is madded, and runs away at the presence of the butcher? is it not because he smells the garments, the hand, the very breath of the butcher stained with the blood and spirit of cattle of his own kind? which is also most clear from the irreconcilable antipathy, which is found to be betwixt dogs, and dog-killers.*

2 *Whence is it that the body of a slain man bleeds at the presence of the murderer, and that after some dayes, or months, yea, and years? (For it is manifest by a thousand trialls that it is so: and at Itzenhow in Denmark, Simeon Gulartius relates that the hand of a dead man cut off, and hung up, and dried in prison, discovered the murderer full ten years after by bleeding, as a thing confirmed by great witnesses, and those of the Kings Counsell) and certainly we are not to flie to miracles where nature it selfe by constant observation shewes her lawes. It is very likely that the spirit of the man ready to be slain, provoked with the injury when it is shed forth with the blood, pouring out it selfe*

selfe as it were in revenge, leaps upon the murderer: and that after the same sort as we see a dog, a wild beast, or oxe, when he is killed, run furiously upon him that striketh him. For if the spirit do so yet abiding in the body, why not parted from it? Therefore it is to be supposed that it leaps upon the murderer, and seises on him. Whence it comes to passe, that when he comes near the body (especially if he be commanded to touch it, or look upon it) look how much spirit is left in the body, it hasteth to meet with its spirit, with its chariot the bloud, namely by sympathie. Hence that Antipathie which more subtile natures find in themselves against murderers though unknown. For they tremble at the very presence of murderers, and nauseat if they do but eat or drink with them, &c.

2. The cunning of a most excellent Chirurgion in *Italy* is [well] known, who helpt one that had lost his nose, carving him another out of his arme, cut and bound to his face for the space of a moneth: and the ridiculous chance [that happened there-upon] a little after is also known. A certain Noble man having also had his nose cut off in a duell, desired his help; but being delicate

cate and not willing to have his arme cut, hired a poor countrey fellow, who suffered himselfe to be bound to him, and his arme to be made use of to repair his nose. The cure succeeded : but when as about some six years after, (or thereabouts) the country man died, the Noble mans nose rotted too, and fell off. What could be the cause of it, I pray you, but that the spirit, and that locally separated, doth maintain its spirituall unity? Therefore when the spirit went out of the countrey mans carcasse, as it rotted, part of it also went out that the Noble mans nose, and his nose (by reason of the Noble mans spirit, succeeded not [into the place of it] as being into the lump of anothers [flesh]) rotted also, and fell off.

4 It is accounted amongst the secrets of nature, that if friends about to part, drink part one of anothers bloud, (and so addes a part of his spirit to his own) it will come to passe, that when one is sick, or ill at ease, though very far asunder, the other also will find himselfe sad : which if it be true, (as it is most likely) the reason is easie to be known.

5 The Magneticall Medicine is very famous amongst Authours : with which they
do

do not cure the wound it selfe, but the instrument wherewith the wound was given, or the garment, wood, or earth besprinkled with the bloud of the wound, is onely anointed: and the wound closes and heals kindly. Some deny that this is done naturally, who do not sufficiently consider the secret strength of nature. Yet examples shew that this kind of cure, with an ointment made with most naturall things, (yea with nothing but the grease of the axel-tree, scraped off from a cart) hath certain successe, without using any superstition. Wherefore it is credible, that the spirit poured out of the body with the bloud that is shed, adheres partly in the bloud, partly to the instrument it self: (for it cannot abide without matter) & being forced thence with the fat that is applied returns to its whole, and supplies that, and hereto perhaps that observation appertains concerning the venom of a snake, viper, or scorpion conveyed into a man with a bite. For if the same beast, or but the bloud or fat thereof, be forthwith applied to the wound, it sucks out the venom again, because it returns to its own connaturall. More of this kind might be observed by approved experiments.

6 Last of all, it is not unworthy of our observation, that the animall spirit doth form living creatures of another kind, rather then quite forsake the putrifying matter: namely, wormes, and such like. Now it is certain by experience, that of living creatures that are dead, and putrified those living creatures are especially bred on which they were wont to feed when they were alive. For example, of the flesh of storks, serpents are bred, of hens spiders, of ducks frogs, &c. which that it will to come to passe, if they be buried in dung, *John Poppus* ■ distiller of *Coburg*, hath taught after others. It appears then that the animall spirit is every where, and that very diligently busied, about the animating of bodies.

CHAP. XI.

Of Man.

I **A** *Man is ■ living creature, endued with an immortall soule.*

For the Creatour inspired ■ soul into him, out of himselfe, *Gen. 2. v 7.* which soul is called also *the mind and reason*, in vvhich the image of God shineth.

II *There-*

II *Therefore he is compounded of three things, a body, a spirit, and a soule.*

So the Apostle testifies. 1 Theſ. 5. 13. *Let your whole spirit, and soul, and body be kept blamelesse.* And so 1 Cor: 14. vers. 14. *He distinguisheth betwixt the spirit and the minde.* And indeed so it is: vve have a body compounded of the Elements as vvell as bruits; vve have a spirit from the spirit of the world, as vvell as they: but the soule or minde is from God. The first vve bear about is mortall: the second dissipable: but the last enduring ever without the body; as we are assured by faith. Therefore when thou seeſt a man, think that thou seeſt a King, royally cloathed, and sitting in his royall throne. For the *minde* is a King, his robe is the *spirit*, his throne the *body*.

III *The body is the Organ and habitation of the spirit: but the spirit is the habitation and mansion of the soule.*

For as the spirit dwels in the body, and guides it, as the Pilot doth the ship; so the soul dwels in the spirit, and rules it. And as a body without a spirit, neither moves it self, nor hath any sense of any thing (as it is to be seen in a dead carcasse:) so the spirit vwithout the minde, hath no reason, nor

understands any thing; as we see in brut beasts Therefore the soul uieeth the spirit for its chariot and instrument; the spirit, the body; and the body, the foresaid instruments.

I V. As the spirit is affected by the body; so is the minde by the spirit.

For as vwhen the body is diseased, the spirit is presently sad, or hindred from its action: so vwhen the spirit is ill disposed, the minde cannot performe its functions dextrously: as vve may see in drunken, melancholie, mad-men, &c. Hence it is, that the gifts of the minde follow the tempera- ture of the body; that one is more ingen- ious, courteous, chaste, courageous, &c, then another. Hence that fight within us, which the Scripture so oft mentions, and we our selves feel. For *the body and the soul*, be- ing that they are extreame (the one earthly, the other heavenly; the one brut, the other rational; the one mortall, the other immortall; are alway contrary to one another in their inclinations. Now *the spi- rit* which is placed betwixt them, ought in- deed to obey the superiour part, and keep the lower part in order as its beck. Yet ne- verthelesse it comes oft so to passe, that it is carried away of the flesh, and becomes brutish.

V Such

V. *Such a body was given to man as might fitly serve all the uses of his reasonable soule, And therefore: 1 Furnished with many Organs. 2 Erect. 3 Naked and unarmed, that it might be free of it self, and yet might be cloathed and armed any way as occasion required.*

For *the hand*, the instrument of instruments, the most painful doer of all works, vvas given to man only. He only hath obtained an erect stature, least he should live unmindful of his countrey, Heaven. Again, he only was made naked and unarmed; but both by the singular favours of God. For living creatures whilest they always bear about them their garment, (haire, feathers, shels) and their armes (sharp prickles, horns) what do they bear about them but burdens, and hindrances of divers actions? The liberty granted to man, and industry in providing, fitting and laying up all things for his use and pleasure, is something more divine.

VI. *A more copious and pure spirit was given to man, and therefore his inward operations are more excellent, namely a quicker attention, a stronger imagination, a surer memory, more vehement affections.*

The first appears from the braine , which is given in greater plenty to man then to any living creature , (considering the proportion of every ones body.) For all that round head, and of so great capacity , is filled up vvith brain ; to what end ? but that the spirit might have a more spacious vvork-house and palace. The rest are known by experience as followeth.

VII *Attention is a considerate receiving of the objects , brought into the sensorie instruments.*

We said in the former Chapter , that it is commonly called *the common sense*. This vv as given to man so much the quicker , as it is destinated to more objects , and more distinctly to be perceived.

VIII *Imagination , is the moving of things perceived by the sense within , and an efformation of the like.*

For the image of the thing seen , heard, or touched with attention ; presently gets into the brain , which the spirit by contemplation judges of , what it is , and how it differs from this or that thing ? therefore it may well be called (in this sense) the judgment. This imagination is stronger in a man, then in any living creature : so that
it

it feignes new formes of things, namely by dividing or variously compounding things conceived. And this is done with such quicknesse, that upon every occasion we imagine any thing to our selves, as vve find dreaming and waking: and by how much the purer spirit any one hath, he is so much the more prompt to think or imagine; but dullnesse proceeds from a grosse spirit.

Observe this also: That the animal spirit when it speculates forward, and drawes new images of things from the senses, is said *to learne*, when backward, resumming images from the memory, it is said *to remember*: When it is moved too and fro vvithin it self it is said to feigne somewhat. *Note also*, that from the evidence of sensation growes the degree of knowledge, for if the sense perceiue any thing a farre off, or weakly and obscurely, it is a *generall conception*: If nearer, distinctly, and perspicuously, it is a *particular conception*: for example, when I see something move a great vvay off, I gather it to be a living creature: when I come near, I know it to be a man, and at length this or that man, &c.

IX. *Memory (remembrance) is the imagination of a thing past, arising from the sense*

of a thing present, by reason of some likeness.

For vve do not remember any thing otherwise, then by a like object: For example, if I see a man, that resembles my father in his face, presently the memory of my father comes into my minde. So by occasion of divers accidents, as place, time, figure, colour, sound, &c. divers things may come to minde, where the like vvas seen, heard, &c. vvhich occasion sometimes is so slight and suddain, that it can scarce be marked, for what is quicker then the spirit?

N. Now it may be demanded: seeing that the animal spirit moveth it self so variously in the brain, yea, and other new spirit alwayes succeeding by nutrition; how is it that the images of things do not perish, but readily offer themselves to our remembrance? *Ans^w*: Look down from a bridge into the vvater gently gliding, you shall see your face unvaried though the vvater passe away. And vvhhen you see any thing tossed vvith the vvind in a free aire, the winde doth not carry away the image of the thing from thine eye: What is the cause? But that the impression of the image is not in the water,

water, nor in the aire: but in the eye, from the light reflected indeed from the water and penetrating the aire. So then in like manner, an inward impression is not really made in the brain, but by a certaine resplendency in the spirit: Which resplendency may be kindled again by any like object. Otherwise if images vvere really imprinted in the brain, we could not see any thing otherwise in our sleep, then it had once imprinted it self in the brain being seen. But being that they are variously changed, it appears that notions are made not by re-all impressions, but by the bare motion of the spirit, and the imagination of like by like.

X *An affection is a motion of the minde, coming from imaginations desiring good, and shunning evill.*

There are more affections and more vehement in a man. For bruits scarce know shame, envy and jealousy, and are not so violently hurried into fury and despaire, or again into excessive joyfulness; thence laughter and weeping still belong to man only.

XI *The minde of man is immediately from God.*

For

For the Scripture saith, *That it was inspired by God, Gen. 2. v. 7. and that after the death of the body it returns to God; that gave it, Eccles. 2. v. 7. For it returns to be judged for those things which it did in the body, whether good or evill: 2 Cor. 5. v. 10. But we are not to thinke that the soul is inspired out of the essence of God, as though it were any part of the deity: (For God is not divisible into parts, neither can he enter into one essence with the creature.) And Moses vvords found thus: And God breathed into the face of Adam the breath of life, and man became a living soule. See he doth not say that that breath (or inspiration) became a living soule, but man became a living soul) Nor yet are we to think, that the soul was created out of nothing, as though it were a new entitie; but only that a new perfection is put into the animall spirit in a man: so that it becomes one degree superiour, to the soul of a beast, that appears out of Zach. 1. v. 1. Where God testifies that he formes the spirit of man in the midst of him. Behold, he forms, and not creates it! It is the same vvord (צָרָר *Fatzar*) vvhich is used of the body also; Gen. 2. v. 7. As therefore the body is formed of the præ-existent matter, so is the soul*

of

of the præ-existent spirit of the world. And by consequent even as the earth, water, air, and skie, are all one matter of the world, differing only in the degree of their density: so the *naturall, vitall, animall*, and this *mentall spirit*, are all one spirit of the world, differing only in the degree of their purity and perfection. Therefore it is credible, that the divine inspiration - conferred no more upon man, but this, that he 1 refined the inmost part of his spirit, that in subtility of actions he might come nearest to God of all visible creatures. 2 Fixed it, that it might subsist both in the body and out of the body. Therefore the Scripture makes no other difference betwixt the spirit of a man and of a beast, then *that the one ascends upwards, the other goes downwards*, (that is the one flees out of the matter, the other slides back into the matter) *Eccles. 3. v. 21.* Hence also that question, *W. ether the soul be propagated by generation?* may be determined. The root of the soul which is the vitall and animall spirit, is certainly by generation: but the formation thereof (that the inmost parts thereof should become the mentall spirit, or the minde) God attributes to himself, *Zach. 12. 1.* Yet not
con-

concurring extraordinarily, or miraculously, but because he hath ordained that it shall be so in the nature of man. It appears also, *why man is commonly said to consist of a body and a soule only?* namely, because, *the rati-
onall soule is of the spirit, and in the spirit.* For as our body is made of a four-fold mat-
ter, that is, of the four Elements: so our
soule (to speak generally, and contradistin-
guish it from the body) consists of a four-
fold spirit, Naturall, Vitall, Animall, and
Mentall.

*XII There are three faculties of the mind
of man, the Understanding, the Will, and the
Conscience.*

These answer to the three functions of
the animall spirit, or to the *inward senses* ;
out of which also they result. For we have
said, that as the spirit useth the body for
its Organ, so the soule useth the spirit.
Therefore the three inward senses, *Atten-
tion, Judgement, and Memory*, are instru-
ments by which the soule useth the Under-
standing, Will, and Conscience. For by dili-
gent attention it begets understanding of
things: by imagination or judging, choise,
that is, to will or nill: by remembrance,
conscience.

XIII The understanding is a faculty of the reasonable soule, gathering things unknown out of things known, and out of things uncertain compared together, drawing things certain, by reasoning.

XV To reason is to enquire the reasons and causes why any thing is, or is not, by thinking thereon.

For the mind or reason doth from the experiments of the senses gathered together, first form to it selfe certain generall notions: as, when it seeth that the fire scorseth all things, it formes to it selfe this rule as it were: *All fire burneth, &c.* Such kind of experimentall notions they call principles, from which the understanding, as occasion is offered, frames discourse. For example, if gold melt with fire, then it is hot also, and burns when it is melted. Whence follows this conclusion: therefore if the Workman pour gold into his hand he is burnt therewith. See here is understanding, and that of a thing never seen! to which a brute cannot attain For they do not reason but stay simply upon experiments. As if a dog be beaten with a staffe, he runs away afterward at the sight of a staffe, because his late suffering comes into his memory:

mory: but that he should reason, (for example, a staffe is hard; and pain was caused me with a staffe: therefore every hard thing struck against the body causeth pain:) this he cannot do, therefore *intelligere*, to understand, is *inter legere*, that is, amongst many things to chuse and determine what is truly, and what is not.

XV When ratiocination doth cohere with it selfe every way, it begets verity: if it gape any where, error.

XVI Promptnesse of reasoning is called Ingenuity; solidity, Judgement; defect, Dullnesse

For he is *Ingenious*, who perceives and discourseth readily: he *Judicious* that with a certain naturall celerity giveth heed whether the reasoning cohere sufficiently every way. He is dull that hath neither of them. The two first are from *the temperature of blood and melancholy*; the last comes from abundance of flegme. For melancholy (understand not grosse and full of dregs, but pure) tempered with much blood, giveth a nimble wit; but moistned with lesse, a piercing and constant judgement: which is made plaine by this similitude. A glasse receiving and rendring shapes excellently

lently, is compounded of three exceedings: exceeding hardnesse, exceeding smoothnesse, exceeding blacknesse: for the smoothnesse receives shapes: hardnesse retains them: the blacknesse underneath clears them. (Hence the best sort of glasses are of steel, those of silver worse, and of glasse better: by reason of their greater smoothnesse and hardnesse under which some black thing is put, or cast, that it may adhere immediately: For instance, lead. If it could be iron or steel, it is certain, that the images would be the brighter for blackness.)

So the animall spirits, receiving agility from pure *bloud*, strength and constancy from *Melancholy*, make men *ingenious*: and when the prevailing melancholy clarifies the imagination; *Judicious*, too much *flegme* overflowing both, makes men *stupid*. *Yellow choler* conferreth nothing but mobility to the affections: whence it is not without cause, called the whetstone of wits.

XVII The understanding begins with universals, but ends in singulars.

We have observed the same touching the senses, upon the eighth Aphorisme. For there is a like reason for both, in as much as the intellect considering any object, first
knows

knows that it is something ; and afterwards enquires by discoursing what it is, and how it differs from other things, and that alwayes more and more subtilly. For universals are confused, singulars distinct. Therefore the understanding of God is most perfect, because he knowes all singularities, by most speciall differences : Therefore he alone truly knoweth all things. But a man by how many the more particulars he knows, and sees how they depend upon their generals, by so much the wiser he is. Therefore *Aristotle* said not rightly, *That sense is of singulars, but understanding of universals.*

XVIII The will is a faculty of the reasonable soul, inclining it to good fore-known, and turning it away from evill fore-seen.

For the soule works, that whereunto the will enclines ; and the will enclines, whither the understanding leads it. It follows this for its guides every where : and erres not unlesse it erre. As, when a Christian chuseth drunkennesse rather then sobriety, (though he be taught otherwise) he doth it, because the intellect deceived by the sense, judgeth it better to please the palate, then to be tormented with
thirst,

thirst, (though perverse.) Therefore we must have a special care, least the intellect should erre, or be carried away with the inferiour appetite. It appears also from thence, that if all men understood alike, they would also will and nill alike: but the diversity of wils, argues a diversity of understanding.

XIX If the will prudently follow things that are truly good, and prudently avoid things that are truly bad, it begets virtue; if it do the contrary; vice.

For virtue is nothing else, but a prudent, and constant, and ardent shunning of evill, and embracing of good: vice, on the contrary, is nothing but a neglecting of good, and embracing of evill.

XX The conscience of man, is an intellectuall memory of those things which reason dictates either to be done, or avoided; and what the will hath done or not done according to this rule; and what God hath denounced to those that doe them, or doe them not.

Therefore the function of it in the soule is three-fold: to warn, testifie, and judge of all things that are done, or to be done. See by the Wisdome of God an inward.

Q

moni-

Monitor, Witnesse, and Judge, 'and always standing by, given to man! woe be to him that neglects this Monitor, contemnes this Witnesse, throwes off the reverence of this Judge!

X X I It appears out of that which hath been said, that ~~man~~ is well termed μικρόκοσμος, a little world. Because

1 *He is compounded of the same that μακρόκοσμος, or the great World is: matter, spirit, light.*

2 *He resembles the universe in the site of his members: for as that is divided into three parts, the Elementary, the Cœlesti- all, and the Supercœlesti- all: so a man hath three ventres or bellies; the lowest which serves for nutrition: the middle-most (or the breast) wherein is the work-house of life, and the fountain of heat: the high- est (or the head) in which the animall spi- rits, and in them reason, the image of God, inhabits.*

3 *There is an analogy betwixt the parts of the world, and the parts of the body. For example; Flesh represents the Earth; Bones the Stones; Bloud and other humours, Waters; Vapours, of which the body is full, the air; the vitall spirit, the Heaven, and*

and Stars; the Haires, Plants; but the seven Planets are the seven vitall Members in our body: for the Heart is in the place of *the Sun*; the Brain, of *the Moon*; the Spleen, of *Saturn*; the Liver, of *Jupiter*; the Bag of Gall; *Mars*; the Reins; *Venus*; the Lungs, *Mercury*, &c. Lastly, certain creatures shew forth their virtues in certaine parts of the body. For example, some herbs cure the Lungs; some the Liver, &c. which shews a certain analogy of the Microcosme to the Macrocosme, though not well known to us.

XXII Also Man is not absurdly called
ὁ πᾶν, or the all; because;

1 *He hath his body from the Elements; his spirit from Heaven, his mind from God: and so in himselfe alone he represents the visible and the invisible world.*

2 *Man is all, because he is apt to be all; that is, either most excellent, or very base. For if he give himselfe to earthly things, he becomes brutish, and falls back again to nothing: if to heavenly things, he is in a manner deified, and gets above all creatures.*

CHAP. XII.

Of Angels.

WE joyn the treatise concerning Angels with the Physicks; because they also are a part of the created World, and in the scale of creatures next to man; by whose nature, the nature of Angels is the easier to be explained. Therefore we will conclude it in some few Aphorismes.

1 There are Angels.

Divine testimonies, and apparitions testify that: and also a *three-fold reason*. 1 Vapours, concretes, plants, living creatures are mixt of water and spirit. Now there is matter without spirit (the pure Element;) therefore there is spirit also without matter.

2 As the matter of the world is divided into four kinds, (the four Elements) so we see already the spirit of the world to be distinguished into the naturall, vitall, animal, and mentall spirit. Now the lowest degree is to be found alone (as in concretes.) Therefore the highest may be found alone, to wit, in the Angels. 3 Every creature is

com-

compounded of Entitie, and Nihility. (For they were nothing before the creation : but now they are something ; because the Creator hath bestowed on them of his Entitie, more or lesse by degrees. By how much the more entitie any thing hath, so much the further it is from nihility : and on the contrary.) Seeing then then that there is the first degree from nihility, (that is a *Chaos*, the rudiment of an Entitie :) without doubt there is the last also, which comes nearest to a pure Entitie. But man is not such : because having matter admixt, he partakes much of nihility. Therefore of necessity there is a creature, with which, materiality being taken away, all other perfections remain. And that is an *Angell*.

II *An Angell is an incorporeall man.*

An Angell may be called a man, in the same sense that man himselfe is called an animall, and an animall, a plant ; and a plant, a concrete, &c. (as we have set down in their definitions :) that is, by reason of the forme of the precedent included, with a new perfection only super-added. For a man is a rationall creature made after the Image of God, immortall : so is an *Angel*, but for more perfections sake free from a

body. Therefore an Angel is nothing but a
~~form~~ without a body: A man is nothing but an
 Angel clothed with a body.

But that Angels are incorporous, appears
 1 Because although they be present, they
 are not discerned neither by the sight, or
 any other sense. 2 Because they assume to
 themselves earthly, watery, aery, fiery,
 or mixt bodies, as need requires; and put
 them off again; which they could not do,
 if they had bodies of their own as we have.
 Yet ordinarily they appear in an humane
 forme, by reason of the likenesse of their
 natures, as we have said.

III *Angels were created before all visi-
 ble things.*

That was shewed in the Appendix of the
 first Chapter: you may see it again, if need
 be. And Moses words are clear: *In the be-
 ginning God created the heaven and the earth:
 and the earth was void.* See the earth was (in
 that first production) emptie and void!
 Therefore heaven was not void: then it
 was filled with its host, the Angels.

IV *The Angels were created out of the Spi-
 rit of the world.*

As Moses seems to comprehend the pro-
 duction of Angels under the name of Hea-
 ven,

ven, so also the universall Spirit. For he doth not say, that this was created with the earth: but he pronounceth abruptly after the creation of the earth, *that the Spirit of God moved it selfe upon the waters*: intimating thus much that it was in being before. We conclude, therefore that the Angels were formed out of that Spirit; so that part of that spirit was left in the invisible heaven, and shaped into meer spirituall substances, [*Angels*;] and part sent down into the material world below. After the same manner, the fire was afterward partly left in the Skie, and fashioned into shining Globes: and partly sunk into the bowels of the earth, for the working of minerals, and other uses. That which follows makes this opinion probable, (if not demonstrable.)

1 Principles should not be multiplied without cause. Seeing therefore that the Scripture doth not say, that they were created out of nothing, nor yet names any other principle, why should we not be satisfied with those principles that *Moses* hath set down?

2 Angels govern the bodies which they assume, like as our spirit inhabiting the

matter doth: Therefore they are like to it.

3 There is in Angels a sense of things, as well as in our spirits. (For they see, hear, touch, &c. though they themselves be invisible, and intangible. Also they have a sense of pleasure and griefe: for as much as joyes are said to be prepared for the Angels, and fire for the divells, (into which wicked men are also to be cast.) Although therefore they perceive without Organs, yet we must needs hold that they are not unlike to our spirit which perceiveth by organs.

V *The Angels were created perfect.*

That is finished in the same moment, so that nothing is added to their essence by adventitious encrease. For being that they are immateriall, they are also free from the law of materiality: that is (when a thing tends to perfection) to be condensed, fixed, to encrease, and so to be augmented, and become solid by certain accessions.

VI *Angels are not begotten.*

Men, Animals and Plants, are generated, because the spirit included in the matter, diffuseth it selfe with the matter, and essays to make new Entities. But an Angel being

being that it is without matter, and its essence cannot be dissipated, hath not whether to transfuse it selfe. Hence Christ saith, that in Heaven we shall be as the Angels, without generation, or desire of generation, *Mat. 22. 30.*

VII *Angels die not.*

The spirit of Animals and of Plants perisheth, because when the matter (that is, its chariot) is dissipated, it also is dissipated. But an Angell having his essence compacted by it selfe, without matter, cannot be dissipated: and therefore endures.

VIII *The number of Angels is in a manner infinite.*

See *Job 25. v. 2, 3.* yet *Daniel* names thousands of thousands, and myriads of myriads, *Dan. 7. 10.* as also *John, Apoc. 5. 11.*

IX *The habitation of the Angels is the Heaven of Heavens, Mat. 18. v. 10. and 6. v. 10.*

Therefore they are called the Angels of Heaven, (*Gal. 1. v. 8.*) and the Host of Heaven, (*1 King. 22. v. 19.*) for it was meet, that as the earth, sea, air, and skie, have their inhabitants, so also that the Heaven of Heavens should not be left empty. Yet they are sent forth from thence for these following Ministeries.

X God

X *God created the Angels, that they might be,*

1 *The delight of their Creatour.*

2 *The supream spectators of his glory.*

3 *His assistent Ministers in governing the World.*

The Scripture teacheth this every where : but they also point at names given them. The first appellation of Angels is in *Gen. 3. v. 24. Cherubim*, that is, *Images*: wherein is intimated that they were made after the image of God, as well as men. *But note what it is to be made after the image of God.* The essential image of God, or the character of his substance, is the Son, his eternall Wisdome, *Heb. 1. v. 3.* after the likeness of him therefore, men and Angels are said to be created: that is, made understanding creatures: in which respect also they are called *the Sons of God*, *Job. 1. v. 2.* seeing then that an Image delights him, whose Image it is, it is intimated that God made the Angels primarily for himselfe, that he might have some, who being cohabitants with him, might behold his glorious Majesty face to face, and be partakers of eternall beatitude. Now the most common name of Angels in the Old Testament,

ment is מַלְאָכִים *Malachim* that is, *Embassadors*: in the New Testament ἀγγελοι, that is, *messengers*; because God created these to be rulers and governours of the World. For whensoever the course of nature is to be hindered, or any thing is to be wrought beyond the ordinary order of nature, God useth their assistance. For example, When the fire was to be cooled, that it should not burn, (*Dan. 3. v. 25, 28.*)

Or the mouthes of lions to be stopped, that they should not tear *Daniel*, (*Dan. 6. v. 22.*)

Or the enterprises of the wicked to be hindered, (*Numb. 22. v. 22.*)

Or any to be killed by a sudden death, (*Exod. 12. v. 23. and 1 Chron. 22. v. 15. and 2 Chron. 32. v. 21. and Acts 12. v. 23.*)

Or the godly to be delivered from danger, (*Gen. 19. v. 1.*)

Or travellers to be guided in their way, (*Psal. 91. v. 11.*)

Or to be preserved in any chance, lest they should be dangerously hurt, *Psal. 91. 12.*

Or to be warned any thing in a dream, or otherwise, *Mat. 1. 20. &c.*

Hence they are thought also to be added to certain persons peculiarly, (*Heb. 1. 14. Mat. 18. 10. Acts 12. 15.*) that they may accom-

accompany them every where, (*Psal.* 91. 11.) and be witnesses of all our actions, (*1 Cor.* 11. 9. *1 Tim.* 5. 21.) but especially that they are sent to defend Kings and Kingdoms, (*Dan.* 10. 12. &c.) Hence also they are called, watchers or keepers, (*Dan.* 4. 10. 20.)

XI *Angels can act upon bodies, but they cannot suffer from bodies.*

Both these appear by the effect. For Angels bear about, move and governe the bodies which they assume: but those that are separated, they overthrow, stay and move from place to place with externall violence, at their pleasure; yet they themselves in the meantime can be hindred or stayed by no body.

XII *The power of Angels exceeds the strength of any corporall creature.*

For it operates 1 without resistance of the objects by penetrating. 2 without endeavour or enforcing, being that they are not deteined or hindred by their own body, as our spirit is: which being tied to the body, must of necessity draw it along with it laboriously, as the snail doth her shell. Hence the Angels are called *Mighty in power*, (*Psal.* 103. 20.) and *Powers, Principalities, Dominions*, (*Col.* 1. 16.)

XIII *The*

XIII *The agility of the Angels is greater then of any corporeall substance.*

Hence they are compared to Wind and to Fire, and to Lightning, *Psal. 104. 4. Ezech. 1. 13. Luke 10. 18.* and they are called *Seraphim*, that is, *flamy*, *Isai. 6. 2.* yet it is certain that they move swifter then wind or lightning, when they passe any whither. For the wind and lightning penetrate the air, not without resistance, but an Angell, being a meer spirit, doth it without any resistance. It appears then, that though an Angell be not in many places at once, (*Dan. 10. 13. 20.*) yet they can in a moment passe themselves whither they will. Hence it is that one Angell was able to slay a whole army in a night; and also to smite the first born of the *Aegyptians*, throughout all the Kingdom, *Isai. 37. 36. Exod. 12. 23. and 2 Sam. 24. 6.*

XIV *The knowledge of Angels is far more sublime then mans.*

And that 1 because of the clearnesse of their understanding, which nothing obumbrates. 2 by reason of their power to penetrate any whither, and see things plainly. 3 because of their long experience for so many ages. (Whereas we are but of yesterday

yesterday, *Job* 8. 9.) and yet they are not omniscious. For they know not the decrees of God, before they be revealed. 2 future contingents. 3 the thoughts of mans heart. (*Jer.* 17. 9. 10.) that is, so long as they are concealed in the heart. For when they are discovered by gestures & effects, they discern them. For if we by the effects, are not altogether ignorant of their thoughts (*2 Cor.* 2. 11.) wherefore should not they be a thousand times more quick sighted upon us.

N. W. How that part of the Angels falling into evill, exercise perpetuall hostility with mankind: and God makes use of them to be as it were executioners to wicked men: but hereafter he will condemne them both; in like manner, as good men are to enjoy the association of good Angels: and lastly, how the frauds of those are to be avoided, but the presence of these to be procured, to teach that belongs to sacred Divinity.

THE EPILOGUE.

THus we have seen that the created World is a meer harmony. All things
 ty

by one, all things to one; the highest and the lowest, the first and the last, most straightly cleaving together, being concatenated by the intermediate things, and perpetuall ties, and mutuall actions and passions inevitable, so that the world being made up of a thousand thousand parts, and particles of parts, is nevertheless one, and undivided in it selfe; even *God the Creatour thereof, is one from eternity to eternity, nor ever was there, is there, or shall there be any other God, (Isai. 43. 10. &c.)*

And we have seen that all these visible things are made out of three principles, Matter, Spirit, and Light: because he who is the beginning and the end of all things, *α and ω*, that thrice blessed and omnipotent God three in one, is he of whom, and through whom, and in whom are all things, *Rom. II. 36.*

We have seen also that admirable scale of creatures, arising out of the principles, and ascending by a septenary gradation. For we have understood, that whatsoever there is besides God, it is either an Element, or a Vapour, or a Concrete, or a Plant, or an Animall, or a Man, or an Angell; and that the whole multitude

tude of creatures, is ranked into these seven Classes, or great Tribes. In every of which there is some eminent virtue flowing from the essence of the Creatour (yet every latter including the former.) For

	Elements, Being	
In	{ Vapours, Motion Concretes, Figure, or Plants, Life. Living creatures, Sense. Men, Reason. Angels, Understanding. }	(Quality) is eminent.

See the house which Wisdome hath built her, having hewn out her seven pillars! (Prov. 9. 1.) See the seven Stairs which the King of Heaven hath placed in the entry of his inner house! Ezek. 40. 22. The six first degrees are of visible creatures, the seventh of invisible Angels: After the same manner, as there were nine dayes wherein God wrought, and rested the seventh; six Planets in heaven of inferiour light, the seventh of extraordinary brightnesse, the Sun; six baser metals on earth. The seventh exceeding all in perfection, gold, &c. And as Salomons Throne had six inferiour steps to every of which there were six inferiour

Leoncels adjoynd: after all in the seventh place stood the Throne, and by it two *Lions* (1 King. 10. 19, 20.) So the King of eternity, when he built him a visible throne of glory, erected six visible degrees of corporeous creatures, to every of which he added their *Leoncels*, that is, their virtues, and their powers, and last of all, about the throne on high, he placed the strongest of the creatures, *the Angels mighty in power*, (*Psal.* 103. 19, 20.)

But now what mean the seven planets in heaven? what mean the seven continents on earth? the seven kinds of meteors, seven kinds of metall, seven kinds of stones, &c? the seven combinations of tangible qualities? the seven differences of taste? the seven vitall members in man? the seven tones in musick? and other things which we meet with throughout all nature? yea, and in the Scripture the number of seven is every where very much celebrated, and sacred: For what do the seven dayes of the week point at? what are the seven weeks betwixt the Passover and Pentecost? what the seventh year of rest? what the seven times seventh of *Jubilee*? what do all these portend I say, but that it is, the expresse image of that *God, whose seven eyes passe*
R through

through the whole earth? (Zach. 4. 10.) and whose seven spirits are before his Throne, (Apoc. 1. 4.) yea, who doth himselfe make a mysticall eighth with every degree of his creatures. For in him all things live, and move, and have their being; which live and move, and have a being (Acts 17. 28.) and he worketh all in all, (1 Cor. 12. 6.) and all these are as it were him himselfe, (Eccles. 43. 2.) and yet none of them is he himselfe, (Job 12. 9. 10.) but because all these have some effigies of the divine essence, and operate that which they operate by virtue thereof; hence it is, that he being above all, without all, and beneath all, is the true mysticall eighth of all. Of whom (that Syracides may conclude our meditation, though we say much, we shall not yet attain thereto. The sum of the doctrine is, that he is all. For what ability have we to praise him? For he is greater then all his works. The Lord is terrible and very great, & marvellous is his power. Extol the Lord in praise as much as you can: For yet he wil be greater then all praise, (Eccl. 43. 20. &c.) Therefore let every spirit praise the Lord, Hallelujah. (Psal. 150.) And thou my soul praise the Lord (Psal. 103. 1.) Holy, holy, holy, Lord of Hosts! Heaven and earth are full of his glory, (Isai. 6. 3) Hallelujah.



A Short

A P P E N D I X
 TO
P H Y S I C K S.

Touching the Diseases of the Bo-
 dy, Mind, and Soul, and their
 generall Remedies.

I.



*Disease is the corruption of an En-
 tity in some part thereof, and a dis-
 position of it to totall perishing (that
 is death.)*

Therefore both the Body, Mind, and
 Soul, hath its diseases.

*I I The diseases of the body are various,
 scarce to be numbred; and oft-times mixt.*

A disease added to a disease is called a
symptome of a disease.

III A disease of the body is either by solution of that which is continued, or by distemper of humours.

IV Solution of that which is continued, is either by a rupture, or a wound. A rupture is prevented by bewareing falls, and violent motion. A wound is avoided by shunning of those things, which can cleave, cut, prick, rent, tear or braise, or hurt anyway: and both are to be cured by the Chirurgeon.

N. W. The cure of a Wound, is desperate, if any vitall member be hurt: as the heart, the brain, the liver, the entrals, &c. For then the vitall actions are hindred, and soon after cease. 2 If any member be quite lost, it cannot be set on again: because the spirit hath not wherewithall to passe into the part that is severed.

V The distempers of the humours and the diseases that come from thence, always proceed from some of these 6 causes: namely, either from

- 1 Crudity
- 2 Inflation
- 3 Distillation
- 4 Obstruction
- 5 Putrefaction
- 6 Inflammation

VI Crudity in the body is nutriment not sufficiently concocted: namely either Chyle, or blond, which comes 1 from the quality of meat and drink; when they are taken too raw, flegmatick, unwholesome, which the concoctive faculty cannot well subdue. 2 from the quantity: when more meat and drink is put in, then it is able to alter and assimilate unto the body. For hence undigested and not assimilated humours, burthen the body, like strangers, and not pertaining thereunto. 3 For want of exercise: when the naturall heat is not stirred up, nor strengthened to perform its office lustily in the concoction of meats.

From such like crudities diverse inconveniences follow. For 1 if the crudity be in the stomach, it causes loathing of food: for so long as the first food is not digested, there can be no appetite to any other. Again, children have an appetite to eat earth, chalk, coales, &c. according as the crudities are turned into the likenesse of any matter. For like desireth like. 2 If there be a viscosus crudity adhering in the ventricle or in the guts, being warmed it takes spirit, and is turned into wormes; which gnawing the bowels stir up evill vapours by

their motion : whence also come *phantasies*, very hurtfull to the head. Lastly, crudity under the skin, (in the blood and flesh) begets *palenesse* : and when it is collected and putrified ; *scabs, ulcers, &c.*

Crudity is prevented by a temperate diet, as to Food, Sleep, and daily exercises : and cured 1 by violent expurgation. 2 by strong exercises. 3 by the use of tart meats and drinks. 4 by comforting the stomach with such things, as heat, both within and without.

VII Inflation is much and grosse vapour, exhaling from the crudities that are gathered together, and stretching the members. And that either without pain as when it causeth yexing or belching in the ventricle ; panting in the heart ; giddinesse in the head (when being prohibited to go any further it is carried in a round) lazinesse and stretching in the whole body ; or else with pain, as when it causeth aches in the bowels (straightning the spirits that lie between in the Fibres) and sharp or else blunt prickings in the muscles, according as it is more grosse or subtle.

It is cured 1 by strong exercise, that the vapour being attenuated, may go out at the pores

pores opened. 2 by expurgation of the humours by which they are generated.

VIII *Distillation is the condensation of crude vapours into rheume, which is the cause of many evils.*

For crude vapours getting up to the head, when as by reason of the abundance and grossnesse of them, they cannot be expurgated by the ordinary passage, they become rheume flowing severall wayes, and causing diverse diseases. For 1 If they run abundantly, and run at the nose, they cause the *Murre* or *Pose*, 2 If the distillation fall into the jawes, it causes the *Catarrhe*. 3 If into the kernels of the jawes, the *Quinsie*. 4 If into the lungs *difficulty of breathing*, and the *Asthma*. 5 If the distillation be salt and sharp, ulcerating the lungs, it causes the *Cough*. 6 Which if it be done oft, and the lungs be filled with apostemes, it causes the consumption. For when the ulcerous lungs cannot with dexterity enough perform their office of cooling the heart, the vitall spirit is generated more hot then it should be, which doth not cherish, but feed upon the flesh and bloud, and at length burns out the very workhouse it self of the bloud, which is, the liver: whence

for want of blood, which is as it were the food, followes the consumption of the whole body. 7 If the distillation flow in abundance, and grosse down the marrow of the back, it causeth the *Palsie*, (by hindring the animall spirit, that it cannot be distributed by the nerves springing from the back bone.) 8 If it fill the nerves of the muscles onely, it becomes the *Spasma*, or *Convulsions* (that is when the nerve is contracted, like a chord being wet and dried again, is wont to be contracted, and become shorter.) 9 If it flow subtile, and penetrating the nerves, it is at length gathered together in the extremities of the members, and there raises sharp pains; which in the feet are called the *Gout*; in the hands, *Chiragra*, or the *Hand-gout*; in any of the joynts of the bones *Erthritica*, the running gout; in the hip, it is called *Ischias*, or the *Hip-gout*, commonly the *Sciatica*. 10 Lastly, if those kind of runnings stay in the head, they procure divers diseases: as when they are subtile, the *Head-ach*. 11 Too raw and flegmatick, the *Lethargie*. 12 Salt, and cholerick, the *Phrensie*. 13 Grosse and mixt with melancholy humour, the *Epilepsie*, or *Falling-sickness*, (when as the spirits diffused through
the

the whole body, making haste to relieve the spirits besieged in the brain, make most vehement stirs, and fight, till they either overcome and repell the disease, or else faint and are extinguished. 14 But if the grosse phlegmatick humours have occupied all the vessels of the brain at once, it becomes the apoplexie, that is, a privation of all sense and motion: whence also the vitall fire in the heart is soon after extinguished.

☞ *All these diseases are both prevented, and also (if they go not too farre) cured* 1 by exercise. 2 by rectification of the brain by good smels. 3 by a thin, hot, and sulphury air. 4 by thin, light meat and drink. But the peculiar cure of every disease is committed to the physiciaus.

IX *Obstruction is a stopping of the bowels by thickned flegme, whence it comes to passe that they cannot execute their office.* For example, when the entrals are stopt, that they cannot void, it is the *Volvuli*, or *wringing of the guts*: when the liver is stopt, the *dropsie*; (For the *Chylus* being not turned into bloud, flowes through the veins and members, and is not turned into members.) When the bladder of gall is stopt, the *Yellow Jaundise*; when the Spleen, the *Black Jaundise*; (For
in

in the first the choler, in the other the melancholy, when it cannot be voided, diffuseth it selfe through the bloud. But when the urine pipes, or the veins, or the bladder are stopped, that is by reason of the breeding of *Tartar*, which they call the *Stone*: which stopping the passages, by its sharpnesse pains the *Veins and Nerves*.

The cure is 1 by purgations. 2 by medicines attenuating, or breaking, cutting, and driving out the grosse humours which Physicians know.

X *Putrefaction is the corruption of some humours in the body: namely, either of flegme, or of choler, or of melancholy; which putrifying either in or out of their vessels, produce feavers or ulcers.*

The cure is 1 Expurgation of the place affected. 2 A good diet. 3 Motion.

XI *Inflamation is a burning of the vitall spirit (N. vitall) or of the bloud caused by too much motion (either of the body by wearying it, or of the mind, by musing and anger,) or else by putrefaction, or else by obstruction.*

For it is known out of the physicks, that motion doth heat even unto firing, and that by obstruction doth by an *Antiperistasis* exasperate

asperate the heat included (even in those things that are watry and putrid) so that at length it breaks out violently, hay laid up wet, (when it cannot get transpiration) doth shew. When the blood is kindled within, it becomes a *feaver*: when under the skin, *S. Antonies fire*.

The generall cure is the opening of a vein, and cooling. But of feavers (being that it is a most common disease, and of divers kinds) something more is to be said.

XII *The feaver so called, from its fervency or heat, is of three kinds. 1 The Ephemera. 2 The Putrid. 3 The Hectick. The first burns the spirits; the second the humours; the third the solid parts. The first like a raging hot wind scorching all it meets with: the second like boiling water poured into a vessell, which it heats with it selfe. The third like unto a hot vessell, heating the water poured into it with it selfe.*

For the *Hectick* occupies the bones and membranes, and eats and consumes them with an unnaturall heat, by degrees almost insensibly, till at length it causeth death. It is very like the Consumption. But the putrid or rotten feaver occupies the blood and humours; by which the whole body grows

grows hot. The Ephemera is a more sub-
 le flame, feeding upon the spirits only : and
 therefore it scarce endures one or two days,
 till the peccant cause be consumed by the spi-
 rit it self. Hence either health or death usu-
 ally follows within two or three dayes ; and
 therefore it is called the Ephemera or dia-
 ry Fever : also the *Maligne* fever. Of
 which sort also is the pestilentiall infection :
 for it comes after the same manner.

Putrid fevers are most usuall, but with
 very much difference : for when the hu-
 mours putrifie within their vessels, (or
 workhouses) especially near the heart, (in
 the liver or the gall,) the spirit rises against
 them, and kindles them : and ceases not to
 assault them, till it either expell the rotten-
 nesse being turned into soot, or be extin-
 guished it selfe ; and therefore this fever is
 often deadly, it is called the *Continuall*
Fever.

But if the humours rot out of their ves-
 sels, that is, in the veins or members, it is
 an *Intermitting Fever*. For the spirit ri-
 seth up at certain times, and opposeth that
 rottenness : with heat : but because this
 battle is made further off from its Castle,
 the heart, when the fight is ended, it re-
 turns

turns home. And if the putrifying humour be flegme, it still ~~recruits~~ to oppose it the next day: hence the Quotidian Feaver. If it be yellow, cholera; then every third day. Hence the Tertian. If black cholera, the fourth day. Hence the Quartan: the cause of the inequality, is because the flegme recollects it selfe soonest, and makes new businesse for the spirits: but is withall sooner dissipated: Hence the Quotidian lasts not long. Melancholy being that it is a dreggy humour, doth not so soon recruit it selfe: but because it is soft and viscous, it is not so easily overcome: hence the long continuance of Quartans, In the Tertian, because the spirit opposeth yellow cholera, which is hot of it selfe, is made the hottest fight: hence Tertians are called burning feavers. They are sometimes changed one into another, or one joyned with another, according as one while one putrified humour, another while another is to be opposed.

Hence it appears I Why a feaver begins with cold? because the vitall spirit being to oppose the rottenesse, gathers heat as it were its aid from every part, the outward members in the mean time being benumbed,
and

and quaking with cold. (For even in too much fear, when the spirit gathers it selfe into the inward parts, there is wont to follow a chilnesse of the outward members, and a quaking with cold.) 2 *Whence afterwards heat?* because the spirits, after they are hotter with fight and motion, return again to the members; which, being cold before, do so much the worse endure the heat, returning now hotter then ordinary. 3 *Why the feaver leaves faintnesse behind it?* because the spirit wearied with fight, betakes it selfe to rest, leaving the members destitute. 4 *Why food is hurtfull at the beginning of a feaver?* because when the spirit is preparing it selfe for the battell, it hath another businessse put upon it, (to concoct the food :) But seeing that it is not able to do both, it either assaults the disease more weakly, or else leaves the food unconcocted: or at least, if it do both, it weakens and tires out it selfe too much. 5 *Why it is dangerous to expell the feaver over soon?* because the feaver is of it selfe a benefit to nature, driving away the rottenesse in time, lest it should at length prevaile and oppresse the heart. Therefore that is no good cure of feavers which staves the fits, but that which

ripens the rotnenneſſe for expulſion. And ſtrengthens nature to oppoſe them, which I leave to Phyſicians.

Let this be the ſum of that which hath been ſaid, Crudity is the ſeed of all diſeaſes. For thence groſs vapours ariſing, cauſe Inflation, the ſame condensed in the head, cauſe, Diſtillation : in the other members, Obſtruction: whence flowes either Rottenneſſe or Inflammation. Therefore let him that prevents crudities, believe this; that he takes the beſt courſe that may be for his whole body. Now the way to prevent them is a temperate diet and daily exerciſes. O the ſtrange virtue of labour, whereby we get both our bread and health! which miſtery if the ſlothfull underſtood, they would not waſte their lives with idleneſſe.

Of the Diſeaſes of the Mind.

I The Diſeaſes of the mind are vices, procuring either diſquiet, or griefe thereto.

II Diſeaſes diſquieting the mind, are evill deſires; that is, too much ardency. 1 Of Living. 2 Of Eating and Drinking. 3 Of Multiplying it ſelfe. 4 Of Knowing. 5 Of Having. 6 Of Excelling.

N. W. Theſe are thus expreſſed by their proper names, 1 Selfe-love. 2 Intemperancy. 3 Salacity. 4 Curioſity. 5 Covetouſneſſe. 6 Ambition. For they that are given to theſe, itch and are diſquieted continually.

III The diſeaſes that cauſe griefe to the mind, are immoderate affections; that is violent alterati-

ons for ~~the~~ things which befall us according to our desires, or contrary thereto: but especially Sadnesse, Angor, and at Irksomnesse of life.

IV The remedies of the mind are held forth in the *Ethicks*. The Sum whereof comes to this. Love the Golden Mean, shun extreame like unto precipices. Never desire to do more then thou canst: Remember that thou art a man. For that may befall every one that befalls any one. There is a vicissitude of all things, an unconquered mind overcomes all things, &c.

Of the Diseases of the Soule.

I The Diseases of the Soule are, Forgetfulnesse of God, Torment of Conscience, and Despair of Mercy.

II Forgetfulnesse of God is cured by the Fear of God. Of, I say, that God, who seeth all, judgeth all, rewardeth all, to every one according to his works: to avoid whose hand, it is impossible. (For in him, we move, live, and have our being,) but to endure it is intolerable. (For he is a consuming fire, &c.)

III Torment of conscience is healed by prayers, and study of innocency, *Psal.* 26.6. *Eccl.* 12.13, 14. For if our heart condemn us not, we have full assurance, &c. *I John* 3.21.

IV Despair is healed by the blood of that onely Lamb of God, which purgeth us from all sin, *I Job.* 1.7. and reconciles us to his Father, *Rom.* 3.25. and saves us, *Rom.* 5.9. and gives us eternall life, *Job.* 6.54

In body sound, a mind as sound, O God we pray thee
give,

That here in peace, in after blisse; for ever we
may live.

FINIS.

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