

think that (at least among inanimate bodies), by the intervention of some very small *addition* or *subtraction* of matter (which yet in most cases will scarce be needed), and of an orderly *series of alterations*, disposing by degrees the matter to be transmuted, almost of any thing may at length be made any thing: as, though out of a *wedge* of gold one cannot immediately make a *ring*, yet by either wire-drawing that wedge by degrees, or by melting it and casting a little of it into a mould, that thing may easily be effected. And so, though water cannot immediately be transmuted into oil, and much less into fire, yet if you nourish certain plants with water alone (as I have done), till they have assimilated a great quantity of water into their own nature, you may, by committing this transmuted water (which you may distinguish and separate from that part of the vegetable you first put in) to distillation in convenient glasses, obtain, besides other things, a true oil, and a black combustible coal (and consequently fire): both of which may be so copious, as to leave no just cause to suspect that they could be anything near afforded by any little spirituous parts which may be presumed to have been communicated, by that part of the vegetable that is first put into the water, to that far greater part of it which was committed to distillation.

But, Pyrophilus, I perceive the difficulty and fruitfulness of my subject have made me so much more prolix than I intended, that it will not now be amiss to contract the summary of our hypothesis, and give you the main points of it with little or no illustration, and without particular proofs, in a few words. We teach, then (but without peremptorily asserting it):

1.²⁶ That the matter of all natural bodies is the same, namely, a substance extended and impenetrable.

2. That all bodies thus agreeing in the same common matter, their distinction is to be taken from those accidents that do diversify it.

3. That motion, not belonging to the essence of matter (which retains its whole nature when it is at rest), and not being originally producible by other accidents as they are from it, may be looked upon as the first and chief *mood* or affection of matter.

4. That motion, variously determined, doth naturally divide the matter it belongs to into actual fragments or parts; and this division obvious experience (and, more eminently, chemical operations)

manifest to have been made into parts exceedingly *minute*, and very often too minute to be singly perceivable by our senses.

5. Whence it must necessarily follow that each of these minute parts or *minima naturalia* (as well as every particular body made up by the coalition of any number of them) must have its determinate *bigness* or *size*, and its own *shape*. And these three, namely *bulk*, *figure*, and either *motion* or *rest* (there being no mean between these two), are the three *primary* and most *catholic moods* or affections of the *insensible* parts of matter, considered *each* of them *apart*.

6. That when *divers* of them are considered *together*, there will necessarily follow here below both a certain *position* or *posture* in reference to the horizon (as erected, inclining, or level) of each of them, and a certain *order* or placing before or behind or besides one another (as, when in a company of soldiers one stands *upright*, the other *stoops*, the other *lies along* upon the ground, they have various *postures*, and their being placed *besides* one another in ranks and *behind* one another in files are varieties of their *order*); and when many of these small parts are brought to convene into one body from their *primary affections* and their disposition or *contrivance* as to *posture* and *order*, there results that which by one comprehensive name we call the *texture* of that body. And indeed these several kinds of *location* (to borrow a scholastical term), attributed (in this 6th number) to the minute particles of bodies, are so near of kin that they seem all of them referable to (that one event of their convening) *situation* or *position*. And these are the affections that belong to a body, as it is considered in itself, without relation to *sensitive* beings or to other natural bodies.

7. That yet there being men in the world, whose organs of sense are contrived in such differing ways that one sensory is fitted to receive impressions from some, and another from other sorts of external objects or bodies without them (whether these act as entire bodies, or by *emission* of their corpuscles, or by *propagating* some motion to the sensory), the perceptions of these impressions are by men called by several names, as *heat*, *colour*, *sound*, *odour*, and are commonly imagined to proceed from certain distinct and peculiar qualities in the external object which have some resemblance to the ideas their action upon the senses excites in the mind: though indeed all these sensible qualities, and the rest that are to be met with in the bodies without us, are but the effects or consequents of the above-mentioned *primary affections* of matter whose operations are

diversified according to the nature of the sensories or other bodies they work upon.

8. That when a portion of matter, either by the *accession* or *recess* of corpuscles, or by the *transposition* of those it consisted of before, or by any *two* or *all* of these ways, happens to obtain a *concurrence* of all those qualities which men commonly agree to be *necessary* and *sufficient* to denominate the body which hath them either a *metal*, or a *stone*, or the like, and to rank it in any peculiar and determinate species of bodies, then a body of that denomination is said to be *generated*.

9. This *convention of essential accidents*, being taken (not any of them apart, but all) *together* for the specifical difference that *constitutes* the body and *discriminates* it from all other sorts of bodies, is by one name, because considered as one *collective* thing, called its *form* (as beauty, which is made up both²⁷ of symmetry of parts and agreeableness of colours): which is consequently but a certain *character* (as I sometimes call it), or a *peculiar state of matter*, or, if I may so name it, an *essential modification* – a *modification*, because it is indeed but a determinate *manner of existence* of the matter, and yet an *essential modification*, because that, though the concurrent qualities be but accidental to matter (which with others instead of them would be matter still), yet they are *essentially necessary* to the particular *body*, which, without those accidents, would not be a body of that denomination, as a *metal* or a *stone*, but of some other.

10. Now a body being capable of many *other* qualities *besides* those whose convention is *necessary* to make up its form, the *acquisition* or *loss* of any such quality is by naturalists, in the more strict sense of that term, named *alteration*, as when oil comes to be frozen, or to change colour, or to grow rancid; but if all or any of the qualities that are reputed *essential* to such a body come to be *lost* or *destroyed*, that notable change is called *corruption*: as, when oil being boiled takes fire, the oil is not said to be *altered* in the former sense, but *corrupted* or *destroyed*, and the emergent fire *generated*; and when it so happens that the body is *slowly corrupted*, and thereby also acquires *qualities offensive to our senses*, especially of *smell* and *taste* (as when flesh or fruit grows rotten), that kind of corruption is by a more particular name called *putrefaction*. But neither in this nor in any other kind of corruption is there anything *substantial* destroyed (no such thing having been produced in generation, and matter itself being on all hands acknowledged *incorruptible*), but only that *special connexion of the parts*, or *manner of their co-existence*, upon whose account the matter,

whilst it was in its former state, was, and was called, a stone or a metal, or did belong to any other determinate species of bodies.

OF THE ORIGIN OF FORMS²⁸

The origin of forms, Pyrophilus, as it is thought the *noblest*, so, if I mistake not, it hath been found one of the most *perplexed* enquiries that belong to natural philosophy; and I confess it is one of the things that has invited me to look about for some more satisfactory account than the Schools usually give of this matter, that I have observed that the wisest that have busied themselves in explicating forms according to the Peripatetic notions of them have either knowingly confessed themselves unable to explain them, or unwittingly proved themselves to be so, by giving but unsatisfactory explications of them.

It will not (I presume) be expected that I, who now write but *notes*, should enumerate, much less examine, all the various opinions touching the origin and nature of forms – it being enough for our purpose if, having already intimated in our hypothesis what, according to that, may be thought of this subject, we now briefly consider the general opinion of our modern Aristotelians and the Schools concerning it. I say the *modern* Aristotelians, because divers of the *ancient*, especially Greek, commentators of Aristotle seem to have understood their master's doctrine of forms much otherwise and less incongruously than his Latin followers, the schoolmen, and others have since done. Nor do I expressly mention Aristotle himself among the champions of substantial forms, because, though he seem in a place or two expressly enough to reckon forms among *substances*, yet elsewhere, the examples he employs to set forth the *forms* of natural things by being taken from the *figures* of artificial things (as of a statue, &c.) which are confessedly but *accidents*, and making very little use, if any, of substantial forms to explain the phenomena of nature, he seems to me upon the whole matter either to have been irresolved whether there were any such substances or no, or to speak ambiguously and obscurely enough of them to make it questionable what his opinions of them were.

But the sum of the controversy betwixt us and the Schools is this: whether or no the forms of natural things (the souls of men always excepted) be in generation *educ'd*, as they speak, *out of the power of the*