THE

Sceptical Chymist:

OR

CHYMICO-PHYSICAL

Doubts & Paradoxes,

Touching the

EXPERIMENTS

WHEREBY

VULGAR SPAGIRISTS

Are wont to Endeavour to Evince their

SALT, SULPHUR

AND

MERCURY,

TO BE

The True Principles of Things.

To which in this Edition are subjoyn'd divers Experiments and Notes about the *Producibleness of Chymical Principles.* C

OXFORD,

Printed by *HENRY HALL* for *Ric. Davis*, and *B. Took* at the Ship in St. *Pauls* Church-Yard. 1680.

54 C

Maii 30. 1677.

Imprimatur.

HEN: CLERKE *Vice-Canc. Oxon.*

A PREFACE INTRODUCTORY

To the following Treatise.

TO give the Reader an account, Why the following Treatise is suffer'd to pass abroad so maim'd and imperfect, I must inform him that 'tis now long since, that to gratify an ingenious Gentleman, I set down some of the Reasons that kept me from fully acquiescing either in the Peripatetical, or in the Chymical Doctrine, of the Material Principles of mixt Bodies. This Discourse some years after falling into the hands of some learned men, had the good luck to be so favourably receiv'd' and advantagiously spoken of by them, that having had more than ordinary Invitations given me to make it publick, I thought fit to review it, that I might retrench some things that seem'd not so fit to be shewn to every Reader, And substitute some of those other things that occurr'd to me of

the tryalls and observations I had since made: What became of my papers, I elsewhere mention in a Preface where I complain of it: But since I writ That, I found many sheets that belong'd to the subjects I am now about to discourse of. Wherefore seeing that I had then in my hands as much of the first Dialogue as was requisite to state the Case, and serve for an Introduction as well to the conference betwixt Carneades *and* Eleutherius, *as to some other Dialogues, which for certain reasons are not herewith publish'd, I resolv'd to supply, as well as I could, the Contents of a Paper belonging to the second of the following Discourses, which I could not possibly retrive, though it were the chief of them all. And having once more try'd the Opinion of Friends, but not the same, about this imperfect work, I found it such, that I was content in complyance with their Desires, that not only it should be publish'd, but that it should be publish'd as soon as conveniently might be. I had indeed all along the Dialogues spoken of my self, as of a third Person; For they containing Discourses which were among the first Treatises that I ventur'd long ago to write of matters Philosophical, I had reason to desire, with the Painter,* to latere pone tabulam, *and hear what men would say of them, before I own'd my self to be their Author. But besides that now I find, 'tis not unknown to many who it is that*

that writ them, I am made to believe that 'tis not inexpedient, they should be known to come from a Person altogether a stranger to Chymical Affairs. And I made the less scruple to let them come abroad uncompleated, partly, because my affairs and Pre-ingagements to publish divers other Treatises allow'd me small hopes of being able in a great while to compleat those Dialogues. And partly because I am not unapt to think, that they may come abroad seasonably enough, though not for the Authors reputation, yet for other purposes. For I observe, that of late Chymistry begins, as indeed it deserves, to be cultivated by Learned Men who before despis'd it; and to be pretended to by many who never cultivated it, that they may be thought not to be ignorant of it: Whence it is come to passe, that divers Chymical Notions about Matters Philosophicall are taken for granted and employ'd, and so adopted by very eminent Writers both Naturalists and Physitians. Now this I fear may prove somewhat prejudicial to the Advancement of solid Philosophy: For though I am a great Lover of Chymical Experiments, and though I have no mean esteem of divers Chymical Remedies, yet I distinguish these from their Notions *about the causes of things and their manner of Generation. And for ought I can hitherto discern, there are a thousand* Phænomena *in Nature, besides a*

Multitude of Accidents relating to the humane Body, which will scarcely be clearly and satisfactorily made out by them that confine themselves to deduce things from Salt, Sulphur and Mercury, and the other Notions peculiar to the Chymists, without taking much more Notice than they are wont to do, of the Motions and Figures, of the small parts of Matter and the other more Catholick and Fruitful affections of Bodies. Wherefore it will not perhaps be now unseasonable to let our Carneades *warne Men, not to subscribe to the grand Doctrine of the Chymists touching their three Hypostatical Principles, till they have a little examin'd it, and consider'd, how they can clear it from his objections, divers of which 'tis like they may never have though on; since a Chymist scarce would, and none but a Chymist could propose them. I hope also it will not be unacceptable to several Ingenious Persons, who are unwilling to determine of any important Controversie, without a previous consideration of what may be said on both sides, and yet have greater desires to understand Chymical Matters, than opportunities of learning them, to find here together, besides several Experiments of my own purposely made to Illustrate the Doctrine of the Elements, divers others scarce to be met with, otherwise then Scatter'd among many Chymical Books: And to Find these Associated*

ciated Experiments so Deliver'd as that an Ordinary Reader, if he be but acquainted with the usual Chymical Termes, may easily enough understand them; and even a wary One may safely rely on Them. These Things I add, because a person any Thing vers'd in the Writings of Chymists cannot but Discern by their obscure, ambiguous, and almost Ænigmatical Way of expressing what they pretend to Teach, that they have no Mind to be understood at all, but by the Sons of Art *(as they call them) nor to be Understood even by these without Difficulty and Hazardous Tryalls. Insomuch that some of Them Scarce ever speak so candidly, as when they make use of that known Chymical Sentence;* Ubi palam locuti sumus, ibi nihil diximus. *And as the obscurity of what some Writers deliver makes it very difficult to be understood; so the Unfaithfulness of too many others makes it unfit to be reli'd on. For though unwillingly, Yet I must for the truth sake, and the Readers, warne him not to be forward to believe Chymical Experiments when they are set down only by way of Prescriptions, and not of Relations; that is, unless he that delivers them mentions his doing it upon his own particular knowledge, or upon the Relation of some credible person, avowing it upon his own experience. For I*

am troubled, I must complain, that even Eminent Writers, both Physitians and Philosophers, whom I can easily name, if it be requir'd, have of late suffer'd themselves to be so far impos'd upon, as to Publish and Build upon Chymical Experiments, which questionless they never try'd; for if they had, they would, as well as I, have found them not to be true. And indeed it were to be wish'd, that now that those begin to quote Chymical Experiments that are not themselves Acquainted with Chymical Operations, men would Leave off that Indefinite Way of Vouching the Chymists say this, or the Chymists affirme that, and would rather for each Experiment they alledge name the Author or Authors, upon whose credit they relate it; For, by this means they would secure themselves from the suspition of falshood, (to which the other Practice Exposes them) and they would leave the Reader to Judge of what is fit for him to Believe of what is Delivered, whilst they employ not their own great names to Countenance doubtfull Relations; and they will also do Justice to the Inventors or Publishers of the true Experiments, as well as upon the Obtruders of false ones. Whereas by that general Way of quoting the Chymists, the candid Writer is Defrauded of the particular Praise, and the impostor escapes the Personal Disgrace that is due to him.

The remaining Part of this Preface must be employ'd in saying something for Carneades, *and something for my Selfe.*

And first, Carneades *hopes that he will be thought to have disputed civilly and Modestly enough for one that was to play the Antagonist and the Sceptick. And if he any where seem to slight his Adversaries Tenents and Arguments, he is willing to have* it *look'd upon as what he was induc'd to, not so much by his Opinion of them, as the Examples of* Themistius *and* Philoponus, *and the custom of such kind of Disputes.*

Next, In case that some of his Arguments shall not be thought of the most Cogent sort that may be, he hopes it will be consider'd that it ought not to be Expected, that they should be So. For, his part being chiefly, but to propose Doubts and Scruples, he does enough, if he shews that his Adversaries Arguments are not strongly Concluding, though his own be not so neither. And if there should appear any disagreement betwixt the things he delivers in divers passages, he hopes it will be considered, that it is not necessary that all the things a Sceptick Proposes, should be consonant; since it being his work to Suggest doubts against the Opinion he questions, it is allowable for him to propose two or more several Hypotheses *about the same thing: And to say*

say that it may be accounted for this way, or that way, or the other Way, though these wayes be perhaps inconsistent among themselves. Because it is enough for him, if either of the proposed Hypotheses be but as probable as that he calls in question. And if he propose many that are Each of them probable, he do's the more ratify his doubts, by making it appear the more difficult to be sure, that that way which they all differ from is the true. And our Carneades *by holding the Negative, has this advantage, that if among all the Instances he brings to invalidate the Vulgar Doctrine of those he Disputes with, any one be Irrefragable, that alone is sufficient to overthrow a Doctrine which Universally asserts what he opposes. For it cannot be true that all Bodies whatsoever that are reckon'd among the Perfectly mixt Ones, are compounded of such a Determinate Number of such or such Ingredients, in case any one such Body can be produc'd, that is not so compounded; and he hopes too, that Accurateness will be the less expected from him, because his undertaking obliges him to maintain such Opinions in Chymistry, and that chiefly by Chymicall Arguments, as are Contrary to the very Principles of the Chymists, From whose writings it is not Therefore like he should receive any intentional Assistance, except from some Passages of the Bold and Ingenious* Helmont,

mont, with whom he yet disagrees in many things (which reduce him to explicate Divers Chymical Phænomena, *according to other Notions;) And of whose Ratiocinations, not only some seem very Extravagant, but even the Rest are not wont to be as considerable as his Experiments. And though it be True indeed, that some* Aristotelians *have occasionally written against the Chymical Doctrine he Oppugnes, yet since they have done it according to their Principles, And since our* Carneades *must as well oppose their* Hypothesis *as that of the Spagyrist, he was fain to fight his Adversaries with his own Weapons, Those of the Peripatetick being Improper if not hurtfull for a Person of his Tenents; besides that those* Aristotelians, (*at Least those he met with,*) *that have written against the Chymists, seem to have had so little Experimental Knowledge in Chymical Matters, that by their frequent Mistakes and unskilfull way of Oppugning, they have too often expos'd themselves to the Derision of their adversaries, for writing so Confidently against what they appeare so little to understand.*

And Lastly, Carneades *hopes, he shall do the Ingenious this Piece of service, that by having Thus drawn the Chymists Doctrine out of their Dark and Smokie Laboratories, and both brought it into the open light, and shewn the weakness*

ness of their Proofs, that have hitherto been wont to be brought for it, either Judicious Men shall henceforth be allowed calmly and after due information to disbelieve it, or those abler Chymists, that are zealous for the reputation of it, will be obliged to speak plainer than hitherto has been done, and maintain it by better Experiments and Arguments than those Carneades *hath examin'd: so That he hopes the Curious will one Way or other Derive either satisfaction or instruction from his endeavours. And as he is ready to make good the profession he makes in the close of his Discourse, of being ready to be better inform'd, so he expects either to be indeed inform'd, or to be let alone. For though, if any Truly knowing Chymists shall Think fit in a civill and rationall way to shew him any truth touching the matter in Dispute That he yet discernes not,* Carneades *will not refuse either to admit, or to own a conviction: yet if any impertinent Person shall, either to get Himselfe a Name, or for what other end soever, wilfully or carelesly mistake the State of the controversie, or the sence of his Arguments, or shall rail instead of arguing, as hath been done of Late in Print by divers Chymists; or lastly, shall write against them in a canting way; I mean shall express himselfe in ambiguous or obscure termes, or argue from Experiments not intelligibly enough Deliver'd,* Carneades *professes, That he values his*

G. and F. and H. and others, in their books against one another.

is time so much, as not to think the answering such Trifles worth the loss of it.

And now having said thus much for Carneades, *I hope the Reader will give me leave to say something for my self.*

And first, if some morose Readers shall find fault with my having made the Interlocutors upon occasion complement with one another, and that I have almost all along written these Dialogues in a stile more Fashionable than That of meer Scholars is wont to be, I hope I shall be excus'd by them that shall consider, that to keep a due decorum *in the Discourses, it was fit that in a book written by a Gentleman, and wherein only Gentlemen are introduc'd as speakers, the Language should be more smooth and the Expressions more Civil than is usual in the more Scholastick way of writing. And indeed, I am not sorry to have this Opportunity of giving an example how to manage even Disputes with Civility; whence perhaps some Readers will be assisted to discern a Difference betwixt Bluntness of Speech and Strength of reason, and find that a man may be a Champion for Truth, without being an* Enemy to Civility; *and may confute an Opinion without railing at Them that hold it; To whom he that desires to convince and not to provoke them, must make some amends by his Civility*

vility to their Persons, for his severity to their mistakes; and must say as little else as he can, to displease them, when he saies that they are in an error.

But perhaps other Readers will be less apt to find fault with the Civility of my Disputants, than the Chymists will be, upon the reading of some Passages of the following Dialogue, to accuse Carneades *of Asperity. But if I have made my Sceptick sometimes speak sleightingly of the Opinions he oppose's, I hope it it will not be found that I have done any more, than became the Part he was to act of an Opponent: especially, if what I have made him say be compar'd with what the Prince of the Romane Orators himself makes both great Persons and Friends say of one anothers Opinions, in his excellent Dialogues,* De Natura Deorum: *And I shall scarce be suspected of Partiality, in the case, by them that take Notice that there is full as much (if not far more) liberty of sleighting their Adversaries Tenents to be met with in the Discourses of those with whom* Carneades *disputes. Nor need I make the Interlocutors speak otherwise than freely in a Dialogue, wherein it was sufficiently intimated, that I meant not to declare my own Opinion of the Arguments propos'd, much lesse of the whole Controversy it selfe, otherwise than as it may by an attentive Reader be gues's'd at by some Passages of* Carneades: *(I say, some Passages, because I make not all that he saies, especially in the heat of Disputation, mine,) partly in this Discourse, and partly in some other* * *Dialogues betwixt the same Speakers (though they treat not immediately of the Elements) which have long layn*

*The Dialogues here meant are those about Heat, Fire, Flame &c. (seen by two Secretaries of the Royal Society) that the Author somewhere complaines to have been missing with other things of his presently after the hasty removal of his Goods by Night in the great fire of *London*.

layn by me, and expect the Entertainement that these present Discourses will meet with. And indeed they will much mistake me, that shall conclude from what I now publish, that I am at Defyance with Chymistry, or would make my Readers so. I hope the Specimina *I have lately publish'd of an attempt to shew the usefulness of Chymical Experiments to Contemplative Philosophers, will give those that read them other thoughts of me, and I had a design (but wanted opportunity) to publish with these Papers an Essay I have lying by me, the greater part of which is Apologetical for one sort of Chymists. And at least, as for those that know me, I hope the pain I have taken in the fire will both convince them, that I am far from being an Enemy to the Chymists Art, (though I am no friend to many that disgrace it by professing it,) and perswade them to believe me when I declare that I distinguish betwixt those Chymists that are either Cheats, or but Laborants, and the true* Adepti; *By whome could I enjoy there conversation, I would both willingly and thankfully be instructed; especially concerning the Nature and Generation of Metals: And possibly, those that know how little I have remitted of my former addictedness to make Chymical Experiments, will easily believe, that one of the chief Designes of this Sceptical Discourse was, not so much to discredit Chymistry, as to give an occasion and a kind of necessity to the more knowing Artists to lay aside a little of their overgreat Reservedness, and either explicate or prove the Chymicall Theory better than ordinary Chymists have done, or by enriching us with some of their nobler Secrets*

crets to evince that Their art is able to make amends even for the deficiencies of their Theory: And thus much I shall make bold to add, that we shall much undervalue Chymistry, if we imagine, that it cannot teach us things farr more useful, not only to Physick but to Philosophy, than those that are hitherto known to vulgar Chymists. And yet as for inferior Spagiricists themselves, they have by their labours deserv'd so well of the common Wealth of Learning, that methinks 'tis Pity they should ever misse the Truth which they have so industriously sought. And though I be no Admirer of the Theorical Part of their Art, yet my conjectures will much deceive me, if the Practical Part be not hereafter much more cultivated than hitherto it has been, and do not both employ Philosophy and Philosophers, and hope to make Men such. Nor would I, that have been diverted by other Studies as well as affairs, be thought to pretend being a profound Spagyrist, by finding so many faults in the Doctrine wherein the generality of Chymists scruples not to Acquisce: For besides that 'tis most commonly far easier to frame Objections against any propos'd Hypothesis, *than to propose an* Hypothesis *not lyable to Objections (besides this I say) 'tis no such great matter, if whereas Beginners in Chymistry are commonly at once imbu'd with the Theory and Operations of their profession, I who had the good fortune to Learn the Operations from illiterate Persons, upon whose credit I was not Tempted to take up any opinion about them, should consider things with lesse prejudice, and consequently*

sequently with other Eyes than the Generality of Learners; And should be more dispos'd to accommodate the Phænomena *that occurr'd to me to other* Notions *than to those of the Spagirists And having at first entertain'd a suspition That the Vulgar Principles were lesse General and comprehensive, or lesse considerately Deduc'd from Chymical Operations, than was beleiv'd, it was not uneasie for me both to Take notice of divers* Phænomena, *overlook'd by prepossest Persons, that seem'd not to suite so well with the* Hermetical Doctrine; *and to devise some Experiments likely to furnish me with Objections against it, not known to many, that having practis'd Chymistry longer perchance than I have yet liv'd, may have far more* Experience, *Than I, of particular processes.*

To conclude, whether the Notions *I have propos'd, and the Experiments I have communicated, be considerable, or not, I willingly leave others to Judge; and this only I shall say for my Self, That I have endeavour'd to deliver matters of Fact, so faithfully, that I may as well assist the lesse skilful Readers to examine the Chymical* Hypothesis, *as provoke the Spagirical Philosophers to illustrate it: which if they do, and that either the Chymical opinion, or the Peripatetick, or any other Theory of the Elements*

differing from that I am most inclin'd to, shall be intelligibly explicated, and duly prov'd to me; what I have hitherto discours'd will not hinder it from making a Proselyte of a Person that Loves Fluctuation of Judgment little enough to be willing to be eas'd of it by any thing but Error.

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Phy:

PHYSIOLOGICAL CONSIDERATIONS

Touching

The experiments wont to be employed to evince either the IV Peripatetick Elements, or the III Chymical Principles of Mixt Bodies.

Part of the First Dialogue.

I Perceive that divers of my Friends have thought it very strange to hear me speak so irresolvedly, as I have been wont to do, concerning those things which some take to be the Elements, and others to be the Principles of all mixt Bodies. But I blush not to acknowledge that I much less scruple to confess that I Doubt, when I do so, than

to profeſs that I Know what I do not: And I ſhould have much ſtronger Expectations than I dare yet entertain, to ſee Philoſophy ſolidly eſtabliſh't, if men would more carefully diſtinguiſh thoſe things that they know, from thoſe that they ignore or do but think, and then explicate clearly the things they conceive they underſtand, acknowledge ingenuouſly what it is they ignore, and profeſs ſo candidly their Doubts, that the induſtry of intelligent perſons might be ſet on work to make further enquiries, & the eaſineſs of leſs diſcerning Men might not be impos'd on. But becauſe a more particular accompt will probably be expected of my unſatisfyedneſs not only with the Peripatetick, but with the Chymical Doctrine of the Primitive Ingredients of Bodies: It may poſſibly ſerve to ſatisfy others of the excuſableneſs of my diſatisfaction to peruſe the enſuing Relation of what paſſed a while ſince at a meeting of perſons of ſeveral opinions, in a place that need not here be named; where the ſubject, whereof we have been ſpeaking, was amply and variouſly diſcours'd of.

It

It was on one of the faireſt dayes of this Summer that the inquiſitive *Eleutherius* came to invite me to make a viſit with him to his friend *Carneades*. I readily conſented to this motion, telling him that if he would but permit me to go firſt and make an excuſe at a place not farr off, where I had at that hour appointed to meet, but not about a buſineſs either of moment, or that could not well admit of a delay, I would preſently wait on him, becauſe of my knowing *Carneades* to be ſo converſant with nature and with Furnaces, and ſo unconfin'd to vulgar Opinions, that he would probably by ſome ingenious Paradox or other, give our mindes at leaſt a pleaſing Exerciſe, and perhaps enrich them with ſome ſolid inſtruction. *Eleutherius* then firſt going with me to the place where my Apology was to be made, I accompanied him to the lodging of *Carneades*, where when we were come, we were told by the Servants, that he was retired with a couple of Friends (whoſe names they alſo told us) to one of the Arbours in his Garden, to enjoy under its coole ſhades a delightful protection from the yet troubleſome heat of the Sun.

Eleutherius being perfectly acquainted with that Garden immediately led me to the Arbour, and relying on the intimate familiarity that had been long cherish'd betwixt him and *Carneades*; in spight of my Reluctancy to what might look like an intrusion upon his privacy, drawing me by the hand, he abruptly entered the Arbour, where we found *Carneades*, *Philoponus*, and *Themistius*, sitting close about a little round Table, on which, besides paper, pen, and inke, there lay two or three open Books; *Carneades* appeared not at all troubled at this surprise, but rising from the Table, received his Friend with open looks and armes, and welcoming me also with his wonted freedom and civility, invited us to rest our selves by him, which, as soon as we had exchanged with his two Friends (who were ours also) the civilities accustomed on such occasions, we did. And he presently after we had seated our selves, shutting the Books that lay open, and turning to us with a smiling countenance, seemed ready to begin some such unconcerning discourse as is wont to pass, or rather waste the time in promiscuous companies.

But

But *Eleutherius* guessing at what he meant to do, prevented him by telling him, I perceive *Carneades* by the books that you have been now shutting, and much more by the posture wherein I found Persons so qualifi'd to discourse of serious matters, and so accustom'd to do it, that you three were, before our coming, engag'd in some Philosophical conference, which I hope you will either prosecute, and allow us to be partakers of, in recompence of the freedome we have us'd in presuming to surprise you, or else give us leave to repair the injury we should otherwise do you, by leaving you to the freedom we have interrupted, and punishing our selves for our boldness by depriving our selves of the happiness of your company. With these last words he and I rose up, as if we meant to be gone: But *Carneades* suddenly laying hold on his arme, and stopping him by it, smileingly told him, We are not so forward to lose good company as you seem to imagine; especially since you are pleas'd to desire to be present at what we shall say, about such a Subject as that You found us considering. For that, being

 the

the number of the Elements, Principles, or Materiall Ingredients of Bodies, is an enquiry whose truth is of that Importance, and of that Difficulty, that it may as well deserve, as require, to be searched into by such skilfull Indagators of Nature, as your selves. And therefore we sent to invite the bold and acute *Leucippus* to lend us some light by his Atomical Paradox, upon which we expected such pregnant hints, that 'twas not without a great deal of trouble that we had lately word brought us that he was not to be found; & we had likewise begg'd the Assistance of your presence and thoughts, had not the messenger we employ'd to *Leucippus* inform'd us that as he was going, he saw you both pass by towards another part of the Town; And this frustrated expectation of *Leucippus* his company, who told me but last night that he would be ready to give me a meeting where I pleas'd to day, having very long suspended our conference about the freshly mention'd Subject, it was so newly begun when you came in, that we shall scarce need to repeat any thing to acquaint you with what had pass'd betwixt us before your

your arrival, so that I cannot but look upon it as a fortunate Accident that you should come so seasonably, to be not hearers alone, but we hope Interlocutors at our conference. For we shall not only allow of your presence at it, but desire your Assistance in it; which I add both for other reasons, and because though these learned Gentlemen (saies he, turning to his two friends) need not fear to discourse before any Auditory, provided it be intelligent enough to understand them, yet for my part (continues he with a new smile,) I shall not dare to vent my unpremeditated thoughts before two such Criticks, unless by promising to take your turnes of speaking, You will allow me mine of quarrelling, with what has been said. He and his friends added divers things to convince us that they were both desirous that we should hear them, and resolved against our doing so, unless we allowed them sometimes to hear us. *Eleutherius*, after having a while fruitlesly endeavoured to obtain leave to be silent, promis'd he would not be so alwayes, provided that he were permitted according to the freedom of his

Genius and Principles to side with one of them in the managing of one Argument, and, if he saw cause, with his Antagonist, in the Prosecution of another, without being confin'd to stick to any one party or opinion, which was after some debate accorded him. But I, conscious to my own Disability's, told them resolutely that I was as much more willing, as more fit, to be a hearer than a speaker, among such knowing Persons, and on so abstruse a Subject. And that therefore I beseeched them without necessitating me to proclaim my weaknesses, to allow me to lessen them by being a silent Auditor of their Discourses: to suffer me to be at which I could present them no motive, save that their instructions would make them in me a more intelligent Admirer. I added, that I desir'd not to be idle whilst they were imploy'd, but would if they pleas'd, by writing down in short hand what should be delivered, preserve Discourses that I knew would merit to be lasting. At first *Carneades* and his two friends utterly rejected this motion; and all that my Resolutenes to make use of my ears, not tongue

tongue at their debates, could do, was to make them acquiesce in the Proposition of *Eleutherius*, who thinking himself concern'd, because he brought me thither, to afford me some faint assistance, was content that I should register their Arguments, that I might be the better able after the conclusion of their conference to give them my sence upon the Subject of it, (The number of Elements or Principles) which he promis'd I should do at the end of the present Debates, if time would permit, or else at our next meeting. And this being by him undertaken in my name, though without my consent, the company would by no means receive my Protestation against it, but casting, all at once, their eyes on *Carneades*, they did by that and their unanimous silence, invite him to begin; which (after a short pause, during which he turn'd himself to *Eleutherius* and me) he did in this manner.

Notwithstanding the subtile reasonings I have met with in the books of the Peripateticks, and the pretty experiments that have been shew'd me in the Laboratories of Chymists, I am of so diffident

diffident, or dull a Nature, as to think that if neither of them can bring more cogent arguments to evince the truth of their assertion than are wont to be brought; a Man may rationally enough retain some doubts concerning the very number of those materiall Ingredients of mixt bodies, which some would have us call Elements, and others Principles. Indeed when I considered, that the Tenents concerning the Elements, are as considerable amongst the Doctrines of natural Philosophy, as the Elements themselves are among the bodies of the Universe, I expected to find those Opinions solidly establish'd, upon which so many others are superstructed. But when I took the pains impartially to examine the bodies themselves that are said to result from the blended Elements, and to torture them into a confession of their constituent Principles, I was quickly induc'd to think that the number of the Elements has been contended about by Philosophers with more earnestness, than success. This unsatisfiedness of mine has been much wonder'd at, by these two Gentlemen (at which words he pointed at *Themistius*

and *Philoponus*) who though they differ almost as much betwixt themselves about the question we are to consider, as I do from either of them, yet they both agree very well in this, that there is a determinate number of such Ingredients as I was just now speaking of, and that what that number is, I say not, may be (for what may not such as they perswade?) but is wont to be clearly enough demonstrated both by Reason and Experience. This has occasion'd our present Conference. For our Discourse this afternoon, having fallen from one subject to another, and at length setl'd on this, they proffer'd to demonstrate to me, each of them the truth of his opinion, out of both the Topicks that I have freshly nam'd. But on the former (that of Reason strictly so taken) we declin'd insisting at the present, lest we should not have time enough before supper to go through the Reasons and Experiments too. The latter of which we unanimously thought the most requisite to be seriously examin'd. I must desire you then to take notice Gentlemen (continued *Carneades*) that my present business doth not ob-

oblige me so to declare my own opinion on the Subject in question, as to assert or deny the truth either of the Peripatetick, or the Chymical Doctrine concerning the number of the Elements, but only to shew you that neither of these Doctrines hath been satisfactorily proved by the arguments commonly alledged on its behalfe. So that if I really discern (as perhaps I think I do) that there may be a more rational account than ordinary, given of one of these opinions, I am left free to declare my self of it, notwithstanding my present engagement, it being obvious to all your observation, that a solid truth may be generally maintained by no other, than incompetent Arguments: And to this Declaration I hope it will be needless to add, that my task obliges me not to answer the Arguments that may be drawn either for *Themistius* or *Philoponus*'s Opinion from the Topick of reason, as opposed to experiments; since 'tis these only that I am to examine, and not all these neither, but such of them alone, as either of them shall think fit to insist on, and as have hitherto been wont to be brought either to prove that 'tis the

four Peripatetick Elements, or that is the three Chymical Principles that all compounded bodies consist of. These things (adds *Carneades*) I thought my self obliged to premise, partly lest you should do these Gentlemen (pointing at *Themistius* and *Philoponus*, and smiling on them) the injury of measuring their parts by the arguments they are ready to propose, the lawes of our Conference confining them to make use of those that the vulgar of Philosophers (for even of them there is a vulgar) has drawn up to their hands; and partly, that you should not comdemn me of presumption for disputing against persons over whom I can hope for no advantage, that I must not derive from the nature, or rules of our controversy, wherein I have but a negative to defend, and wherein too I am like on several occasions to have the Assistance of one of my disagreeing adversaries against the other.

Philoponus and *Themistius* soon returned this complement with civilities of the like nature, in which *Eleutherius* perceiving them engaged, to prevent the further loss of that time of which they were not like to have very much to spare, he

he minded them that their present busi-
ness was not to exchange complements,
but Arguments: and then addressing his
speech to *Carneades*, I esteem it no small
happiness (saies he) that I am come
here so luckily this Evening. For I have
been long disquieted with Doubts con-
cerning this very subject which you are
now ready to debate. And since a
Question of this importance is to be now
discussed by persons that maintain such
variety of opinions concerning it, & are
both so able to enquire after truth, and
so ready to embrace it by whomsoever
and on what occasion soever it is presen-
ted them; I cannot but promise my self
that I shall, before we part, either lose my
Doubts or the hopes of ever finding
them resolved: *Eleutherius* paused not
here; but to prevent their answer, added
almost in the same breath; and I am
not a little pleased to find that you are
resolved on this occasion to insist rather
on Experiments than Syllogismes. For
I, and no doubt You, have long obser-
ved, that those Dialectical subtleties,
that the Schoolmen too often employ a-
bout Physiological Mysteries, are wont
much more to declare the wit of him

that

that uses them, than increase the know-
ledge or remove the doubts of sober lo-
vers of truth. And such captious subtle-
ties do indeed often puzzle & sometimes
silence men, but rarely satisfy them.
Being like the tricks of Jugglers, where-
by men doubt not but they are chea-
ted, though oftentimes they cannot de-
clare by what slights they are imposed
on. And therefore I think you have done
very wisely to make it your business to
consider the *Phænomena* relating to the
present Question, which have been af-
forded by experiments, especially since
it might seem injurious to our senses by
whose mediation we acquire so much
of the knowledge we have of things cor-
poral, to have recourse to far-fetched &
abstracted Ratiocinations, to know what
are the sensible ingredients of those sen-
sible things that we daily see and han-
dle, and are supposed to have the liberty
to untwist (if I may so speak) into the
primitive bodies they consist of. He an-
nexed that he wished therefore they
would no longer delay his expected sa-
tisfaction, if they had not, as he feared
they had, forgotten something prepara-
tory to their debate; and that was to

lay

lay down what should be all along understood by the word Principle or Element. *Carneades* thank'd him for his admonition, but told him that they had not been unmindful of so requisite a thing. But that being Gentlemen & very far from the litigious humour of loving to wrangle about words, or terms, or notions as empty; they had before his coming in, readily agreed promiscuously to use when they pleased, Elements and Principles as terms equivalent: and to understand both by the one and the other, those primitive and simple Bodies of which the mixt ones are said to be composed, and into which they are ultimately resolved. And upon the same account (he added) we agreed to discourse of the opinions to be debated, as we have found them maintained by the Generality of the asserters of the four Elements of the one party, and of those that receive the three Principles on the other, without tying our selves to enquire scrupulously what notion either *Aristotle* or *Paracelsus*, or this or that Interpreter, or follower of either of those great persons, framed of Elements or Principles; our design being to examine, not what

these or those writers thought or taught, but what we find to be the obvious & most general opinion of those, who are willing to be accounted Favorers of the Peripatetick or Chymical Doctrine, concerning this subject.

I see not (saies *Eleutherius*) why you might not immediately begin to argue, if you were but agreed which of your two friendly Adversaries shall be first heard. And it being quickly resolv'd on that *Themistius* should first propose the Proofs for his Opinion, because it was the antienter, and the more general, he made not the company expect long before he thus addressed himself to *Eleutherius*, as to the Person least interessed in the dispute.

If you have taken sufficient notice of the late Confession which was made by *Carneades*, and which (though his Civility dressed it up in complementall Expressions) was exacted of him by his Justice, I suppose You will be easily made sensible, that I engage in this Controversie with great and peculiar Disadvantages, besides those which his Parts and my Personal Disabilities would bring to any other cause to be

maintained by me againſt him. For he juſtly apprehending the force of truth, though ſpeaking by no better a tongue than mine, has made it the chief condition of our Duell, that I ſhould lay aſide the beſt Weapons I have, and thoſe I can beſt handle; Whereas if I were allowed the freedom, in pleading for the four Elements, to employ the Arguments ſuggeſted to me by Reaſon to demonſtrate them, I ſhould almoſt as little doubt of making You a Proſelyte to thoſe unſever'd Teachers, Truth and *Ariſtotle*, as I do of your Candour & your Judgment. And I hope you will however conſider, that that great Favorite and Interpreter of Nature, *Ariſtotle*, who was (as his *Organum* witneſſes) the greateſt Maſter of Logick that ever liv'd, diſclaim'd the courſe taken by other petty Philoſophers (Antient and Modern) who not attending the Coherence and Conſequences of their Opinions, are more ſollicitous to make each particular Opinion plauſible independently upon the the reſt, than to frame them all ſo, as not only to be conſiſtent together, but to ſupport each other. For that great Man

Man in his vaſt and comprehenſive Intellect, ſo fram'd each of his Notions, that being curiouſly adapted into one Syſteme, they need not each of them any other defence than that which their mutuall Coherence gives them: As 'tis in an Arch, where each ſingle ſtone, which if ſever'd from the reſt would be perhaps defenceleſs, is ſufficiently ſecur'd by the ſolidity and entireneſs of the whole Fabrick of which it is a part. How juſtly this may be apply'd to the preſent caſe, I could eaſily ſhew You, if I were permitted to declare to You, how harmonious *Ariſtotles* Doctrine of the Elements is with his other Principles of Philoſophy; and how rationally he has deduc'd their number from that of the combinations of the four firſt Qualities from the kinds of ſimple Motion belonging to ſimple bodies, and from I know not how many other Principles and *Phænomena* of Nature, which ſo conſpire with his Doctrine of the Elements, that they mutually ſtrengthen and ſupport each other. But ſince 'tis forbidden me to inſiſt on Reflections of this kind, I muſt proceed to tell You, that though the

Assertors of the four Elements value Reason so highly, and are furnish'd with Arguments enough drawn from thence, to be satisfi'd that there must be four Elements, though no man had ever yet made any sensible tryal to discover their Number, yet they are not destitute of Experience to satisfie others that are wont to be more sway'd by their senses than their Reason. And I shall proceed to consider the testimony of Experience, when I shall have first advertis'd You, that if Men were as perfectly rational, as 'tis to be wish'd they were, this sensible way of Probation would be as needless as 'tis wont to be imperfect. For it is much more high and Philosophical to discover things *a priore*, than *a posteriore*. And therefore the Peripatetieks have not been very sollicitous to gather Experiments to prove their Doctrines, contenting themselves with a few only, to satisfie those that are not capable of a Nobler Conviction. And indeed they employ Experiments rather to illustrate than to demonstrate their Doctrines, as Astronomers use Sphæres of pastboard, to descend to the capacities

ties of such as must be taught by their senses, for want of being arriv'd to a clear apprehension of purely Mathematical Notions and Truths. I speak thus *Eleutherius* (adds *Themistius*) only to do right to Reason, and not out of Diffidence of the Experimental proof I am to alledge. For though I shall name but one, yet it is such a one as will make all other appear as needless as it self will be found Satisfactory. For if you but consider a piece of green Wood burning in a Chimney, You will readily discern in the disbanded parts of it the four Elements, of which we teach it and other mixt bodies to be compos'd. The fire discovers it self in the flame by its own light; the smoake by ascending to the top of the chimney, and there readily vanishing into air, like a River losing it self in the Sea, sufficiently manifests to what Element it belongs and gladly returnes. The water in its own form boyling and hissing at the ends of the burning Wood betrayes it self to more than one of our senses; and the ashes by their weight, their firiness, & their dryness, put it past doubt that they belong to the Element

of Earth. If I ſpoke (continues *Themiſtius*) to leſs knowing Perſons, I would perhaps make ſome Excuſe for building upon ſuch an obvious and eaſie *Analyſis*, but 'twould be, I fear, injurious, not to think ſuch an Apology needleſs to You, who are too judicious either to think it neceſſary that Experiments to prove obvious truths ſhould be farr fetch'd, or to wonder that among ſo many mixt Bodies that are compounded of the four Elements, ſome of them ſhould upon a ſlight *Analyſis* manifeſtly exhibite the Ingredients they conſiſt of. Eſpecially ſince it is very agreeable to the Goodneſs of Nature, to diſcloſe, even in ſome of the moſt obvious Experiments that men make, a Truth ſo important and ſo requiſite to be taken notice of by them. Beſides that our *Analyſis* by how much the more obvious we make it, by ſo much the more ſuitable it will be to the Nature of that Doctrine which 'tis alledged to prove, which being as clear and intelligible to the Underſtanding as obvious to the ſenſe, 'tis no marvel the learned part of Mankind ſhould ſo long and ſo generally imbrace it. For this Doctrine is

is very different from the whimſeys of *Chymiſts* and other Modern Innovators, of whoſe *Hypotheſes* we may obſerve, as Naturaliſts do of leſs perfect Animals, that as they are haſtily form'd, ſo they are commonly ſhort liv'd. For ſo theſe, as they are often fram'd in one week, are perhaps thought fit to be laughed at the next; and being built perchance but upon two or three Experiments are deſtroyed by a third or fourth, whereas the doctrine of the four Elements was fram'd by *Ariſtotle* after he had leaſurely conſidered thoſe Theories of former Philoſophers which are now with great applauſe revived as diſcovered by theſe latter ages; And had ſo judiciouſly detected and ſupplyed the Errors and defects of former *Hypotheſes* concerning the Elements, that his Doctrine of them has been ever ſince deſervedly embraced by the letter'd part of Mankind: All the Philoſophers that preceded him having in their ſeveral ages contributed to the compleatneſs of this Doctrine, as thoſe of ſucceding times have acquieſc'd in it. Nor has an *Hypotheſis*, ſo deliberately and maturely eſtabliſhed, been called in Queſti-

on till in the last Century *Paracelsus* and some few other sooty Empiricks, rather than (as they are fain to call themselves) Philosophers, having their eyes darken'd, and their Braines troubl'd with the smoak of their own Furnaces, began to rail at the Peripatetick Doctrine, which they were too illiterate to understand, and to tell the credulous World, that they could see but three Ingredients in mixt Bodies; which to gain themselves the repute of Inventors, they endeavoured to disguise by calling them, instead of Earth, and Fire, and Vapour, Salt, Sulphur, and Mercury; to which they gave the canting title of Hypostatical Principles. but when they came to describe them, they shewed how little they understood what they meant by them, by disagreeing as much from one another, as from the truth they agreed in opposing: For they deliver their *Hypotheses* as darkly as their Processes; and 'tis almost as impossible for any sober Man to find their meaning, as 'tis for them to find their Elixir. And indeed nothing has spread their Philosophy, but their great Brags and undertakings; notwithstanding all which, (saies *Themistius*

(smiling) I scarce know any thing they have performed worth wondering at, save that they have been able to draw *Philoponus* to their Party, and to engage him to the Defence of an unintelligible *Hypothesis*, who knowes so well as he does, that Principles ought to be like Diamonds, as well very clear, as perfectly solid.

Themistius having after these last words declared by his silence, that he had finished his Discourse, *Carneades* addressing himself, as his Adversary had done, to *Eleutherius*, returned this Answer to it. I hop'd for a Demonstration, but I perceive *Themistius* hopes to put me off with an Harangue, wherein he cannot have given me a greater Opinion of his Parts, than he has given me Distrust for his *Hypothesis*, since for it even a Man of such Learning can bring no better Arguments. The Rhetorical part of his Discourse, though it make not the least part of it, I shall say nothing to, designing to examine only the Argumentative part, and leaving it to *Philoponus* to answer those passages wherein either *Paracelsus* or *Chymists* are concern'd: I shall observe to You, that in what he has said besides

beſides, he makes it his Buſineſs to do theſe two things. The one to propoſe and make out an Experiment to demonſtrate the common Opinion about the four Elements; And the other, to inſinuate divers things which he thinks may repair the weakneſs of his Argument, from Experience, and upon other Accounts bring ſome credit to the otherwiſe defenceleſs Doctrine he maintains.

To begin then with his Experiment of the burning Wood, it ſeems to me to be obnoxious to not a few conſiderable Exceptions.

And firſt, if I would now deal rigidly with my Adverſary, I might here make a great Queſtion of the very way of Probation which he and others employ, without the leaſt ſcruple, to evince, that the Bodies commonly call'd mixt, are made up of Earth, Air, Water, and Fire, which they are pleas'd alſo to call Elements; namely that upon the ſuppos'd *Analyſis* made by the fire, of the former ſort of *Concretes*, there are wont to emerge Bodies reſembling thoſe which they take for the Elements. For not to Anticipate here what I foreſee I ſhall

ſhall have occaſion to inſiſt on, when I come to diſcourſe with *Philoponus* concerning the right that fire has to paſs for the proper and Univerſal Inſtrument of Analyzing mixt Bodies; not to Anticipate that, I ſay, if I were diſpos'd to wrangle, I might alledge, that by *Themiſtius* his Experiment it would appear rather that thoſe he calls Elements, are made of thoſe he calls mixt Bodies, than mix'd Bodies of the Elements. For in *Themiſtius*'s Analyz'd Wood, and in other Bodies diſſipated and alter'd by the fire, it appears, and he confeſſes, that which he takes for Elementary Fire and Water, are made out of the Concrete; but it appears not that the Concrete was made up of Fire and Water. Nor has either He, or any Man, for ought I know, of his perſwaſion, yet prov'd that nothing can be obtained from a Body by the fire that was not *Pre-exiſtent* in it.

At this unexpected objection, not only *Themiſtius*, but the reſt of the company appear'd not a little ſurpriz'd; but after a while *Philoponus* conceiving his opinion, as well as that of *Ariſtotle*, concern'd in that Objection, You cannot ſure

(ſaies

(saies he to *Carneades*) propose this Difficulty, not to call it Cavill, otherwise than as an Exercise of wit, and not as laying any weight upon it. For how can that be separated from a thing that was not existent in it. When, for instance, a Refiner mingles Gold and Lead, and exposing this Mixture upon a Cuppell to the violence of the fire, thereby separates it into pure and refulgent Gold and Lead (which driven off together with the Dross of the Gold is thence call'd *Lythargyrium Auri*) can any man doubt that sees these two so differing substances separated from the Mass, that they were existent in it before it was committed to the fire.

I should (replies *Carneades*) allow your Argument to prove something, if, as Men see the Refiners commonly take before hand both Lead and Gold to make the Mass you speak of, so we did see Nature pull down a parcell of the Element of Fire, that is fancy'd to be plac'd I know not how many thousand Leagues off, contiguous to the Orb of the Moon, and to blend it with a quantity of each of the three other Elements, to compose every mixt Body, upon whose Resolution the Fire

Fire presents us with Fire, and Earth, and the rest. And let me add, *Philoponus*, that to make your Reasoning cogent, it must be first prov'd, that the fire do's only take the Elementary Ingredients asunder, without otherwise altering them. For else 'tis obvious, that Bodies may afford substances which were not pre-existent in them; as Flesh too long kept produces Magots, and old Cheese Mites, which I suppose you will not affirm to be Ingredients of those Bodies. Now that fire do's not alwayes barely separate the Elementary parts, but sometimes at least alter also the Ingredients of Bodies, if I did not expect ere long a better occasion to prove it, I might make probable out of your very Instance, wherein there is nothing Elementary separated by the great violence of the Refiners fire: the Gold and Lead which are the two Ingredients separated upon the *Analysis* being confessedly yet perfectly mixt Bodies, and the Litharge being Lead indeed; but such Lead as is differing in consistence and other Qualities from what it was before. To which I must add that I have sometimes seen, and so questionless have you much

much oftner, ſome parcells of Glaſſe adhering to the Teſt or Cuppel, and this Glaſs though Emergent as well as the Gold or Litharge upon your Analyſis, you will not I hope allow to have been a third Ingredient of the Maſs out of which the fire produc'd it.

Both *Philoponus* and *Themiſtius* were about to reply, when *Eleutherius* apprehending that the Proſecution of this Diſpute would take up time, which might be better employ'd, thought fit to prevent them by ſaying to *Carneades*: You made at leaſt half a Promiſe, when you firſt propos'd this Objection, that you would not (now at leaſt) inſiſt on it, nor indeed does it ſeem to be of abſolute neceſſity to your cauſe, that you ſhould. For though you ſhould grant that there are Elements, it would not follow that there muſt be preciſely four. And therefore I hope you will proceed to acquaint us with your other and more conſiderable Objections againſt *Themiſtius*'s Opinion, eſpecially ſince there is ſo great a Diſproportion in Bulk betwixt the Earth, Water and Air, on the one part, and thoſe little parcells of reſembling ſubſtances, that the fire ſepa-

rates

rates from *Concretes* on the other part, that I can ſcarce think that you are ſerious, when to loſe no advantage againſt your Adverſary, you ſeem to deny it to be rational, to conclude theſe great ſimple Bodies to be the Elements, and not the Products of compounded ones.

What you alledge (replies *Carneades*) of the Vaſtneſs of the Earth and Water, has long ſince made me willing to allow them to be the greateſt and chief Maſſes of Matter to be met with here below: But I think I could ſhew You, if You would give me leave, that this will prove only that the Elements, as You call them, are the chief Bodies that make up the neighbouring part of the World, but not that they are ſuch Ingredients as every mixt Body muſt conſiſt of. But ſince You challenge me of ſomething of a Promiſe, though it be not an entire one, Yet I ſhall willingly performe it. And indeed I intended not, when I firſt mention'd this Objection, to inſiſt on it at preſent againſt *Themiſtius*, (as I plainly intimated in my way of propoſing it) being only deſirous to lett you ſee, that though I diſcern'd my Advantages, yet

I was willing to forego ſome of them rather than appear a rigid Adverſary of a Cauſe ſo weak, that it may with ſafety be favourably dealt with. But I muſt here profeſs, and deſire You to take Notice of it, that though I paſs on to another Argument, it is not becauſe I think this firſt invalid. For You will find in the Progreſs of our Diſpute, that I had ſome reaſon to queſtion the very way of Probation imploy'd both by Peripateticks and Chymiſts, to evince the being and number of the Elements. For that there are ſuch, and that they are wont to be ſeparated by the Analyſis made by Fire, is indeed taken for granted by both Parties, but has not (for ought I know) been ſo much as plauſibly attempted to be proved by either. Hoping then that when we come to that part of our Debate, wherein Conſiderations relating to this Matter are to be treated of, you will remember what I have now ſaid, and that I do rather for a while ſuppoſe, than abſolutely grant the truth of what I have queſtion'd, I will proceed to another Objection.

And hereupon *Eleutherius* having pro-

promis'd him not to be unmindfull, when time ſhould ſerve, of what he had declar'd.

I conſider then (ſaies *Carneades*) in the next place, that there are divers Bodies out of which *Themiſtius* will not prove in haſte, that there can be ſo many Elements as four extracted by the Fire. And I ſhould perchance trouble him if I ſhould ask him what Peripatetick can ſhew us, (I ſay not, all the four Elements, for that would be too rigid a Queſtion, but) any one of them extracted out of Gold by any degree of Fire whatſoever. Nor is Gold the only Bodie in Nature that would puzzle an *Ariſtotelian*, (that is no more) to analyze by the Fire into Elementary Bodies, ſince, for ought I have yet obſerv'd both Silver and calcin'd *Venetian* Talck, and ſome other Concretes, not neceſſary here to be nam'd, are ſo fixt, that to reduce any of them into four Heterogeneous Subſtances has hitherto prov'd a Task much too hard, not only for the Diſciples of *Ariſtotle*, but thoſe of *Vulcan*, at leaſt, whilſt the latter have employ'd only Fire to make the *Analyſis*.

The next Argument (continues *Carneades*) that I shall urge against *Themistius*'s Opinion shall be this, That as there are divers Bodies whose *Analysis* by Fire cannot reduce them into so many Heterogeneous Substances or Ingredients as four, so there are others which may be reduc'd into more, as the Blood (and divers other parts) of Men and other Animals, which yield when analyz'd five distinct Substances Phlegme, Spirit, Oyle, Salt and Earth, as Experience has shewn us in distilling Mans Blood, Harts-Horns, and divers other Bodies that belonging to the Animal-Kingdom abound with not uneasily sequestrable Salt.

The

THE SCEPTICAL CHYMIST

The First Part.

I Am (saies *Carneades*) so unwilling to deny *Eleutherius* any thing, that though, before the rest of the Company I am resolv'd to make good the part I have undertaken of a Sceptick; yet I shall readily, since you will have it so, lay aside for a while the Person of an Adversary to the Peripateticks and Chymists; and before I acquaint you with my Objections against their Opinions, acknowledge to you what may be (whether truly or not) tolerably enough added, in favour of a certain number of Principles of mixt Bodies, to that grand and known Argument from the *Analysis*,

of compound Bodies, which I may poſſibly hereafter be able to confute.

And that you may the more eaſily Examine, and the better Judge of what I have to ſay, I ſhall caſt it into a pretty number of diſtinct Propoſitions, to which I ſhall not premiſe any thing; becauſe I take it for granted, that you need not be advertis'd, that much of what I am to deliver, whether for or againſt a determinate number of Ingredients of mixt Bodies, may be indifferently apply'd to the four Peripatetick Elements, and the three Chymical Principles, though divers of my Objections will more peculiarly belong to theſe laſt nam'd, becauſe the Chymical *Hypotheſis* ſeeming to be much more countenanc'd by Experience than the other, it will be expedient to inſiſt chiefly upon the diſproving of that; eſpecially ſince moſt of the Arguments that are imploy'd againſt it, may, by a little variation, be made to conclude, at leaſt as ſtrongly againſt the leſs plauſible, *Ariſtotelian* Doctrine.

To proceed then to my Propoſitions I ſhall begin with this. That

It

ſeems not abſurd to conceive that at the Propoſ. I.
firſt Production of mixt Bodies, the Univerſal Matter whereof they among other Parts of the Univerſe conſiſted, was actually divided into little Particles of ſeveral ſizes and ſhapes variouſly mov'd.

This (ſaies *Carneades*) I ſuppoſe you will eaſily enough allow. For beſides that which happens in the Generation, Corruption, Nutrition, and waſting of Bodies, that which we diſcover partly by our *Microſcopes* of the extream littleneſs of even the ſcarce ſenſible parts of Concretes; and partly by the Chymical Reſolutions of mixt Bodies, and by divers other Operations of Spagyrical Fires upon them, ſeems ſufficiently to manifeſt their conſiſting of parts very minute and of differing Figures. And that there does alſo intervene a various local Motion of ſuch ſmall Bodies, will ſcarce be denied; whether we chuſe to grant the Origine of Concretions aſſign'd by *Epicurus*, or that related by *Moſes*. For the firſt, as you well know, ſuppoſes not only all

mixt Bodies, but all others to be produc'd by the various and casual occursions of Atomes, moving themselves to and fro by an internal Principle in the Immense or rather Infinite *Vacuum*. And as for the inspir'd Historian, He, informing us that the great and Wise Author of Things did not immediately create Plants, Beasts, Birds, &c. but produc'd them out of those portions of the pre-existent, though created, Matter, that he calls Water and Earth, allows us to conceive, that the constituent Particles whereof these new Concretes were to consist, were variously moved in order to their being connected into the Bodies they were, by their various Coalitions and Textures, to compose.

But (continues *Carneades*) presuming that the first Proposition needs not be longer insisted on, I will pass on to the second, and tell you that

Propos. II. *Neither is it possible that of these minute Particles divers of the smallest and neighbouring ones were here and there associated into minute Masses or Clusters, and did by their Coalitions constitute great store of such little primary Concretions*

Concretions or Masses as were not easily dissipable into such Particles as compos'd them.

To what may be deduc'd, in favour of this Assertion from the Nature of the Thing it self, I will add something out of Experience, which though I have not known it used to such a purpose, seems to me more fairly to make out that there may be Elementary Bodies, than the more questionable Experiments of Peripateticks and Chymists prove that there are such. I consider then that Gold will mix and be colliquated not only with Silver, Copper, Tin and Lead, but with Antimony, *Regulus Martis* and many other Minerals, with which it will compose Bodies very differing both from Gold, and the other Ingredients of the resulting Concretes. And the same Gold will also by common *Aqua Regis*, and (I speak it knowingly) by divers other *Menstruums* be reduc'd into a seeming Liquor, in so much that the Corpuscles of Gold will, with those of the *Menstruum*, pass through Cap-Paper, and with them also coagulate into a Chrystalline Salt. And I have further try'd, that

with a small quantity of a certain Saline Substance I prepar'd, I can easily enough sublime Gold into the form of red Chrystalls of a considerable length; and many other ways may Gold be disguis'd, and help to constitute Bodies of very differing Natures both from It and from one another, and nevertheless be afterward reduc'd to the self-same Numerical, Yellow, Fixt, Ponderous and Malleable Gold it was before its commixture. Nor is it only the fixedst of Metals, but the most fugitive, that I may employ in favour of our Proposition: for Quicksilver will with divers Metals compose an *Amalgam*, with divers *Menstruums* it seems to be turn'd into a Liquor, with *Aqua fortis* it will be brought into either a red or white Powder or precipitate, with Oyl of Vitriol into a pale Yellow one, with Sulphur it will compose a blood-red and volatile Cinaber, with some Saline Bodies it will ascend in form of a Salt which will be dissoluble in water; with *Regulus* of Antimony and Silver I have seen it sublim'd into a kinde of Crystalls, with another Mixture I reduc'd it into a malleable Body, into a hard and brittle Substance by another: And some

me there are who affirm, that by proper Additaments they can reduce Quicksilver into Oyl, nay into Glass, to mention no more. And yet out of all these exotick Compounds, we may recover the very same running Mercury that was the main Ingredient of them, and was so disguis'd in them. Now the Reason (proceeds *Carneades*) that I have represented these things concerning Gold and Quicksilver, is, That it may not appear absurd to conceive, that such little primary Masses or Clusters; as our Proposition mentions, may remain undissipated, notwithstanding their entring into the composition of various Concretions, since the Corpuscle of Gold and Mercury, though they be not primary Concretions of the most minute Particles of matter, but confessedly mixt Bodies, are able to concurre plentifully to the composition of several very differing Bodies, without losing their own Nature or Texture, or having their cohesion violated by the divorce of their associated parts or Ingredients.

Give me leave to add (saies *Eleutherius*) on this occasion, to what you now observ'd, that as confidently as some Chymists

Chymists, and other modern Innovators in Philosophy are wont to object against the Peripateticks, That from the mixture of their four Elements there could arise but an inconsiderable variety of compound Bodies; yet if the *Aristotelians* were but half as well vers'd in the works of Nature as they are in the Writings of their Master, the propos'd Objection would not so calmly triumph, as for want of Experiments they are fain to suffer it to do. For if we assigne to the Corpuscles, whereof each Element consists, a peculiar size and shape, it may easily enough be manifested, That such differingly figur'd Corpuscles may be mingled in such various Proportions, and may be connected so many several waies, that an almost incredible number of variously qualified Concretes may be compos'd of them. Especially since the Corpuscles of one Element may barely, by being associated among themselves, make up little Masses of differing size and figure from their constituent parts: and since also to the strict union of such minute Bodies there seems oftentimes nothing requisite, besides the bare Contact of a great part of their Surfaces.

And

And how great a variety of *Phænomena* the same matter, without the addition of any other, & only several ways dispos'd or contex'd, is able to exhibit, may partly appear by the multitude of differing Engins which by the contrivances of skilful Mechanilians, and the dexterity of expert Workmen, may be made of Iron alone. But in our present case being allow'd to deduce compound Bodies from four very differently qualified sorts of matter, he who shall but consider what you freshly took notice of concerning the new Concretes resulting from the mixture of incorporated Minerals, will scarce doubt but that the four Elements mannag'd by Natures Skill may afford a multitude of differing Compounds.

I am thus far of your minde (saies *Carneades*) that the *Aristotelians* might with probability deduce a much greater number of compound Bodies from the mixture of their four Elements, than according to their present *Hypothesis* they can, if instead of vainly attempting to deduce the variety and proprieties of all mixt Bodies from the Combinations & Temperaments of the four Elements, as they are (among them) endowd

with

with the four first Qualities, they had endeavoured to do it by the Bulk and Figure of the smallest parts of those supposed Elements. For from these more Catholick and Fruitfull Accidents of the Elementary matter may spring a great variety of Textures, upon whose Account a multitude of compound Bodies may very much differ from one another. And what I now observe touching the four Peripatetick Elements, may be also applyed, *mutatis mutandis*, (as they speak) to the Chymical Principles. But (to take notice of that by the by) both the one and the other, must, I fear, call in to their assistance something that is not Elementary, to excite or regulate the motion of the parts of the matter, and dispose them after the manner requisite to the Constitution of particular Concretes. For that otherwise they are like to give us but a very imperfect account of the Origine of very many mixt Bodies, It would, I think, be no hard matter to perswade you, if it would not spend time, and were no Digression, to examine, what they are wont to alledge of the Origine of the Textures and Qualities of mixt Bodies, from

from a certain substantial Form, whose Origination they leave more obscure than what it is assum'd to explicate.

But to proceed to a new Proposition.

Propos. III.

I shall not peremptorily deny, that from most of such mixt Bodies as partake either of Animal or Vegetable Nature, there may by the Help of the Fire, be actually obtain'd a determinate number (whether Three, Four, or Five, or fewer or more) of Substances, worthy of differing Denominations.

Of the Experiments that induce me to make this Concession, I am like to have occasion enough to mention several in the prosecution of my Discourse. And therefore, that I may not hereafter be oblig'd to trouble You and my self with needless Repetitions, I shall now only desire you to take notice of such Experiments, when they shall be mention'd, and in your thoughts referre them hither.

To these three Concessions I have but this Fourth to add, That

Propos. IV. *It may likewise be granted, that those distinct Substances, which Concretes generally either afford or are made up of, may without very much Inconvenience be call'd the Elements or Principles of them.*

When I said, *without very much Inconvenience*, I had in my Thoughts that sober Admonition of *Galen*, *Cum de re constat, de verbis non est Litigandum.* And therefore also I scruple not to say *Elements* or *Principles*, partly because the Chymists are wont to call the Ingredients of mixt Bodies, *Principles*, as the *Aristotelians* name them *Elements*; I would here exclude neither. And, partly, because it seems doubtfull whether the same Ingredients may not be call'd *Principles*; as not being compounded of any more primary Bodies; and *Elements*, in regard that all mixt Bodies are compounded of them. But I thought it requisite to limit my Concession by premising the words, *very much*, to the word *Inconvenience*, because that though the Inconvenience of calling the distinct Substances, mention'd in the Proposition *Elements* or *Principles*, be not very great,

great; yet that it is Impropriety of Speech, and consequently in a matter of this moment not to be altogether over-look'd, You will perhaps think, as well as I, by that time you shall have heard the following part of my Discourse, by which you will best discern what Construction to put upon the former Propositions, and how far they may be look'd upon, as things that I concede as true, & how far as things I only represent as specious enough to be fit to be consider'd.

And now *Eleutherius* (continues *Carneades*) I must resume the person of a Sceptick, and as such, propose some part of what may be either dislik't, or at least doubted of in the common *Hypothesis* of the Chymists. which if I examine with a little the more freedom, I hope I need not desire you (a person to whom I have the Happiness of being so well known) to look upon it as something more suitable to the Employment whereto the Company has, for this Meeting, doom'd me; than either to my Humour or my Custom.

Now though I might present you many things against the Vulgar Chymical Opinion of the three Principles, and the

Ex-

Experiments wont to be alleg'd as Demonstrations of it, yet those I shall at present offer you may be conveniently enough comprehended in four Capital Considerations; touching all which I shall only premise this in general, That since it is not my present Task so much to assert an *Hypothesis* of my own, as to give an Account wherefore I suspect the truth of that of the Chymists, it ought not to be expected that all my Objections should be of the most cogent sort, since it is reason enough to Doubt of a propos'd Opinion, that there appears no cogent Reason for it.

To come then to the Objections themselves; I consider in the first place, That notwithstanding what common Chymists have prov'd or taught, it may reasonably enough be Doubted, how far, and in what sence, Fire ought to be esteem'd the genuine and universal Instrument of analyzing mixt Bodies.

This Doubt, you may remember, was formerly mention'd, but so transiently discours'd of, that it will now be fit to insist upon it; And manifest that it was not so inconsiderately propos'd as our Adversaries then imagin'd.

But,

But, before I enter any further into this Disquisition, I cannot but here take notice, that it were to be wish'd, our Chymists had clearly inform'd us what kind of Division of Bodies by Fire must determine the number of the Elements: For it is nothing near so easy as many seem to think, to determine distinctly the Effects of Heat, as I could easily manifest, if I had leasure to shew you how much the Operations of Fire may be diversify'd by Circumstances. But not wholly to pass by a matter of this Importance, I will first take notice to you, that *Guajacum* (for instance) burnt with an open Fire in a Chimney, is sequestred into Ashes and Soot, whereas the same Wood distill'd in a Retort does yield far other Heterogeneities, (to use the *Helmontian* expression) and is resolv'd into Oyl, Spirit, Vinegar, Water and Charcoal; the last of which to be reduc'd into Ashes, requires the being farther calcin'd than it can be in a close Vessel: Besides having kindled Amber, and held a clean Silver Spoon, or some other Concave and smooth Vessel over the Smoak of its Flame, I observ'd the Soot into which that Fume condens'd,

to be very differing from any thing that I had obſerv'd to proceed from the ſteam of Amber purpoſely (for that is not uſual) diſtilled *per ſe* in cloſe Veſſels. Thus having, for Tryals ſake, kindled Camphire and catcht the Smoak that copiouſly aſcended out of the Flame, it condens'd into a Black and unctuous Soot, which would not have been gueſs'd by the Smell or other Properties to have proceeded from Camphire: whereas having (as I ſhall otherwhere more fully declare) expos'd a quantity of that Fugitive Concrete to a gentle heat in a cloſe Glaſs-Veſſel, it ſublim'd up without ſeeming to have loſt any thing of its whiteneſs, or its Nature, both which it retain'd, though afterwards I ſo encreaſed the Fire as to bring it to Fuſion. And, beſides Camphire, there are divers other Bodies (that I elſewhere name) in which the heat in cloſe Veſſels is not wont to make any ſeparation of Heterogeneities, but only a comminution of Parts, thoſe that riſe firſt being Homogeneal with the others, though ſubdivided into ſmaller Particles: whence Sublimations have been ſtiled, *The Peſtles of the Chymiſts*. But not here to

to mention what I elſewhere take notice of, concerning common Brimſtone once or twice ſublim'd, that expos'd to a moderate Fire in Subliming-Pots, it riſes all into dry, and almoſt taſtleſs, Flowers; Whereas being expos'd to a naked Fire it affords ſtore of a Saline and Fretting Liquor: Not to mention this, I ſay, I will further obſerve to you, that as it is conſiderable in the *Analyſis* of mixt Bodies, whether the Fire act on them when they are expos'd to the open Air, or ſhut up in cloſe Veſſels, ſo is the degree of Fire, by which the *Analyſis* is attempted, of no ſmall moment. For a milde *Balneum* will ſever unfermented Blood (for inſtance) but into Phlegme and *Caput mortuum*, the latter whereof (which I have ſometimes had) hard, britle, and of divers Colours, (tranſparent almoſt like Tortoiſe-ſhell) preſs'd by a good Fire in a Retort yields a Spirit, an Oyl or two, and a volatile Salt, beſides another *Caput mortuum*. It may be alſo pertinent to our preſent Deſigne, to take notice of what happens in the making and diſtilling of Sope; for by one degree of Fire the Salt, the Water, and the Oyl or Greaſe, whereof that factitious

Concrete is made up, being boyl'd up together are eaſily brought to mingle and incorporate into one Maſs; but by another and further degree of Heat the ſame Maſs may be again divided into an oleagenous, and aqueous, a Saline, and an Earthy part. And ſo we may obſerve that impure Silver and Lead being expos'd together to a moderate Fire will thereby be colliquated into one Maſs, and mingle *per minima*, as they ſpeak; whereas a much vehementer Fire will drive or carry off the baſer Metals (I mean the Lead, and the Copper or other Alloy) from the Silver, though not, for ought appears, ſeparate them from one another. Beſides, when a Vegetable abounding in fixt Salt is analyz'd by a naked Fire, as one degree of Heat will reduce it into Aſhes, (as the Chymiſts themſelves teach us) ſo, by only a further degree of Fire, thoſe Aſhes may be vitrified and turn'd into Glaſs. I will not ſtay to examine how far a meere Chymiſt might on this occaſion demand, If it be lawful for an *Ariſtotelian* to make Aſhes, (which he miſtakes for meere Earth) paſs for an Element, becauſe by one degree of Fire it may be pro-

produc'd, why a Chymiſt may not upon the like Principle argue, that Glaſs is one of the Elements of many Bodies, becauſe that alſo may be obtain'd from them, barely by the Fire? I will not, I ſay, loſe time to examine this, but obſerve, that by a Method of applying the Fire, ſuch ſimilar Bodies may be obtain'd from a Concrete, as Chymiſts have not been able to ſeparate; either by barely burning it in an open Fire, or by barely diſtilling it in cloſe Veſſels. For to me it ſeems very conſiderable, and I wonder that men have taken ſo little notice of it, that I have not by any of the common wayes of Diſtillation in cloſe Veſſels, ſeen any ſeparation made of ſuch a volatile Salt as is afforded us by Wood, when that is firſt by an open Fire divided into Aſhes and Soot, and that Soot is afterwards plac'd in a ſtrong Retort, and compell'd by an urgent Fire to part with its Spirit, Oyl and Salt; for though I dare not peremptorily deny, that in the Liquors of *Guajacum* and other Woods diſtill'd in Retorts after the common manner, there may be Saline parts, which by reaſon of the Analogy may pretend to the name of ſome kinde of

Concrete is made up, being boyl'd up together are easily brought to mingle and incorporate into one Mass; but by another and further degree of Heat the same Mass may be again divided into an oleagenous, and aqueous, a Saline, and an Earthy part. And so we may observe that impure Silver and Lead being expos'd together to a moderate Fire will thereby be colliquated into one Mass, and mingle *per minima*, as they speak; whereas a much vehementer Fire will drive or carry off the baser Metals (I mean the Lead, and the Copper or other Alloy) from the Silver, though not, for ought appears, separate them from one another. Besides, when a Vegetable abounding in fixt Salt is analyz'd by a naked Fire, as one degree of Heat will reduce it into Ashes, (as the Chymists themselves teach us) so, by only a further degree of Fire, those Ashes may be vitrified and turn'd into Glass. I will not stay to examine how far a meere Chymist might on this occasion demand, If it be lawful for an *Aristotelian* to make Ashes, (which he mistakes for meere Earth) pass for an Element, because by one degree of Fire it may be pro-

produc'd, why a Chymist may not upon the like Principle argue, that Glass is one of the Elements of many Bodies, because that also may be obtain'd from them, barely by the Fire? I will not, I say, lose time to examine this, but observe, that by a Method of applying the Fire, such similar Bodies may be obtain'd from a Concrete, as Chymists have not been able to separate; either by barely burning it in an open Fire, or by barely distilling it in close Vessels. For to me it seems very considerable, and I wonder that men have taken so little notice of it, that I have not by any of the common wayes of Distillation in close Vessels, seen any separation made of such a volatile Salt as is afforded us by Wood, when that is first by an open Fire divided into Ashes and Soot, and that Soot is afterwards plac'd in a strong Retort, and compell'd by an urgent Fire to part with its Spirit, Oyl and Salt; for though I dare not peremptorily deny, that in the Liquors of *Guajacum* and other Woods distill'd in Retorts after the common manner, there may be Saline parts, which by reason of the Analogy may pretend to the name of some kinde of

volatile Salts; yet queſtionleſs there is a great diſparity betwixt ſuch Salts and that which we have ſometimes obtain'd upon the firſt Diſtillation of Soot (though for the moſt part it has not been ſeparated from the firſt or ſecond Rectification, and ſometimes not till the third) For we could never yet ſee ſeparated from Woods analyz'd only the vulgar way in cloſe veſſels any volatile Salt in a dry and Saline form, as that of Soot, which we have often had very Chryſtalline and Geometrically figur'd. And then, whereas the Saline parts of the Spirits of *Guajacum*, &c. appear upon diſtillation ſluggiſh enough, the Salt of Soot ſeems to be one of the moſt volatile Bodies in all Nature; and if it be well made will readily aſcend with the milde heat of a Furnace, warm'd only by the ſingle Wieck of a Lamp, to the top of the higheſt Glaſs Veſſels that are commonly made uſe of for Diſtillation: and beſides all this, the taſte and ſmell of the Salt of Soot are exceeding differing from thoſe of the Spirits of *Guajacum*, &c. and the former not only ſmells & taſtes much leſs like a vegetable Salt, than like that of Harts-horn, and other Animal

Animal Concretes; but in divers other Properties ſeems more of Kinne to the Family of Animals, than to that of vegetable Salts, as I may elſewhere (God permitting) have an occaſion more particularly to declare. I might likewiſe by ſome other Examples manifeſt, That the Chymiſts, to have dealt clearly, ought to have more explicitly and particularly declar'd by what Degree of Fire, and in what manner of Application of it, they would have us Judge a Diviſion made by the Fire to be a true *Analyſis* into their Principles, and the Productions of it to deſerve the name of Elementary Bodies. But it is time that I proceed to mention the particular Reaſons that incline me to Doubt, whether the Fire be the true and univerſal Analyzer of mixt Bodies; of which Reaſons what has been already objected may paſs for one.

In the next place I obſerve, That there are ſome mixt Bodies from which it has not been yet made appear, that any degree of Fire can ſeparate either Salt or Sulphur or Mercury, much leſs all the Three. The moſt obvious Inſtance of this Truth is Gold, which is a Body ſo fix'd, and wherein the Elementary

Ingredients (if it have any) are so firmly united to each other, that we finde not in the operations wherein Gold is expos'd to the Fire, how violent soever, that it does discernably so much as lose of its fixedness or weight, so far is it from being dissipated into those Principles, whereof one at least is acknowledged to be Fugitive enough; and so justly did the Spagyricall Poet somewhere exclaim,

Cuncta adeo miris illic compagibus hærent.

And I must not omit on this occasion to mention to you, *Eleutherius*, the memorable Experiment that I remember I met with in * *Gesto Claveus*, who, though a Lawyer by Profession, seems to have had no small Curiosity and Experience in Chymical affairs: He relates then, that having put into one small Earthen Vessel an Ounce of the most pure Gold, and into another the like weight of pure Silver, he plac'd them both in that part of a Glass-house Furnace wherein the Workmen keep their Metal, (as our English Artificers call their Liquid Glass) continually melted, and that having there kept both the Gold and the Silver in constant Fusion for two Moneths together, he afterwards took them out of the Furnace and the Vessels, and weighing both of them again, found that the Silver had not lost above a 12th part of its weight but the Gold had not of his lost any thing at all. And though our Author endeavours to give us of this a Scholastick Reason, which I suppose you would be as little satisfied with, as I was when I read it; yet for the matter of Fact, which will serve our present turne, he assures us, that though it be strange, yet Experience it self taught it him to be most true.

* *Gesto Claveus* Apolog. Argur. & Chrysopeia.

And though there be not perhaps any other Body to be found so perfectly fix'd as Gold, yet there are divers others so fix'd or compos'd, at least of so strictly united parts, that I have not yet observ'd the Fire to separate from them any one of the Chymists Principles. I need not tell you what Complaints the more Candid and Judicious of the Chymists themselves are wont to make of those Boasters that confidently pretend, that they have extracted the Salt or Sulphur of Quicksilver, when they have disguis'd it by Additaments, wherewith it resembles

ſembles the Concretes whoſe Names are given it; whereas by a skilfull and rigid *Examen*, it may be eaſily enough ſtript of its Diſguiſes, and made to appear again in the priſtine form of running Mercury. The pretended Salts and Sulphurs being ſo far from being Elementary parts extracted out of the Bodie of Mercurie, that they are rather (to borrow a terme of the Grammarians) De-compound Bodies, made up of the whole Metal and the *Menſtruum*, or other Additaments imploy'd to diſguiſe it. And as for Silver, I never could ſee any degree of Fire make it part with any of its three Principles. And though the Experiment lately mentioned from *Claveus* may beget a Suſpition that Silver may be diſſipated by Fire, provided it be extreamly violent and very laſting; yet it will not neceſſarily follow, that becauſe the Fire was able at length to make the Silver loſe a little of its weight, it was therefore able to diſſipate it into its Principles. For firſt I might alledge that I have obſerv'd little Grains of Silver to lie hid in the ſmall Cavities (perhaps glas'd over by a vitrifying heat) in Crucibles, wherein Silver has been long kept in Fuſion; whence

whence ſome Goldſmiths of my Acquaintance make a Benefit by grinding ſuch Crucibles to powder, to recover out of them the latent particles of Silver. And hence I might argue, that perhaps *Claveus* was miſtaken, and imagin'd that Silver to have been driven away by the Fire, that indeed lay in minute parts hid in his Crucible, in ſo many ſo ſmall a quantity as he miſt of ſo ponderous a Bodie might very well lie conceal'd.

But Secondly, admitting that ſome parts of the Silver were driven away by the violence of the Fire, what proof is there that it was either the Salt, the Sulphur, or the Mercury of the Metal, and not rather a part of it homogeneous to what remain'd? For beſides, that the Silver that was left ſeem'd not ſenſibly alter'd, which probably would have appear'd, had ſo much of any one of its Principles been ſeparated from it; We finde in other Mineral Bodies of a leſs permanent nature than Silver, that the Fire may divide them into ſuch minute parts, as to be able to carry them away with its ſelf, without at all deſtroying their Nature. Thus we ſee that in the refining

fining of Silver, the Lead that is mix'd with it (to carry away the Copper or other ignoble Mineral that embaſes the Silver) will, if it be let alone, in time evaporate away upon the Teſt; but if (as is moſt uſual amongſt thoſe that refine great quantities of Metals together) the Lead be blown off from the Silver by Bellowes, that which would elſe have gone away in the Form of unheeded ſteams, will in great part be collected not far from the Silver, in the Form of a Darkiſh Powder or Calx; which, becauſe it is blown off from Silver, they call Litharge of Silver. And thus *Agricola* in divers places informs us, when Copper, or the Oare of it is colliquated by the violence of the Fire with *Cadmia*, the Sparks, that in great multitudes do fly upwards, do ſome of them, ſtick to the vaulted Roofs of the Furnaces, in the form of little and (for the moſt part) White Bubbles, which therefore the Greeks, and, in imitation of them, our Drugſters call *Pompholyx*: and others more heavy partly adhere to the ſides of the Furnace, and partly (eſpecially if the Covers be not kept upon the Pots) fall to the Ground, and by reaſon of their Aſhy

Agricola de Natura Foſſil. Lib. 9. Cap. 11. & 12.

Aſhy Colour as well as Weight were called by the ſame Greeks σποδὸς, which, I need not tell you, in their Language ſignifies Aſhes. I might add, that I have not found that from Venetian Talck (I ſay Venetian becauſe I have found other kinds of that Mineral more open) from the *Lapis Oſſifragus*, (which the Shops call *Oſtiocolla*) from *Muſcovia* Glaſs, from pure and Fuſible Sand (to mention now no other Concretes) thoſe of my Acquaintance that have try'd, have been able by the Fire to ſeparate any one of the Hypoſtatical Principles; which you will the leſs ſcruple to believe, if you conſider that Glaſs may be made by the bare Colliquation of the Salt and Earth remaining in the Aſhes of a burnt Plant, and that yet common Glaſs, once made, does ſo far reſiſt the violence of the Fire, that moſt Chymiſts think it a Body more undeſtroyable than Gold it ſelf. For if the Artificer can ſo firmly unite ſuch comparative groſs Particles as thoſe of Earth and Salt that make up common Aſhes, into a Body indiſſoluble by Fire, why may not Nature aſſociate in divers Bodies the more minute Elementary Corpuſcles ſhe has at hand too firmly to

let

let them be ſeparable by the Fire? And on this Occaſion, *Eleutherius*, give me leave to mention to you two or three ſlight Experiments, which will, I hope be found more pertinent to our preſent Diſcourſe, than at firſt perhaps they will appear. The firſt is, that, having (for Tryals ſake) put a quantity of that Fugitive Concrete, Camphire, into a Glaſs Veſſel, and plac'd it in a gentle Heat, I found it (not leaving behinde, according to my Eſtimate, not ſo much as one Grain) to ſublime to the Top of the Veſſel into Flowers: Which in Whiteneſs, Smell, &c. ſeem'd not to differ from the Camphire it ſelf. Another Experiment is that of *Helmont*, who in ſeveral places affirms, That a Coal kept in a Glaſs exactly clos'd will never be calcin'd to Aſhes, though kept never ſo long in a ſtrong Fire: To countenance which I ſhall tell you this Tryal of my own, That having ſometimes diſtilled ſome Woods, as particularly Box, whilſt our *Caput mortuū* remain'd in the Retort, it continued black like Charcoal, though the Retort were Earthen, and kept red-hot in a vehement Fire; but as ſoon as ever it was brought out of the candent Veſſel

Veſſel into the open Air, the burning Coals did haſtily degenerate or fall aſunder, without the Aſſiſtance of any new Calcination, into pure white Aſhes. And to theſe two I ſhall add but this obvious and known Obſervation, that common Sulphur (if it be pure & freed from its Vinegar) being leaſurely ſublim'd in cloſe Veſſels, riſes into dry Flowers, which may be preſently melted into a Bodie of the ſame Nature with that which afforded them. Though, if Brimſtone be burnt in the open Air, it gives, you know, a penetrating Fume, which being caught in a Glaſs-Bell condenſes into that acid Liquor called Oyl of Sulphur *per Campanam*. The uſe I would make of theſe Experiments collated with what I lately told you out of *Agricola* is this, That even among the Bodies that are not fixt, there are divers of ſuch a Texture, that it will be hard to make it appear, how the Fire, as Chymiſts are wont to imploy it, can reſolve them into Elementary Subſtances. For ſome Bodies being of ſuch a Texture that the Fire can drive them into the cooler and leſs hot part of the Veſſels wherein they are included, and if need be, remove them from

place

place to place to fly the greatest heat, more easily than it can divorce their Elements(especially without the Assistance of the Air)we see that our Chymists cannot Analyze them in close Vessels,and of other compound Bodies the open Fire can as little separate the Elements. For what can a naked Fire do to Analyze a mixt Bodie, if its component Principles be so minute,and so strictly united, that the Corpuscles of it need less heat to carry them up,than is requisite to divide them into their Principles. So that of some Bodies the Fire cannot in close Vessels make any *Analysis* at all; and others will in the open Air fly away in the Forms of Flowers or Liquors,before the Heat can prove able to divide them into their Principles. And this may hold, whether the various similar parts of a Concrete be combin'd by Nature or by Art; For in factitious *Sal Armoniack* we finde the common and the Urinous Salts so well mingled, that both in the open Fire, and in subliming Vessels they rise togeher,as one Salt,which seems in such Vessels irresoluble by Fire alone. For I can shew you *Sal Armoniack* which after the ninth Sublimation does still retain its com-

compounded Nature. And indeed I scarce know any one Mineral, from which by Fire alone Chymists are wont to sever any Substance simple enough to deserve the name of an Element or Principle. For though out of native Cinnaber they distill Quicksilver,and though from many of those Stones that the Ancients called *Pyrites* they sublime Brimstone, yet both that Quicksilver and this Sulphur being very often the same with the common Minerals that are sold in the Shops under those names, are themselves too much compounded Bodies to pass for the Elements of such. And thus much,*Eleutherius*, for the *Se*cond Argument that belongs to my First Consideration; the others I shall the lesse insist on, because I have dwelt so long upon this.

Proceed we then in the next place to consider, That there are divers *Separations* to be made by other means, which either cannot at all, or else cannot so well be made by the Fire alone. When Gold and Silver are melted into one Mass, it would lay a great Obligation upon Refiners and Goldsmiths to teach them the Art of separating them,

by the Fire, without the trouble and charge they are fain to be at to sever them. Whereas they may be very easily parted by the Affusion of Spirit of Nitre or *Aqua fortis*; which the French therefore call *Eau de Depart*: So likewise the Metalline part of Vitriol will not be so easily and conveniently separated from the Saline part even by a violent Fire, as by the Affusion of certain Alkalizate Salts in a liquid Form upon the Solution of Vitriol made in common water. For thereby the acid Salt of the Vitriol leaving the Copper it had corroded to joyn with the added Salts, the Metalline part will be precipitated to the bottom almost like Mud. And that I may not give Instances only in De-compound Bodies, I will add a not useless one of another kinde. Not only Chymists have not been able (for ought is vulgarly known) by Fire alone to separate true Sulphur from Antimony; but though you may finde in their Books many plausible Processes of Extracting it, yet he that shall make as many fruitless Tryals as I have done to obtain it by most of them will, I suppose, be easily perswaded, that the Productions of such Processes are Antimonial *Sulphurs* rather in Name than Nature. But though Antimony sublim'd by its self is reduc'd but to a volatile Powder, or Antimonial Flowers, of a compounded Nature like the Mineral that affords them: yet I remember that some years ago I sublim'd out of Antimony a Sulphur, and that in greater plenty than ever I saw obtain'd from that Mineral, by a Method which I shall therefore acquaint you with, because Chymists seem not to have taken notice, of what Importance such Experiments may be in the Indagation of the Nature, and especially of the Number of the Elements. Having then purpose-for Tryals sake digested eight Ounces of good and well powder'd Antimony with twelve Ounces of Oyl of Vitriol in a well stopt Glass-Vessel for about six Weeks; and having caus'd the Mass (grown hard and brittle) to be distill'd in a Retort plac'd in Sand, with a strong Fire; we found the Antimony to be so opened, or alter'd by the *Menstruum* wherewith it had been digested, that whereas crude Antimony, forc'd by the Fire, arises only in Flowers, our Antimony thus handled afforded us

partly in the Receiver, and partly in the Neck and at the Top of the Retort, about an Ounce of Sulphur, yellow and brittle like common Brimstone, and of so *Sulphureous* a smell, that upon the unluting the Vessels it infected the Room with a scarce supportable stink. And this Sulphur, besides the Colour and Smell, had the perfect inflamability of common Brimstone, and would immediately kindle (at the Flame of a Candle) and burn blew like it. And though it seem'd that the long digestion wherein our Antimony and *Menstruum* were detain'd, did conduce to the better unlocking of the Mineral, yet if you have not the leasure to make so long a Digestion you may by incorporating with powder'd Antimony a convenient Quantity of Oyl of Vitriol, and committing them immediately to Distillation, obtain a little *Sulphur* like unto the common one, and more combustable than perhaps you will at first take notice of. For I have observ'd, that though (after its being first kindled) the Flame would sometimes go out too soon of its self, if the same Lump of *Sulphur* were held again to the Flame of a Candle, it would be

rekindled and burn a pretty while, not only after the second, but after the third or fourth accension. You, to whom I think I shewed my way of discovering something of *Sulphureous* in Oyl of Vitriol, may perchance suspect, *Eleutherius*, either that this *Substance* was some Venereal *Sulphur* that lay hid in that Liquor, and was by this operation only reduc'd into a manifest Body; or else that it was a compound of the unctuous parts of the Antimony, and the *Saline* ones of the Vitriol, in regard that (as *Gunther* informs us) divers learned men would have *Sulphur* to be nothing but a mixture made in the Bowels of the Earth of Vitriolate *Spirits* and a certain combustible *Substance*. But the Quantity of *Sulphur* we obtain'd by Digestion was much too great to have been latent in the Oyl of Vitriol. And that Vitriolate *Spirits* are not necessary to the Construction of such a *Sulphur* as ours, I could easily manifest, if I would acquaint you with the several wayes by which I have obtain'd though not in such plenty, a *Sulphur* of Antimony, colour'd and combustible like common Brimstone. And though I am not now minded

Lib. 1 Observat. Cap. 6.

to discover them, yet I shall tell you, that to satisfie some Ingenious Men, that distill'd Vitriolate Spirits are not necessary to the obtaining of such a *Sulphur* as we have been considering, I did by the bare distillation of only *Spirit* of Nitre, from its weight of crude Antimony separate, in a short time, a yellow and very inflamable *Sulphur*, which, for ought I know, deserves as much the name of an Element, as any thing that Chymists are wont to separate from any Mineral by the Fire. I could perhaps tell you of other Operations upon Antimony, whereby That may be extracted from it, which cannot be forc'd out of it by the Fire; but I shall reserve them for a fitter Opportunity, and only annex at present this slight, but not impertinent Experiment. That whereas I lately observed to you, that the Urinous and common *Salts* whereof *Sal Armoniack* consists, remain'd unsever'd by the Fire in many successive *Sublimations*, they may be easily separated, and partly without any Fire at all, by pouring upon the Concrete finely powder'd, a *Solution* of *Salt* of Tartar, or of the *Salt* of Wood-Ashes; for upon your diligently mixing of

of these you will finde your Nose invaded with a very strong smell of Urine, and perhaps too your Eyes forc'd to water, by the same subtle & piercing Body that produces the stink; both these effects proceding from hence, that by the Alcalizate *Salt*, the *Sea Salt* that enter'd the composition of the *Sal Armoniack* is mortify'd and made more fixt, and thereby a divorce is made between it and the volatile Urinous *Salt*, which being at once set at liberty, and put into motion, begins presently to fly away, and to offend the Nostrils and Eyes it meets with by the way. And if the operation of these *Salts* be in convenient Glasses promoted by warmth, though but by that of a Bath, the ascending *Steames* may easily be caught and reduc'd into a penetrant *Spirit*, abounding with a *Salt*, which I have sometimes found to be separable in a Chrystalline Form. I might add to these Instances, that whereas *Sublimate*, consisting, as you know, of *Salts* & Quicksilver combin'd and carried up together by Heat, may be *Sublim'd*, I know not how often, by a like degree of Fire, without suffering any divorce of the component Bodies, the Mercury may be ea-

ſily ſever'd from the adhering *Salts*, if the *Sublimate* be diſtill'd from *Salt* of Tartar, Quick Lime, or ſuch Alcalizate Bodies. But I will rather obſerve to you, *Eleutherius*, what divers ingenious men have thought ſomewhat ſtrange; that by ſuch an Additament that ſeems but only to promote the *Separation*, there may be eaſily obtain'd from a Concrete, that by the Fire alone is eaſily diviſible into all the Elements that Vegetables are ſuppos'd to conſiſt of, ſuch a ſimilar *Subſtance* as differs in many reſpects from them all, and conſequently has by many of the moſt Intelligent Chymiſts been denied to be contain'd in the mixt Body. For I know a way, and have practis'd it, whereby common Tartar, without the addition of any thing that is not perfectly a Mineral, except *Salt*-petre, may by one Diſtillation in an Earthen Retort be made to afford good ſtore of real *Salt*, readily diſſoluble in water, which I found to be neither acid, nor of the ſmell of Tartar, and to be almoſt as volatile as *Spirit* of Wine it ſelf, and to be indeed of ſo differing a Nature from all that is wont to be ſeparated by Fire from Tartar, and divers Learned

Learned Men, with whom I diſcours'd of it, could hardly be brought to beleeve, that ſo fugitive a *Salt* could be afforded by Tartar, till I aſſur'd it them upon my own Knowledge. And if I did not think you apt to ſuſpect me to be rather too backward than too forward to credit or affirm unlikely things, I could convince you by what I have yet lying by me of that anomalous *Salt*.

The Fourth thing that I ſhall alledge to countenance my firſt Conſideration is, That the Fire even when it divides a Body into *Subſtances* of divers Conſiſtences, does not moſt commonly analyze it into Hypoſtatical Principles, but only diſpoſes its parts into new Textures, & thereby produces Concretes of a new indeed, but yet of a compound Nature. This Argument it will be requiſite for me to proſecute ſo fully hereafter, that I hope you will then confeſs that 'tis not for want of good Proofs that I deſire leave to ſuſpend my Proofs till the *Series* of my Diſcourſe ſhall make it more proper and ſeaſonable to propoſe them.

It may be further alledg'd on the behalf of my Firſt Conſideration, That ſome ſuch diſtinct Subſtances may be obtain'd

tain'd from ſome Concretes without Fire, as deſerve no leſs the name of Elementary, than many that Chymiſts extort by the Violence of the Fire.

We ſee that the Inflamable Spirit, or as the Chymiſts eſteem it, the Sulphur of Wine, may not only be ſeparated from it by the gentle heat of a Bath, but may be diſtill'd either by the help of the Sun-Beams, or even of a Dunghill, being indeed of ſo Fugitive a Nature, that it is not eaſy to keep it from flying away, even without the Application of external heat. I have likewiſe obſerv'd that a Veſſel full of Urine being plac'd in a Dunghill, the Putrefaction is wont after ſome weeks ſo to open the Body, that the parts disbanding the Saline *Spirit*, will within no very long time, if the Veſſel be not ſtopt, fly away of it ſelf; Inſomuch that from ſuch Urine I have been able to diſtill little or nothing elſe than a nauſeous Phlegme, inſtead of the active and piercing *Salt* and *Spirit* that it would have afforded, when firſt expos'd to the Fire, if the Veſſel had been carefully ſtopt.

And this leads me to conſider in the Fifth place, That it will be very hard to prove,

prove, that there can no other Body or way be given which will as well as the Fire divide Concretes into ſeveral homogeneous Subſtances, which may conſequently be call'd their Elements or Principles, as well as thoſe ſeparated or produc'd by the Fire. For ſince we have lately ſeen, that Nature can ſucceſſefully employ other Inſtruments than the Fire to ſeparate diſtinct Subſtances from mixt Bodies, how I now ſee, but that Nature has made, or Art may make, ſome ſuch Subſtance as may be a fit Inſtrument to Analyze mixt Bodies, or that ſome ſuch Method may be found by Humane Induſtry or Luck, by whoſe means compound Bodies may be reſolv'd into other Subſtances, than ſuch as they are wont to be divided into by the Fire. And why the Products of ſuch an *Analyſis* may not as juſtly be call'd the component Principles of the Bodies that afford them, it will not be eaſy to ſhew, eſpecially ſince I ſhall hereafter make it evident, that the Subſtances which Chymiſts are wont to call the Salts, and Sulphurs, and Mercuries of Bodies, are not ſo pure and Elementary as they preſume, and as their *Hypotheſis* requires. And this may there

therefore be the more freely press'd upon the Chymists, because neither the *Paracelsians*, nor the *Helmontians* can reject it without apparent Injury to their respective Masters. For *Helmont* do's more than once Inform his Readers, that both *Paracelsus* and Himself were Possessors of the famous Liquor, *Alkahest*, which for its great power in resolving Bodies irresoluble by Vulgar Fires, he somewhere seems to call *Ignis Gehennæ*. To this Liquor he ascribes, (and that in great part upon his own Experience) such wonders, that if we suppose them all true, I am so much the more a Friend to Knowledge than to Wealth, that I should think the *Alkahest* a nobler and more desireable Secret than the Philosophers Stone it self. Of this Universal Dissolvent he relates, That having digested with it for a competent time a piece of Oaken Charcoal, it was thereby reduc'd into a couple of new and distinct Liquors, discriminated from each other by their Colour and Situation, and that the whole body of the Coal was reduc'd into those Liquors, both of them separable from his Immortal *Menstruum*, which remain'd as fit for such Operations

ons as before. And he moreover tells us in divers places of his Writings, that by his powerful, and unwearied Agent, he could dissolve Metals, Marchasites, Stones, Vegetable and Animal Bodies of what kinde soever, and even Glass it self (first reduc'd to powder,) and in a word, all kind of mixt Bodies in the World into their several similar Substances, without any Residence or *Caput mortuum*. And lastly, we may gather this further from his Informations, That the homogeneous Substances obtainable from compound Bodies by his piercing Liquor, were oftentimes different enough both as to Number and as to Nature, from those into which the same Bodies are wont to be divided by common Fire. Of which I shall need in this place to mention no other proof, than that whereas we know that in our common *Analysis* of a mixt Body, there remains a terrestrial and very fixt Substance, oftentimes associated with a Salt as fixt; Our Author tells us, that by his way he could Distill over all Concretes without any *Caput mortuum*, and consequently could make those parts of the Concrete volatile, which in the Vulgar *Analysis* would have

been

been fixt. So that if our Chymists will not reject the solemn and repeated Testimony of a Person, who cannot but be acknowledg'd for one of the greatest Spagyrists that they can boast of, they must nor deny that there is to be found in Nature another Agent able to Analyze compound Bodies less violently, and both more genuinely and more universally than the Fire. And for my own part, though I cannot but say on this Occasion what (you know) our Friend Mr. *Boyle* is wont to say, when he is askt his Opinion of any strange Experiment; *That He that hath seen it hath more Reason to beleeve it, than He that hath not*, yet I have found *Helmont* so faithful a Writer, even in divers of his improbable Experiments (I alwaies except that Extravagant Treatise *De Magnetica Vulnerũ Curatione*, which some of his Friends affirm to have been first publish'd by his Enemies) that I think it somewhat harsh to give him the Lye, especially to what he delivers upon his own proper Tryal. And I have heard from very credible Eye-witnesses some things, and seen some others my self, which argue so strongly, that a circulated Salt, or a *Menstruum* (such

(such as it may be) may by being abstracted from compound Bodies, whether Mineral, Animal, or Vegetable, leave them more unlockt than a wary Naturalist would easily beleeve, that I dare not confidently measure the Power of Nature and Art by that of the *Menstruums*, and other Instruments that eminent Chymists themselves are as yet wont to employ about the Analyzing of Bodies; nor Deny that a *Menstruum* may at least from this or that particular Concrete obtain some apparently similar Substance, differing from any obtainable from the same Body by any degree or manner of Application of the Fire. And I am the more backward to deny peremptorily, that there may be such Openers of compound Bodies, because among the Experiments that make me speak thus warily, there wanted not some in which it appear'd not, that one of the Substances, not separable by common Fires and *Menstruums*, could retain any thing of the Salt by which the separation was made.

And here, *Eleutherius*, (saies *Carneades*) I should conclude as much of my Discourse as belongs to the first Consideration

sideration I propos'd, but that I foresee, that what I have delivered will appear liable to two such specious Objections, that I cannot safely proceed any further till I have examin'd them.

And first, one sort of Opposers will be forward to tell me, That they do not pretend by Fire alone to separate out of all compound Bodies their *Hypostatical* Principles; it being sufficient that the Fire divides them into such, though afterwards they employ other Bodies to collect the similar parts of the Compounds; as 'tis known, that though they make use of water to collect the Saline parts of Ashes from the Terrestrial wherewith they are blended, yet it is the Fire only that Incinerates Bodies, and reduces the fix'd part of them into the Salt and Earth, whereof Ashes are made up. This Objection is not, I confess, inconsiderable, and I might in great part allow of it, without granting it to make against me, if I would content my self to answer, that it is not against those that make it that I have been disputing, but against those Vulgar Chymists, who themselves believe, and would fain make others do so, That the Fire is not only an

an universal, but an adequate and sufficient Instrument to analyze mixt Bodies with. For as to their Practice of Extracting the fix'd Salt out of Ashes by the Affusion of Water, 'tis obvious to alledge, that the Water does only assemble together the Salt, the Fire had before divided from the Earth: as a Sieve does not further break the Corn, but only bring together into two distinct heaps the Flower and the Bran, whose Corpuscles before lay promiscuously blended together in the Meal. This I say I might alledge, and thereby exempt my self from the need of taking any farther notice of the propos'd Objection. But not to lose the Rise it may afford me of Illustrating the matter under Consideration, I am content briefly to consider it, as far forth as my present Disquisition may be concern'd in it.

Not to repeat then what has been already answer'd, I say further, that though I am so civil an Adversary, that I will allow the Chymists, after the Fire has done all its work, the use of fair Water to make their Extractions with, in such cases wherein the Water does not cooperate with the Fire to make the *Ana-*

lysis; yet since I Grant this but upon Supposition that the Water does only wash off the Saline Particles, which the Fire alone has before Extricated in the Analyz'd Body, it will not be Reasonable, that this Concession should Extend to other Liquors that may Add to what they Dissolve, nor so much as to other Cases than those Newly Mentioned: Which Limitation I Desire You would be Pleas'd to Bear in Mind till I shall Anon have Occasion to make Use of it. And This being thus Premis'd, I shall Proceed to Observe,

First, That Many of the Instances I Propos'd in the Preceding Discourse are Such, that the Objection we are Considering will not at all Reach Them. For Fire can no more with the Assistance of Water, than without it, Separate any of the Three Principles, either from Gold, Silver, Mercury, or some Others of the Concretes named Above:

Hence We may Inferre, That Fire is not an Universal Analyzer of all Mixt Bodies, since of Metals and Minerals, wherein Chymists have most Exercis'd Themselves, there Appear scarce Any which they are able to Analyze by Fire, Nay,

Nay, from which they can Unquestionably Separate so much as any One of their Hypostatical Principles; Which may well Appear no small Disparagement, as well to their *Hypothesis*, as to their Pretensions.

It will also remain True, notwithstanding the Objection, That there may be Other Wayes, than the wonted *Analysis* by Fire, to Separate from a Compound Body Substances as Homogeneous as those that Chymists Scruple not to Reckon among their *Tria Prima* (as some of them, for Brevity Sake, call their Three Principles.)

And it Appears, That by Convenient Additaments such Substances may be Separated by the Help of the Fire, as would not be so by the Fire alone: Witness the Sulphur of Antimony.

And Lastly, I must Represent, That since it appears too that the Fire is but One of the Instruments that must be Employ'd in the Resolution of Bodies, We may Reasonably Challenge the Liberty of doing Two Things. For when ever any *Menstruum* or other Additament is Employ'd, together with the Fire to Obtain a Sulphur or a Salt from

a Body, We may well take the Freedom to Examine, whether or no That *Menſtruum* do barely Help to Separate the Principle Obtain'd by It, or whether there Intervene not a Coalition of the Parts of the Body Wrought upon with Thoſe of the *Menſtruum*, whereby the Produc'd Concrete may be Judg'd to Reſult from the Union of Both. And it will be farther Allowable for Us to Conſider, how far any Subſtance, Separated by the Help of ſuch Additaments, Ought to paſs for one of the *Tria Prima*; ſince by One Way of Handling the ſame Mixt Body, it may, according to the Nature of the Additaments, and the Method of Working upon it, be made to Afford differing Subſtances from thoſe Obtainable from it by other Additaments, and another Method, nay and (as may appear by what I Formerly told You about Tartar) Differing from any of the Subſtances into which a Concrete is Diviſible by the Fire without Additaments; though perhaps thoſe Additaments do not, as Ingredients, enter the Compoſition of the Obtained Body, but only Diverſify the Operation of the Fire upon the Concrete; and though that

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Concrete by the Fire alone may be Divided into a Number of Differing Subſtances, as Great as any of the Chymiſts; that I have met with, teach us that of the Elements to be. And having ſaid thus much (ſaies *Carneades*) to the Objection likely to be Propos'd by ſome Chymiſts, I am now to Examine that which I Foreſee will be Confidently preſs'd by Divers Peripateticks, who, to Prove Fire to be the true Analyzer of Bodies, will Plead, That it is the very Definition of Heat given by *Ariſtotle*, and Generally Received, *Congregare Homogenea, & Heterogenea Segregare*, to Aſſemble Things of a Reſembling, and Disjoyn thoſe of a Differing Nature. To this I anſwer, That this Effect is far from being ſo Eſſential to Heat, as 'tis Generally Imagin'd; for it rather Seems, that the True and Genuine Property of Heat is, to ſet a Moving, and thereby to Diſſociate the parts of Bodies, and Subdivide them into Minute Particles, without regard to their being Homogeneous or Heterogeneous, as is apparent in the Boyling of Water, the Diſtillation of Quickſilver, or the Expoſing of Bodies to the action of the Fire, whoſe Parts

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either Are not (at leaſt in that Degree of Heat Appear not) Diſſimilar, where, all that the Fire can do, is to Divide the Body into very Minute Parts which are of the ſame Nature with one another, and with their *Totum*, as their Reduction by Condenſation Evinces. And even when the Fire ſeems moſt ſo *Congregare Homogenea, & Segregare Heterogenea*, it Produces that Effect but by Accident; For the Fire does but Diſſolve the Cement, or rather Shatter the Frame, or ſtructure that kept the Heterogeneous Parts of Bodies together, under one Common Form; upon which Diſſolution the Component Particles of the Mixt, being Freed and ſet at Liberty, do Naturally, and oftentimes without any Operation of the Fire, Aſſociate themſelves each with its Like, or rather do take thoſe places which their Several Degrees of Gravity and Levity, Fixedneſs or Volatility (either Natural, or Adventitious from the Impreſſion of the Fire) Aſſigne them. Thus in the Diſtillation (for Inſtance) of Man's Blood, the Fire do's Firſt begin to Diſſolve the *Nexus* or Cement of the Body; and then the Water, being the moſt Vo-

Volatile, and Eaſy to be Extracted, is either by the Igneous Atomes, or the Agitation they are put into by the Fire, firſt carried up, till Forſaken by what carried it up, its Weight ſinks it down, into the Receiver: but all this while the other Principles of the Concrete Remain Unſever'd, and Require a ſtronger Degree of Heat to make a Separation of its more Fixt Elements; and therefore the Fire muſt be Increas'd which Carries over the Volatile Salt and the Spirit, they being, though Beleev'd to be Differing Principles, and though Really of Different Conſiſtency, yet of an almoſt Equal Volatility. After them, as leſs Fugitive, comes over the Oyl, and leaves behinde the Earth and the *Alcali*, which being of an Equal Fixedneſſe, the Fire Severs them not, for all the Definition of the Schools. And if into a Red-hot Earthen or Iron Retort you caſt the Matter to be Diſtill'd, You may Obſerve, as I have often done, that the Predominant Fire will Carry up all the Volatile Elements Confuſedly in one Fume, which will afterwards take their Places in the Receiver, either according to the Degree of their Gravity, or ac-

cording to the Exigency of their respective Textures; the Salt Adhering, for the most part, to the Sides and Top, and the Phlegme Fastening it self there too in great Drops, the Oyle and Spirit placing themselves Under, or Above one another, according as their Ponderousness makes them Swim or Sink. For 'tis Observable, that though Oyl or Liquid Sulphur be one of the Elements Separated by this Fiery *Analysis*, yet the Heat which Accidentally Unites the Particles of the other Volatile Principles, has not alwayes the same Operation on this, there being divers Bodies which Yield Two Oyls, whereof the One sinks to the Bottom of that Spirit on which the other Swims; as I can shew You in some Oyls of the same Deers Blood, which are yet by Me: Nay I can shew you Two Oyls carefully made of the same Parcel of Humane Blood, which not only Differ extreamly in Colour, but Swim upon one another without Mixture, and if by Agitation Confounded will of themselves Divorce again.

And that the Fire doth oftentimes divide Bodies, upon the account that some of

of their Parts are more Fixt, and some more Volatile, how far soever either of these Two may be from a pure Elementary Nature is Obvious enough, if Men would but heed it in the Burning of Wood, which the Fire Dissipates into Smoake and Ashes: For not only the latter of these is Confessedly made up of two such Differing Bodies as Earth and Salt; but the Former being condens'd into that Soot which adheres to our Chimneys, Discovers it self to Contain both Salt and Oyl, and Spirit and Earth, (and some Portion of Phlegme too) which being, all almost, Equally Volatile to that Degree of Fire which Forces them up, (the more Volatile Parts Helping perhaps, as well as the Urgency of the Fire, to carry up the more Fixt ones, as I have often Try'd in Dulcify'd *Colcothar*, Sublim'd by *Sal Armoniack* Blended with it) are carried Up together, but may afterwards be Separated by other Degrees of Fire, whose orderly Gradation allowes the Disparity of their Volatileness to Discover it self. Besides, if Differing Bodies United into one Mass be both sufficiently Fixt, the Fire finding no Parts Volatile enough

enough to be Expell'd or carried up, makes no Separation at all; as may appear by a Mixture of Colliquated Silver and Gold, whose Component Metals may be easily Sever'd by *Aqua fortis*, or *Aqua Regis* (according to the Predominancy of the Silver or the Gold) but in the Fire alone, though vehement, the Metals remain unsever'd, the Fire only dividing the Body into smaller Particles (whose Littleness may be argued from their Fluidity) in which either the little nimble Atoms of Fire, or its brisk and numberless strokes upon the Vessels, hinder Rest and Continuity, without any Sequestration of Elementary Principles. Moreover, the Fire sometimes does not Separate, so much as Unite, Bodies of a differing Nature; provided they be of an almost resembling Fixedness, and have in the Figure of their Parts an Aptness to Coalition, as we see in the making of many Plaisters, Oyntments, &c. And in such Metalline Mixtures as that made by Melting together two parts of clean Brass with one of pure Copper, of which some Ingenious Trades-men cast such curious Patterns (for Gold and Silver Works) as

as I have sometimes taken great Pleasure to Look upon. Sometimes the Bodies mingled by the Fire are Differing enough as to Fixidity and Volatility, and yet are so combin'd by the first Operation of the Fire, that it self does scarce afterwards Separate them, but only Pulverize them; hereof an Instance is afforded us by the Common Preparation of *Mercurius Dulcis*, where the Saline Particles of the Vitriol, Sea Salt, and sometimes Nitre, Employ'd to make the Sublimate, do so unite themselves with the Mercurial Particles made use of, first to Make Sublimate, and then to Dulcifie it, that the Saline and Metalline Parts arise together in many successive Sublimations, as if they all made but one Body. And sometimes too the Fire does not only not Sever the Differing Elements of a Body, but Combine them so firmly, that Nature her self does very seldom, if ever, make Unions less Dissoluble. For the Fire meeting with some Bodies exceedingly and almost equally Fixt, instead of making a Separation, makes an Union so strict, that it self, alone, is unable to Dissolve it; As we see, when an Alcalizate

lizate Salt and the Terrestrial Residue of the Ashes are Incorporated with pure Sand, and by Vitrification made one permanent Body, (I mean the course or greenish sort of Glass) that mocks the greatest Violence of the Fire, which though able to Marry the Ingredients of it, yet is not able to Divorce them. I can shew you some pieces of Glass which I saw flow down from an Earthen Crucible purposely Expos'd for a good while, with *Silver* in it, to a very vehement Fire. And some that deal much in the Fusion of Metals Informe me, that the melting of a great part of a Crucible into Glass is no great Wonder in their Furnaces. I remember, I have Observ'd too in the Melting of great Quantities of Iron out of the Oar, by the Help of store of Charcoal (for they Affirm that *Sea*-Coal will not yield a Flame strong enough) that by the prodigious Vehemence of the Fire, Excited by vast Bellows (made to play by great Wheels turn'd about by Water) part of the Materials Expos'd to it was, instead of being Analyz'd, Colliquated, and turn'd into a Dark, *Solid* and very Ponderous Glass, and that in such Quantity,

tity; that in some places I have seen the very High-wayes, neer such Iron-works, mended with Heaps of such Lumps of Glasse, instead of *Stones* and Gravel. And I have also Observ'd, that some kind of Fire-stone it *Self*, having been employ'd in Furnaces wherein it was expos'd to very strong and lasting Fires, has had all its Fixt Parts so Wrought on by the Fire, as to be Perfectly Vitrifi'd, which I have try'd by Forcing from it Pretty large Pieces of Perfect and Transparent Glass. And lest You might think, *Eleutherius*, that the Question'd Definition of Heat may be Demonstrated, by the Definition which is wont to be given and Acquiesc'd in, of its contrary Quality, Cold, whose property is taught to be *tam Homogenea, quam Heterogenea congregare*, Give me leave to represent to You, that neither is this Definition unquestionable; for not to Mention the Exceptions, which a *Logician*, as such, may Take at it, I Consider that the Union of Heterogeneous Bodies which is *Suppos'd* to be the Genuine Production of Cold, is not Perform'd by every Degree of Cold. For we see for Instance that in the Urine of Healthy

Healthy Men; when the Liquor has been Suffer'd a while to ſtand, the Cold makes a Separation of the Thinner Part from the Groſſer, which Subſides to the Bottom, and Growes Opacous there; whereas if the Urinal be Warme, theſe Parts readily Mingle again, and the whole Liquor becomes Tranſparent as before. And when, by Glaciation, Wood, Straw, Duſt, Water, &c. are Suppos'd to be United into one Lump of Ice, the Cold does not Cauſe any Real Union or Adunation, (if I may ſo Speak) of theſe Bodies, but only Hardening the Aqueous Parts of the Liquor into Ice, the other Bodies being Accidentally Preſent in that Liquor are frozen up in it, but not Really United. And accordingly if we Expoſe a Heap of Mony Conſiſting of Gold, Silver and Copper Coynes, or any other Bodies of Differing Natures, which are Deſtitute of Aqueous Moiſture, Capable of Congelation, to never ſo intenſe a Cold, we find not that theſe Differing Bodies are at all thereby ſo much as Compacted, much leſs United together; and even in Liquors Themſelves we find *Phænomena* which

which Induce us to Queſtion the Definition which we are examining. If *Paracelſus* his Authority were to be look't upon as a Sufficient Proof in matters of this Nature, I might here inſiſt on that Proceſs of his, whereby he Teaches that the Eſſence of Wine may be Sever'd from the Phlegme and Ignoble Part by the Aſſiſtance of Congelation: and becauſe much Weight has been laid upon this Proceſs, not only by *Paracelſians*, but other Writers, ſome of whom ſeem not to have perus'd it themſelves, I ſhall give You the entire Paſſage in the Authors own Words, as I lately found them in the ſixth Book of his *Archidoxis*, an Extract whereof I have yet about me; and it ſounds thus. *De Vino ſciendum eſt, fæcem phlegmaque ejus eſſe Mineram, & Vini ſubſtantiam eſſe corpus in quo conſervatur Eſſentia, prout auri in auro latet Eſſentia. Juxta quod Practicam nobis ad Memoriam ponimus, ut non obliviſcamur, ad hunc modum: Recipe Vinum vetuſtiſſimum & optimum quod habere poteris, calore ſaporeque ad placitum, hoc in vas vitreum infundas ut tertiam ejus partem impleat, & ſigillo Hermetis occluſum*

in

in equino ventre mensibus quatuor, & in continuato calore teneatur qui non deficiat. Quo peracto, Hyeme cum frigus & gelu maxime sæviunt, his per mensem exponatur ut congeletur. Ad hunc modum frigus vini spiritum una cum ejus substantia protrudit in vini centrum, ac separat a phlegmate: Congelatum abjice, quod vero congelatum non est, id Spiritum cum substantia esse judicato. Hunc in Pelicanum positum in arenæ digestione non adeo calida per aliquod tempus manere sinito; Postmodum eximito vini Magisterium, de quo locuti sumus.

But I dare not *Eleu.* lay much Weight upon this Process, because I have found that if it were True, it would be but seldom Practicable in this Countrey upon the best Wine: for Though this present Winter hath been Extraordinary Cold, yet in very Keen Frosts accompanied with lasting Snowes, I have not been able in any Measure to Freez a thin Vial full of Sack; and even with Snow and Salt I could Freeze little more then the Surface of it; and I suppose *Eleu.* that tis not every Degree of Cold that is Capable of Congealing Liquors, which is able to make such an *Analysis* if

(if I may so call it) of them by Separating their Aqueous and Spirituous Parts; for I have sometimes, though not often, frozen severally, Red-Wine, Urine and Milk, but could not Observe the expected Separation. And the Dutch-Men that were forc'd to Winter in that Icie Region neer the Artick Circle, call'd *Nova Zembla*, although they relate, as we shall see below, that there was a Separation of Parts made in their frozen Beer about the middle of *November* yet of the freezing of their Sack in *December* following they give but this Account: *Ten and our Sack, which is so hot, was Frozen very hard, so that when we were every Man to have his part, we were forc'd to melt it in the Fire; which we shar'd every second Day, about half a Pinte for a Man, wherewith we were forc'd to sustain our selves.* In which words they imply not, that their Sack was divided by the Frost into differing Substances, after such manner as their Beer had been. All which notwithstanding, *Eleu.* suppose that it may be made to appear, that even Cold sometimes may *Congregare Homogenea, & Heterogenea Segregare*: and to Manifest this I may tell you,

that I did once, purposely, cause to be Decocted in fair Water a Plant abounding with Sulphureous and Spirituous Parts, and having expos'd the Decoction to a keen North-Wind in a very Frosty Night, I observ'd, that the more Aqueous Parts of it were turn'd by the next Morning into Ice, towards the innermost part of which, the more Agile and Spirituous parts, as I then conjectur'd, having Retreated, to shun as much as might be their Environing Enemy, they had there preserv'd themselves unfrozen in the Form of a high colour'd Liquor; the Aqueous and Spirituous parts having been so slightly (Blended rather than) United in the Decoction, that they were easily Separable by such a Degree of Cold, as would not have been able to have Divorc'd the Parts of Urine or Wine, which by Fermentation or Digestion are wont, as Tryal has inform'd me, to be more intimately associated each with other. But I have already intimated, *Eleutherius*, that I shall not Insist on this Experiment, not only because having made it but once I may possibly have been mistaken in it; but also (and that principally) because of that much more

more full and eminent Experiment of the Separative Vertue of extream Cold, that was made, against their Wills, by the forementiond Dutch men that Winter'd in *Nova Zembla*; the Relation of whose Voyage being a very scarce Book, it will not be amiss to give you that Memorable part of it which concerns our present Theme, as I caus'd the Passage to be extracted out of the Englished Voyage it self.

"*Gerard de Veer*, *John Cornelyson* and "Others, sent out of *Amsterdam*, *Anno* "*Dom.* 1596. being forc'd by unseasonable Weather to Winter in *Nova Zembla*, near Ice-Haven; on the thirteenth "of *October*, Three of us (saies the Relation) went aboard the Ship, and laded a Sled with Beer; but when we had laden it, thinking to go to our House with it, suddenly there arose such a Winde, and so great a Storm and Cold, that we were forc'd to go into the Ship again, because we were not able to stay without; and we could not get the Beer into the Ship again, but were forc'd to let it stand without upon the Sled: the Fourteenth, as we came out of the Ship, we found the Barrel of

"Beer ſtanding upon the Sled, but it was
"faſt frozen at the Heads; yet by rea-
"ſon of the great Cold, the Beer that
"purg'd out, froze as hard upon the Side
"of the Barrel, as if it had been glu'd
"thereon: and In that ſort we drew
"it to our Houſe, and ſet the Barrel an
"end, and drank it up; but firſt we were
"forc'd to melt the Beer, for there was
"ſcarce any unfrozen Beer in the bar-
"rel; but in that thick Yeaſt that was
"unfrozen, lay the Strength of the Beer,
"ſo that it was too ſtrong to drink a-
"lone, and that which was frozen
"taſted like Water; and being melted
"we Mix'd one with the other, and ſo
"drank it; but it had neither Strength
"nor Taſt.

And on this Occaſion I remember, that having the laſt very Sharp Winter purpoſely try'd to Freeze, among other Liquors, ſome Beer moderately ſtrong, in Glaſs Veſſels, with Snow and Salt, I obſerv'd, that there came out of the Neck a certain thick Subſtance, which, it ſeems, was much better able than the reſt of the Liquor (that I found turn'd into Ice) to reſiſt a Froſt; and which, by its Colour and conſiſtence ſeem'd ma-

nifeſtly enough to be Yeaſt, whereat, I confeſs, I ſomewhat marvail'd, becauſe I did not either diſcerne by the Taſte, or find by Enquiry, that the Beer was at all too New to be very fit to be Drank. I might confirm the Dutchmens Relation, by what happen'd a while ſince to a neere Friend of mine, who complained to me, that having Brew'd ſome Beer or Ale for his own drinking in *Holland* (where he then dwelt) the Keenneſs of the late bitter Winter froze the drink ſo as to reduce it into Ice, and a ſmall Proportion of a very Strong and Spirituous Liquor. But I muſt not entertaine you any longer concerning Cold, not onely becauſe you may think I have but loſt my way into a Theme which does not directly belong to my preſent Undertaking; but becauſe I have already enlarg'd my ſelf too much upon the firſt Conſideration I propos'd, though it appears ſo much a Paradox, that it ſeem'd to require that I ſhould ſay much to keep it from being thought a meer Extravagance; yet ſince I Undertook but to make the common Aſſumption

of our Chymists and *Aristotelians* appear Questionable, I hope I have so Perform'd that Task, that I may now Proceed to my Following Considerations, and Insist less on them than I have done on the First.

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The Second Part.

THE Second Consideration I Desire to have Notice Taken of, is This; That it is not so Sure, as Both Chymists and *Aristotelians* are wont to Think it, that every Seemingly Similar or Distinct Substance that is Separated from a Body by the Help of the Fire, was Pre-existent in it as a Principle or Element of it.

That I may not make this Paradox a Greater than I needs must, I will First Briefly Explain what the Proposition means, before I proceed to Argue for it.

And I suppose You will easily Believe

That I do not mean that any thing is ſeparable from a body by Fire, that was not Materially pre-exiſtent in it; for it Far Exceeds the power of Meerly Naturall Agents, and Conſequently of the Fire, to produce anew, ſo Much as one Atome of Matter, which they can but Modifie and Alter, not Create; which is ſo Obvious a Truth, that almoſt all Sects of Philoſophers have Deny'd the Power of producing Matter to Second Cauſes; and the *Epicureans* and ſome Others have Done the Like, in Reference to their Gods themſelves.

Nor does the Propoſition peremptorily Deny, but that ſome Things Obtain'd by the Fire from a Mixt Body, may have been more than barely Materially pre-exiſtent in it, ſince there are Concretes, which before they be Expos'd to the Fire afford us ſeveral Documents of their abounding, ſome with Salt, and Others with Sulphur. For it will ſerve the preſent Turn, if it appear that diverſe things Obtain'd from a Mixt Body expos'd to the Fire, were not its Ingredients Before: for if this be made to appear, it will be Rationall enough

nough to ſuſpect that Chymiſts may Deceive themſelves, and Others, in concluding Reſolutely and Univerſally, thoſe Subſtances to be the Elementary Ingredients of Bodies barely ſeparated by the Fire, of which it yet may be Doubted, Whether there be ſuch or No; at leaſt till ſome other Argument, than that drawn from the *Analyſis*, be Brought to reſolve the Doubt.

That then which I Mean by the Propoſition I am Explaining, is, That it may without Abſurdity be Doubted whether or no the Differing Subſtances Obtainable from a Concrete Diſſipated by the Fire were ſo Exiſtent in it in that Forme (at leaſt as to their minute Parts) wherein we find them when the *Analyſis* is over, that the Fire did only Dis-joyne and Extricate the Corpuſcles of one Principle from thoſe of the other wherewith before they were Blended.

Having thus Explain'd my Propoſition, I ſhall endeavour to do two things, to prove it; The firſt of which is to ſhew that ſuch Subſtances as Chymiſts call Principles may be produc'd *De novo.* (as they ſpeak) And the other is to make

make it probable, that by the Fire we may Actually obtain from some Mixt Bodies such Substances, as were not in the Newly Expounded sence, pre-existent in them.

To begin then with the First of these, I Consider that if it be as true, as 'tis probable, that Compounded Bodies Differ from One Another but in the Various Textures Resulting from the Bigness, Shape, Motion, and contrivance of their small parts, It will not be Irrational to conceive that one and the same parcel of the Universall Matter may by Various Alterations and Contextures be brought to Deserve the Name, sometimes of a Sulphureous, and sometimes of a Terrene, or Aqueous Body. And this I could more largely Explicate, but that our Friend Mr. *Boyle* has promis'd us something about Qualities, wherein the Theme I now willingly Resign him, Will I Question not be Studiously Enquired into. Wherefore what I shall now advance in favour of what I have lately Deliver'd shall be Deduc'd from Experiments made Divers Years since. The first of which would have been much more con-

siderable, but that by some intervening Accidents I was Necessitated to lose the best time of the year, for a trial of the Nature of that I design'd; it being about the middle of *May* before I was able to begin an Experiment which should have then been two moneths old; but such as it was, it will not perhaps be impertinent to Give You this Narrative of it. At the time newly Mention'd, I caus'd My Gardiner (being by Urgent Occasions Hinder'd from being present my self) to dig out a convenient quantity of good Earth, and dry it well in an Oven, to weigh it, to put it in an Earthen pot almost level with the Surface of the ground, and to set in it a selected seed he had before received from me, for that purpose, of Squash, which is an Indian kind of Pompion, that Growes a pace; this seed I Ordered Him to Water only with Rain or Spring Water. I did not (when my Occasions permitted me to visit it) without delight behold how fast it Grew, though unseasonably sown; but the Hastning Winter Hinder'd it from attaining any thing neer its due and Wonted magnitude; (for I found the

the ſame Autumn, in my Garden, ſome of thoſe plants, by Meaſure, as big about as my Middle) and made me order the having it taken Up; which about the Middle of *October* was carefully Done by the ſame Gardiner, who a while after ſent me this account of it; *I have Weighed the Pompion with the Stalk and Leaves, all which Weighed three pound wanting a quarter; Then I took the Earth, baked it as formerly, and found it juſt as much as I did at Firſt, which made me think I had not dry'd it Sufficiently: then I put it into the Oven twice More, after the Bread was Drawn, and Weighed it the Second time, but found it Shrink little or nothing.*

But to deal Candidly with You, *Eleutherius*, I muſt not conceal from You the Event of another Experiment of this Kind made this preſent Summer, wherein the Earth ſeems to have been much more Waſted; as may appear by the following account, Lately ſent me by the ſame Gardiner, in theſe Words. *To give You an Account of your Cucumbers, I have Gain'd two Indifferent Fair Ones, the Weight of them is ten Pound and a Halfe, the Branches with the Roots*

Roots Weighed four Pounds wanting two Ounces; and when I had weighed them I took the Earth, and bak'd it in ſeveral ſmall Earthen Diſhes in an Oven; and when I had ſo done, I found the Earth wanted a Pound and a halfe of what it was formerly; yet I was not ſatisfi'd, doubting the Earth was not dry: I put it into an Oven the Second Time, (after the Bread was drawn.) and after I had taken it out and weighed it, I found it to be the Same Weight. So I Suppoſe there was no Moiſture left in the Earth. Neither do I think that the Pound and Half that was wanting was Drawn away by the Cucumber but a great Part of it in the Ordering was in Duſt (and the like) waſted: (the Cucumbers are kept by themſelves, leſt You ſhould ſend for thẽ.) But yet in this Tryal, *Eleutherius*, it appears that though ſome of the Earth, or rather the diſſoluble Salt harbour'd in it, were waſted, the main Body of the Plant conſiſted of Tranſmuted Water. And I might add, that a year after I caus'd the formerly mentioned Experiment, touching large Pompions, to be reiterated, with ſo good ſucceſs, that if my memory does not much mis-inform me, it did not only much ſurpaſs

any

any that I made before, but seem'd strangely to conclude what I am pleading for; though (by reason I have unhappily lost the particular Account my Gardiner writ me up of the Circumstances) I dare not insist upon them. The like Experiment may be as conveniently try'd with the seeds of any Plant, whose growth is hasty, and its size Bulky. If Tobacco will in These Cold Climates Grow well in Earth undung'd, it would not be amiss to make a Tryal with it; for 'tis an annual Plant, that arises where it prospers, sometimes as high as a Tall Man, and I have had leaves of it in my Garden neer a Foot and a Halfe broad. But the next time I Try this Experiment, it shall be with several seeds of the same sort, in the same pot of Earth, that so the event may be the more Conspicuous. But because every Body has not Conveniency of time and place for this Experiment neither, I made in my Chamber, some shorter and more Expeditious Tryals. I took a Top of Spearmint, about an Inch Long, and put it into a good Vial full of Spring water, so as the upper part of the Mint was above the neck of the Glass, and the

the lower part Immers'd in the Water; within a few Dayes this Mint began to shoot forth Roots into the Water, and to display its Leaves, and aspire upwards; and in a short time it had numerous Roots and Leaves, and these very strong and fragrant of the Odour of the Mint, but the Heat of my Chamber, as I suppose, kill'd the Plant when it was grown to have a pretty thick Stalk, which with the various and ramified Roots, which it shot into the Water as if it had been Earth, presented in its Transparent Flower-pot a Spectacle not unpleasant to behold. The like I try'd with sweet Marjoram, and I found the Experiment succeed also, though somewhat more slowly, with Balm and Peniroyal, to name now no other Plants. And one of these Vegetables, cherish'd only by Water, having obtain'd a competent Growth, I did, for Tryals sake, cause to be Distill'd in a small Retort, and thereby obtain'd some Phlegme, a little Empyreumaticall Spirit, a small Quantity of adust Oyl, and a *Caput mortuum*; which appearing to be a Coal, I concluded it to consist of Salt and Earth: but the

the Quantity of it was so small, that I forbore to Calcine it. The Water I us'd to nourish this Plant was not shifted nor renewed; and I chose Spring-water rather than Rain-water, because the latter is more discernably a kind of πνευματεμία, which, though it be granted to be freed from grosser Mixtures, seems yet to Contain in it, besides the Steams of several Bodies wandering in the Air, which may be suppos'd to impregnate it, a certain Spirituous Substance, which may be Extracted out of it, and is by some mistaken for the Spirit of the World Corporify'd, upon what Grounds, and with what Probability, I may elsewhere perchance, but must not now, Discourse to you.

But perhaps I might have sav'd a great part of my Labour. For I finde that *Helmont* (an Author more considerable for his Experiments, than many Learned men are pleas'd to think him) having had an Opportunity to prosecute an Experiment much of the same nature with those I have been now speaking of, for five Years together, obtain'd at the end of that time so notable a Quantity of Transmuted Water, that I should scarce Think it fit to have his Experiment, and Mine Mention'd together, were it not that the Length of Time Requisite to this may deterr the Curiosity of some, and exceed the leasure of Others; and partly, that so Paradoxical a Truth as that which these Experiments seem to hold forth, needs to be Confirm'd by more Witnesses than one, especially since the Extravagancies and Untruths to be met with in *Helmonts* Treatise of the Magnetick Cure of Wounds, have made his Testimonies suspected in his other Writings, though as to some of the Unlikely matters of Fact he delivers in them, I might safely undertake to be his Compurgator. But that Experiment of his which I was mentioning to You, he saies, was this. He took 200 pound of Earth dry'd in an Oven, and having put it into an Earthen Vessel and moisten'd it with Rain water, he planted in it the Trunk of a Willow tree of five pound Weight; this he Water'd, as need required, with Rain or with Distill'd Water; and to keep the Neighbouring Earth from getting into the Vessel, he employ'd a plate of Iron tinn'd over and perforated

forated with many holes. Five years being efflux'd, he took out the Tree and weighed it, and (with computing the leaves that fell during four Autumnes) he found it to weigh 169 pound, and about three Ounces. And Having again Dry'd the Earth it grew in, he found it want of its Former Weight of 200 Pound, about a couple only of Ounces; so that 164 pound of the Roots, Wood, and Bark, which Constituted the Tree, seem to have Sprung from the VVater. And though it appears not that *Helmont* had the Curiosity to make any *Analysis* of this Plant, yet what I lately told You I did to One of the Vegetables I nourish'd with Water only, will I suppose keep You from Doubting that if he had Distill'd this Tree, it would have afforded him the like Distinct Substances as another Vegetable of the same kind. I need not Subjoyne that I had it also in my thoughts to try how Experiments to the same purpose with those I related to You would succeed in other Bodies than Vegetables, because importunate Avocations having hitherto hinder'd me from putting my Design in Practise, I can

can yet speak but Conjecturally of the Success: but the best is, that the Experiments already made and mention'd to you need not the Assistance of new Ones, to Verifie as much as my present task makes it concern me to prove by Experiments of this Nature.

One would suspect (saies *Eleutherius* after his long silence) by what You have been discoursing, that You are not far from *Helmonts* Opinion about the Origination of Compound Bodies, and perhaps too dislike not the Arguments which he imploys to prove it.

VVhat *Helmontian* Opinion, and what Arguments do you mean (askes *Carneades*)

VVhat you have been Newly Discoursing (replies *Eleutherius*) tells us, that You cannot but know that this bold and Acute Spagyrist scruples not to Assert that all mixt Bodies spring from one Element; and that Vegetables, Animals, Marchasites, Stones, Metalls, &c. are Materially but simple VVater disguis'd into these Various Formes, by the plastick or Formative Vertue of their Seeds. And as for his Reasons you may find divers of them scatter'd up and

down his writings; the considerabl'st of which seem to be these three; The Ultimate Reduction of mixt Bodies into Insipid Water, the Vicissitude of the supposed Elements, and the production of perfectly mixt Bodies out of simple VVater. And first he affirmes that the *Sal circulatus Paracelsi*, or his Liquor *Alkahest*, does adequately resolve Plants, Animals, and Mineralls into one Liquor or more, according to their several internall Disparities of Parts, (without *Caput mortuum*, or the Destruction of their seminal Vertues;) and that the *Alkahest* being abstracted from these Liquors in the same weight and Vertue wherewith it Dissolv'd them, the Liquors may by frequent Cohobations from chalke or some other idoneous matter, be Totally depriv'd of their seminal Endowments, and return at last to their first matter, Insipid VVater; some other wayes he proposes here and there to divest some particular Bodies of their borrow'd shapes, and make them remigrate to their first Simplicity. The second Topick whence *Helmont* drawes his Arguments, to prove VVater to be the Material cause of Mixt Bodies, I told You

You was this, that the other suppos'd Elements may be transmuted into one another. But the Experiments by him here and there produc'd on this Occasion, are so uneasie to be made and to be judg'd of, that I shall not insist on them; not to mention, that if they were granted to be true, his Inference from them is somewhat disputable; and therefore I shall pass on to tell You, That as, in his First Argument, our Paradoxical Author endeavours to prove Water the Sole Element of Mixt Bodies, by their Ultimate Resolution, when by his *Alkahest*, or some other conquering Agent, the Seeds have been Destroy'd, which Disguis'd them; or when by time those seeds are Weari'd, or Exantlated, or unable to Act their Parts upon the Stage of the Universe any Longer: So in his Third Argument he Endeavours to evince the same Conclusion, by the constitution of Bodies which he asserts to be nothing but Water Subdu'd by Seminal Vertues. Of this he gives here & there in his VVritings several Instances, as to Plants and Animals; but divers of them being Difficult either to be try'd or to be Understood, and others of them

being not altogether Unobnoxious to Exceptions, I think you have singl'd out the Principal and leſs Queſtionable Experiment when you lately mention'd that of the Willow Tree. And having thus, Continues *Eleutherius*, to Anſwer your Queſtion, given you a Summary Account of what I am Confident, You know better than I do, I ſhall be very glad to receive Your Sence of it, if the giving it me will not too much Divert You from the Proſecution of your Diſcourſe.

That *If* (replies *Carneades*) was not needleſly annex'd: for thorowly to examine ſuch an Hypotheſis and ſuch Arguments would require ſo many Conſiderations, and Conſequently ſo much time, that I ſhould not now have the Leaſure to perfect ſuch a Digreſſion, and much leſs to finiſh my Principal Diſcourſe. Yet thus much I ſhall tell You at preſent, that you need not fear my rejecting this Opinion for its Novelty; ſince, however the *Helmontians* may in complement to their Maſter pretend it to be a new Diſcovery, Yet though the Arguments be for the moſt part his, the Opinion it ſelf is very Antient: For *Diogenes*

ogenes Laertius and divers other Authors ſpeak of *Thales*, as the firſt among the *Græcians* that made diſquiſitions upon nature. And of this *Thales*, I Remember, *Tully* informs us, that he taught all things were at firſt made of Water. And it ſeems by *Plutarch* and *Juſtin Martyr*, that the Opinion was Ancienter than he: For they tell us that he us'd to defend his Tenent by the Teſtimony of *Homer*. And a Greek Author, the (*Scholiaſt* of *Apollonius*) upon theſe VVords

* De Natura Deorum.

Ἐξ ἰλύος ἐβλάστησε χθὼν ἄυτη. Argonaut. 4.

The Earth of Slime was made,

Affirms, (out of *Zeno*) that the *Chaos*, whereof all things were made, was, according to *Heſiod*, VVater; which; ſetling firſt, became Slime, and then condens'd into ſolid Earth. And the ſame Opinion about the Generation of Slime ſeems to have been entertain'd by *Orpheus*, out of whom one of the Antients cites this Teſtimony, Athenagoras.

Ἐκ τοῦ ὕδατος ἰλὺς κατέστη.

Of Water Slime was made,

Universarum rerum primordia diversa esse, faciendi autem mundi ipsum aquam. *Strab. Geograph. lib.* 15. *circa medium.*

It seems also by what is delivered in *Strabo* out of another Author concerning the *Indians*, That they likewise held that all things had differing Beginnings, but that of which the World was made, was Water. And the like Opinion has been by some of the Antients ascrib'd to the *Phœnicians*, from whom *Thales* himself is conceiv'd to have borrow'd it; as probably the Greeks did much of Theologie, and, as I am apt to think, of their Philosophy too; since the Devising of the Atomical *Hypothesis* commonly ascrib'd to *Leucippus* and his Disciple *Democritus*, is by Learned Men attributed to one *Moschus* a *Phœnician*. And possibly the Opinion is yet antienter than so; For 'tis known that the *Phœnicians* borrow'd most of their Learning from the *Hebrews*. And among those that acknowledge the Books of *Moses*, many have been inclin'd to think Water to have been the Primitive and Universal Matter, by perusing the Beginning of *Genesis*, where the Waters seem to be mention'd as the Material Cause, not only of Sublunary Compound Bodies, but of all those that make up the Universe; whose Component Parts did orderly, as it

it were, emerge out of that vast Abysse, by the Operation of the Spirit of God, who is said to have been moving Himself, as hatching Females do, (as the Original מרחפת, *Merahephet*, is said to Import, and it seems to signifie in one of the two other places, wherein alone I have met with it in the Hebrew Bible) upon the Face of the Waters; which being, as may be suppos'd, Divinely Impregnated with the seeds of all things, were by that productive Incubation qualify'd to produce them. But you, I presume, Expect that I should Discourse of this Matter like a Naturalist, not a Philologer. Wherefore I shall add, to Countenance *Helmonts* Opinion, That whereas he gives not, that I remember, any Instance of any Mineral Body, nor scarce of any Animal, generated of Water, a French Chymist, *Monsieur de Rochas*, has presented his Readers an Experiment, which if it were punctually such as he has deliver'd it, is very Notable. He then, Discoursing of the Generation of things according to certain Chymical and Metaphorical Notions (which I confess are not to me Intelligible) sets down, among divers Speculations not per-

Deuter. 32. 11. Jerem. 23. 9.

pertinent to our Subject, the following Narrative, which I shall repeat to you the sence of in English, with as little variation from the Literal sence of the French words, as my memory will enable me. *Having* (saies he) *discern'd such great Wonders by the Natural Operation of Water, I would know what may be done with it by Art Imitating Nature. Wherefore I took Water which I well knew not to be compounded, nor to be mix'd with any other thing than that Spirit of Life* (whereof he had spoken before) *and with a Heat Artificial, Continual and Proportionate, I prepar'd and dispos'd it by the above mention'd Graduations of Coagulation, Congelation, and Fixation, untill it was turn'd into Earth, which Earth produced Animals, Vegetables and Minerals. I tell not what Animals, Vegetables and Minerals, for that is reserv'd for another Occasion: but the Animals did Move of themselves, Eat, &c. —and by the true Anatomie I made of them, I found that they were compos'd of much Sulphur, little Mercury, and less Salt. —The Minerals began to grow and increase by converting into their own Nature one part of the Earth thereunto dispos'd; they were solid and heavy.*

heavy. And by this truly Demonstrative Science, namely Chymistry, I found that they were compos'd of much Salt, little Sulphur, and less Mercury.

But (saies *Carneades*) I have some Suspitions concerning this strange Relation, which make me unwilling to Declare an Opinion of it, unless I were satisfied concerning divers Material Circumstances that our Author has left unmentioned; though as for the Generation of Living Creatures, both Vegetable and Sensitive, it needs not seem Incredible, since we find that our common water (which indeed is often Impregnated with Variety of Seminal Principles and Rudiments) being long kept in a quiet place will putrifie and stink, and then perhaps too produce Moss and little Worms, or other Insects, according to the nature of the Seeds that were lurking in it. I must likewise desire you to take Notice, that as *Helmont* gives us no Instance of the Production of Minerals out of Water, so the main Argument that he employ's to prove that they and other Bodies may be resolv'd into water, is drawn from the Operations of his *Alkahest*, and consequently cannot be

be satisfactorily Examin'd by You and Me:

Yet certainly (saies *Eleutherius*) You cannot but have somewhat wonder'd as well as I, to observe how great a share of Water goes to the making up of Divers Bodies, whose Disguises promise nothing neer so much. The Distillation of Eeles, though it yielded me some Oyle, and Spirit, and Volatile Salt, besides the *Caput mortuum*, yet were all these so disproportionate to the Phlegm that came from them, (and in which at first they boyl'd as in a Pot of Water) that they seem'd to have bin nothing but coagulated Phlegm, which does likewise strangely abound in Vipers, though they are esteem'd very hot in Operation, and will in a Convenient Air survive some dayes the loss of their Heads and Hearts, so vigorous is their Vivacity. Mans Bloud it self as Spirituous, and as Elaborate a Liquor as 'tis reputed, does so abound in Phlegm, that, the other Day, Distilling some of it on purpose to try the Experiment (as I had formerly done in Deers Bloud) out of about seven Ounces and a halfe of pure Bloud we drew neere six Ounces of Phlegm, before any

of the more operative Principles began to arise and Invite us to change the Receiver. And to satisfie my self that some of these Animall Phlegms were void enough of Spirit to deserve that Name, I would not content my self to taste them only, but fruitlesly pour'd on them acid Liquors, to try if they contain'd any Volatile Salt or Spirit, which (had there been any there) would probably have discover'd it self by making an Ebullition with the Affused Liquor. And now I mention Corrosive Spirits, I am minded to Inform you, That though they seem to be nothing else but Fluid Salts, yet they abound in Water, as you may Observe, if either you Entangle, and so Fix their Saline Part, by making them Corrode some idoneous Body; or else if you mortifie it with a contrary Salt; as I have very manifestly Observ'd in the making a Medicine somewhat like *Helmont*'s *Balsamus Samech*, with Distill'd Vinegar instead of Spirit of Wine, wherewith he prepares it: For you would scarce Beleeve (what I have lately Observ'd) that of that acid Spirit, the Salt of Tartar, from which it is Distill'd, will by mortifying and retaining

taining the acid Salt turn into worthless Phlegm neere twenty times its weight, before it be so fully Impregnated as to rob no more Distill'd Vinegar of its Salt. And though Spirit of Wine Exquisitely rectify'd seem of all Liquors to be the most free from Water, it being so Igneous that it will Flame all away without leaving the least Drop behinde it, yet even this Fiery Liquor is by *Helmont* not improbably affirm'd, in case what he relates be True, to be Materially Water, under a Sulphureous Disguise: For, according to him, in the making that excellent Medicine, *Paracelsus* his *Balsamus Samech*, (which is nothing but *Sal Tartari* dulcify'd by Distilling from it Spirit of Wine till the Salt be sufficiently glutted with its Sulphur, and till it suffer the Liquor to be drawn off, as strong as it was pour'd on) when the Salt of Tartar from which it is Distill'd hath retain'd, or depriv'd it of the Sulphureous parts of the Spirit of Wine, the rest, which is incomparably the greater part of the Liquor, will remigrate into Phlegm. I added that Clause [*In case what he Relates be True*] because I have not as yet sufficiently try'd it my self.

self. But not only something of Experiment keeps me from thinking it, as many Chymists do, absurd, (though I have as well as they, in vain try'd it with ordinary Salt of Tartar) but besides that *Helmont* often Relates it, and draws Consequences from it; A Person noted for his Soberness and Skill in Spagyrical Preparations, having been askt by me, Whether the Experiment might not be made to succeed, if the Salt and Spirit were prepar'd according to a way suitable to my Principles, he affirm'd to me, that he had that way, I propos'd, made *Helmont*'s Experiment succeed very well, without adding any thing to the Salt and Spirit. But our way is neither short nor Easie.

I have indeed (saies *Carneades*) sometimes wonder'd to see how much Phlegme may be obtain'd from Bodies by the Fire. But concerning that Phlegme I may anon have Occasion to note something, which I therefore shall not now anticipate. But to return to the Opinion of *Thales*, and of *Helmont*, I consider, that supposing the *Alkahest* could reduce all Bodies into water, yet whether that water, because insipid, must be Elementary

mentary, may not groundlesly be doubted; For I remember the Candid and Eloquent *Petrus Laurembergius* in his Notes upon *Sala*'s Aphorismes affirmes, that he saw an insipid *Menstruum* that was a powerfull Dissolvent, and (if my Memory does not much mis-inform me) could dissolve Gold. And the water which may be drawn from Quicksilver without Addition, though it be almost Tastless, You will I believe think of a differing Nature from simple Water, especially if you Digest in it Appropriated Mineralls. To which I shall add but this, that this Consideration may be further extended. For I see no Necessity to conceive that the Water mention'd in the Beginning of *Genesis*, as the Universal Matter, was simple and Elementary Water; since though we should Suppose it to have been an Agitated Congeries or Heap consisting of a great Variety of Seminal Principles and Rudiments, and of other Corpuscles fit to be subdu'd and Fashion'd by them, it might yet be a Body Fluid like Water, in case the Corpuscles it was made up of, were by their Creator made small enough, and put into such an actuall

actuall Motion as might make them Glide along one another. And as we now say, the Sea consists of Water, (notwithstanding the Saline, Terrestrial, and other Bodies mingl'd with it,) such a Liquor may well enough be called Water, because that was the greatest of the known Bodies whereunto it was like; Though, that a Body may be Fluid enough to appear a Liquor, and yet contain Corpuscles of a very differing Nature, You will easily believe, if You but expose a good Quntity of Vitriol in a strong Vessel to a Competent Fire. For although it contains both Aqueous, Earthy, Saline, Sulphureous, and Metaline Corpuscles, yet the whole Mass will at first be Fluid like water, and boyle like a seething pot.

I might easily (Continues *Carneades*) enlarge my self on such Considerations, if I were now Oblig'd to give You my Judgment of the *Thalesian*, and *Helmontian Hypothesis*. But Whether or no we conclude that all things were at first Generated of Water, I may Deduce from what I have try'd Concerning the Growth of Vegetables, nourish'd with water, all that I now propos'd to my Self

or need at preſent to prove, namely that Salt, Spirit, Earth, and ev'n Oyl (though that be thought of all Bodies the moſt oppoſite to Water) may be produc'd out of Water; and conſequently that a Chymical Principle as well as a Peripatetick Element, may (in ſome caſes) be Generated a new, or obtain'd from ſuch a parcel of Matter as was not endow'd with the form of ſuch a Principle or Element before.

And having thus, *Eleutherius*, Evinc'd that 'tis poſſible that ſuch Subſtances as thoſe that Chymiſts are wont to call their *Tria Prima*, may be Generated a new: I muſt next Endeavour to make it Probable, that the Operation of the Fire does Actually (ſometimes) not only divide Compounded Bodies into ſmall Parts, but Compound thoſe Parts after a new Manner, whence Conſequently for ought we Know, there may Emerge as well Saline and Sulphureous Subſtances, as Bodies of other Textures. And perhaps it will aſſiſt us in our Enquiry after the Effects of the Operations of the Fire upon other Bodies, to Conſider a little, what it does to thoſe Mixtures which being Productions of the Art of Man

Man, We beſt know the Compoſition of. You may then be pleas'd to take Notice that though Sope is made up by the Sope-Boylers of Oyle or Greaſe, and Salt, and Water Diligently Incorporated together; yet if You expoſe the Maſs they Conſtitute to a Graduall Fire in a Retort, You ſhall then indeed make a Separation, but not of the ſame Subſtances that were United into Sope, but of others of a Diſtant and yet not an Elementary Nature, and eſpecially of an Oyle very ſharp and Fœtid, and of a very Differing Quality from that which was Employ'd to make the Sope: ſo, if you Mingle in a due Proportion, *Sal Armoniack* with Quick-Lime, and Diſtill them by Degrees of Fire, You ſhall not Divide the *Sal Armoniack* from the Quick-Lime, though the one be a Volatile, and the other a Fix'd Subſtance, but that which will aſcend will be a Spirit much more Fugitive, Penetrant, and ſtinking, than *Sal Armoniack*; and there will remain with the Quick-Lime all, or very near all the Sea Salt, that concurr'd to make up the *Sal Armoniack*; concerning which Sea Salt I ſhall, to ſatiſfie You how well it was United to the

Lime, informe You, that I have by making the Fire at length very Vehement, caus'd both the Ingredients to melt in the Retort it ſelf into one Maſs, and ſuch Maſſes are apt to Relent in the Moiſt Air. If it be here Objected, that theſe Inſtances are taken from factitious Concretes which are more Compounded than thoſe which Nature produces; I ſhall reply, that beſides that I have Mention'd them as much to Illuſtrate what I propos'd, as to prove it; it will be Difficult to Evince that Nature her ſelf does not make Decompounded Bodies, I mean, mingle together ſuch mixt Bodies, as are already Compounded of Elementary, or rather of more ſimple ones. For Vitriol (for Inſtance) though I have ſometimes taken it out of Minerall Earths, where Nature had without any aſſiſtance of Art prepar'd it to my Hand, is really, though Chymiſts are pleas'd to reckon it among Salts, a Decompounded Body Conſiſting (as I ſhall have occaſion to declare anon) of a Terreſtriall Subſtance, of a Metal, and alſo of at leaſt one Saline Body, of a peculiar, and not Elementary Nature. And we ſee alſo in Animals, that their blood

blood may be compos'd of Divers very Differing Mixt Bodies, ſince we find it obſerv'd that divers Sea-Fowle taſt rank of the Fiſh on which they ordinarily feed; and *Hippocrates* himſelf Obſerves, that a Child may be purg'd by the Milke of the Nurſe, if ſhe have taken *Elaterium*; which argues that the purging Corpuſcles of the Medicament Concurr to make up the Milk of the Nurſe; and that white Liquor is generally by Phyſitians ſuppos'd to be but blanch'd and alter'd Blood. And I remember I have obſerv'd, not farr from the *Alps*, that at a certain time of the Yeare the Butter of that Country was very Offenſive to ſtrangers, by reaſon of the rank taſt of a certain Herb, whereon the Cows were then wont plentifully to feed. But (proceeds *Carneades*) to give you Inſtances of another kind, to ſhew that things may be obtain'd by the Fire from a Mixt Body that were not Pre-exiſtent in it, let Me Remind You, that from many Vegetables there may without any Addition be Obtain'd Glaſs, a Body, which I preſume You will not ſay was Pre-exiſtent in it, but produc'd by the Fire. To which I ſhall

add but this one Example more, namely that by a certain Artificial way of handling Quicksilver, You may without Additiou separate from it at least a 5th. or 4th. part of clear Liquor, which with an Ordinary Peripatetick would pass for Water, and which a Vulgar Chymist would not scruple to call Phlegme, and which, for ought I have yet seen or heard, is not reducible into Mercury again, and Consequently is more than a Moyety of it. Now besides that divers Chymists will not allow Mercury to have any, or at least any Considerable Quantity of either of the Ignoble Ingredients, Earth and Water; Besides this, I say, the great Ponderousness of Quicksilver makes it very unlikely that it can have so much Water in it as may be thus obtain'd from it, since Mercury weighs 12 or 14 times as much as water of the same Bulk. Nay for a further Confirmation of this Argument, I will add this Strange Relation, that two Friends of mine, the one a Physitian, and the other a Mathematician, and both of them Persons of unsuspected Credit, have Solemnly assured me, that after many Tryals they made, to reduce

duce Mercury into Water, in Order to a Philosophicall Work, upon Gold (which yet, by the way, I know prov'd Unsuccesfull) they did once by divers Cohobations reduce a pound of Quicksilver into almost a pound of Water, and this without the Addition of any other Substance, but only by pressing the Mercury by a Skilfully Manag'd Fire in purposely contriv'd Vessels. But of these Experiments our Friend (saies *Carneades*, pointing at the Register of this Dialogue) will perhaps give You a more Particular Account than it is necessary for me to do: Since what I have now said may sufficiently evince, that the Fire may sometimes as well alter Bodies as divide them, and by it we may obtain from a Mixt Body what was not Pre-existent in it. And how are we sure, that in no other Body what we call Phlegme is barely separated, not Produc'd by the Action of the Fire: Since so many other Mixt Bodies are of a much less Constant, and more alterable Nature, than Mercury (by many Tricks it is wont to put upon Chymists, and by the Experiments I told You of, about an hour since,

since) Appears to be. But because I shall ere long have Occasion to resume into Consideration the Power of the Fire to produce new Concretes, I shall no longer insist on this Argument at present; only I must mind You, that if You will not dis-believe *Helmonts* Relations, You must confess that the *Tria Prima* are neither ingenerable nor incorruptible Substances; since by his *Alkaheſt* some of them may be produc'd of Bodies that were before of another Denomination; and by the same powerfull *Menstruum* all of them may be reduc'd into insipid Water.

Here *Carneades* was about to pass on to his Third Consideration, when *Eleutherius* being desirous to hear what he could say to clear his second General Consideration from being repugnant to what he seem'd to think the true Theory of Mistion, prevented him by telling him, I somewhat wonder, *Carneades*, that You, who are in so many Points unsatisfied with the Peripatetick Opinion touching the Elements & Mixt Bodies, should also seem averse to that Notion touching the manner of Mistion, wherein the Chymists (though perhaps without

out knowing that they do so) agree with most of the Antient Philosophers that preceded *Aristotle*, and that for Reasons so considerable, that divers Modern Naturalists and Physitians, in other things unfavourable enough to the Spagyrists, do in this case side with them against the common Opinion of the Schools. If you should ask me (continues *Eleutherius*) what Reasons I mean? I should partly by the Writings of *Sennertus* and other learned Men, and partly by my own Thoughts, be supply'd with more, than 'twere at present proper for me to Insist largely on. And therefore I shall mention only, and that briefly, three or four. Of these, I shall take the First from the state of the Controversie it self, and the genuine Notion of Mistion, which though much intricated by the Schoolmen, I take in short to be this. *Aristotle*, at least as many of his Interpreters expound him, and as indeed he Teaches in some places, where he professedly Dissents from the Antients, declares Mistion to be such a mutual Penetration, and perfect Union of the mingl'd Elements, that there is no Portion of the mixt Body, how Minute soever, which does not

contain

contain All, and Every of the Four Elements, or in which, if you pleaſe, all the Elements are not. And I remember, that he reprehends the Miſtion taught by the Ancients, as too ſlight or groſs, for this Reaſon, that Bodies mixt according to their *Hypotheſis*, though they appear to humane Eyes, would not appear ſuch to the acute Eyes of a *Lynx*, whoſe perfecter Sight would diſcerne the Elements, if they were no otherwiſe mingled, than as his Predeceſſors would have it, to be but Blended, not United; whereas the Antients, though they did not all Agree about what kind of Bodies were Mixt, yet they did almoſt unanimouſly hold, that in a compounded Bodie, though the *Miſcibilia*, whether Elements, Principles, or whatever they pleas'd to call them, were aſſociated in ſuch ſmall Parts, and with ſo much Exactneſs, that there was no ſenſible Part of the Maſs but ſeem'd to be of the ſame Nature with the reſt, and with the whole; Yet as to the Atomes, or other Inſenſible Parcels of Matter, whereof each of the *Miſcibilia* conſiſted, they retain'd each of them its own Nature, being but by Appoſition or *Juxta* Poſition united

united with the reſt into one Bodie. So that although by vertue of this compoſition the mixt Body did perhaps obtain divers new Qualities, yet ſtill the Ingredients that Compounded it, retaining their own Nature, were by the Deſtruction of the *Compoſitum* ſeparable from each other, the minute Parts diſengag'd from thoſe of a differing Nature, and aſſociated with thoſe of their own ſort returning to be again, Fire, Earth, or Water, as they were before they chanc'd to be Ingredients of that *Compoſitum*. This may be explain'd (Continues *Eleutherius*,) by a piece of Cloath made of white and black threds interwoven, wherein though the whole piece appear neither white nor black, but of a reſulting Colour, that is gray, yet each of the white and black threds that compoſe it, remains what it was before, as would appear if the threds were pull'd aſunder, and ſorted each Colour by it ſelf. This (purſues *Eleutherius*) being, as I underſtand it, the State of the Controverſie, and the *Ariſtotelians* after their Maſter Commonly Defining, that Miſtion is *Miſcibilium alterarum Unio*, that ſeems to comport much better

better with the Opinion of the Chy-
mists, than with that of their Adver-
saries, since according to that as the new-
ly mention'd Example declares, there
is but a *Juxta*-position of separable
Corpuscles, retaining each its own Na-
ture, whereas according to the *Aristote-
lians*, when what they are pleas'd to call
a mixt Body results from the Concourse
of the Elements, the *Miscibilia* can
not so properly be said to be Alter'd, as
Destroy'd, since there is no Part in the
mixt Body, how small soever, that can
be call'd either Fire, or Air, or Water,
or Earth.

Nor indeed can I well understand, how
Bodies can be mingl'd other waies than
as I have declar'd, or at least how they
can be mingl'd, as our Peripatetick
would have it. For whereas *Aristotle*
tells us, that if a Drop of Wine be
put into ten thousand Measures of Wa-
ter, the Wine being Overpower'd by
so Vast a Quantity of Water will be
turn'd into it, he speaks to my Appre-
hension, very improbably. For though
One should add to that Quantity of
Water as many Drops of Wine as
would a Thousand times exceed it all,
yet

yet by his Rule the whole Liquor should
not be a *Crama*, a Mixture of Wine and
Water, , wherein the Wine would be
Predominant, but Water only; Since
the Wine being added but by a Drop
at a time, would still Fall into nothing
but Water, and Consequently would
be turn'd into it. And if this would
hold in Metals too, 'twere a rare se-
cret for Goldsmiths, and Refiners; For
by melting a Mass of Gold, or Silver,
and by but casting into it Lead or An-
timony, Grain after Grain, they might
at pleasure, within a reasonable Compass
of time, turn what Quantity they de-
sire, of the Ignoble into the Noble Me-
talls. And indeed since a Pint of wine,
and a Pint of water, amount to about
a Quart of Liquor, it seems manifest
to sense, that these Bodies doe not
Totally Penetrate one another, as one
would have it; but that each retains its
own Dimensions; and Consequently,
that they are by being Mingl'd only di-
vided into minute Bodies, that do but
touch one another with their Surfaces,
as do the Grains, of Wheat, Rye, Bar-
ley, &c. in a heap of severall sorts of
Corn: And unless we say, that as

when

when one measure of wheat, for I
stance, is Blended with a hundred me
sures of Barley, there happens only
Juxta-position and Superficial Conta
betwixt the Grains of wheat, and
many or thereabouts of the Grains
Barley; So when a Drop of wine
mingl'd with a great deal of wate
there is but an Apposition of so man
Vinous Corpuscles to a Corresponde
Number of Aqueous ones; Unless I s
this be said, I see not how that Ab
surdity will be avoyded, whereunto th
Stoical Notion of mistion (namely b
σύγχυσις, or Confusion) was Liable, ac
cording to which the least Body ma
be co-extended with the greatest: Sinc
in a mixt Body wherein before the Ele
ments were Mingl'd there was, for In
stance, but one pound of water to te
thousand of Earth, yet according t
them there must not be the least par
of that Compound, that Consisted no
as well of Earth, as water. But I in
sist, Perhaps, too long (saies *Eleuthe
rius*) upon the proofs afforded me by
the Nature of Mistion: Wherefore I
will but name Two or Three other Ar
guments; whereof the first shall be
that

that according to *Aristotle* himself, the motion of a mixt Body followes the Nature of the Predominant Element, as those wherein the Earth prevails, tend towards the Centre of heavy Bodies. And since many things make it Evident, that in divers Mixt Bodies the Elementary Qualities are as well Active, though not altogether so much so as in the Elements themselves, it seems not reasonable to deny the actual Existence of the Elements in those Bodies wherein they Operate.

To which I shall add this Convincing Argument, that Experience manifests, and *Aristotle* Confesses it, that the *Miscibilia* may be again separated from a mixt Body, as is Obvious in the Chymical Resolutions of Plants and Animalls, which could not be unless they did actually retain their formes in it: For since, according to *Aristotle*, and I think according to truth, there is but one common Mass of all things, which he has been pleas'd to call *Materia Prima*; And since tis not therefore the Matter but the Forme that Constitutes and Discriminates Things, to say that the Elements remain not in a Mixt Body,

dy, according to their Formes, but according to their Matter, is not to say that they remain there at all; Since although those Portions of Matter were Earth and water, &c. before they concurr'd; yet the resulting Body being once Constituted, may as well be said to be simple as any of the Elements; the Matter being confessedly of the same Nature in all Bodies, and the Elementary Formes being according to this *Hypothesis* perish'd and abolish'd.

And lastly, and if we will Consult Chymical Experiments, we shall find the Advantages of the Chymical Doctrine above the Peripatetick Title little less than Palpable. For in that Operation that Refiners call Quartation, which they employ to purifie Gold, although three parts of Silver be so exquisitely mingl'd by Fusion with a fourth Part of Gold (whence the Operation is Denominated) that the resulting Mass acquires several new Qualities, by vertue of the Composition, and that there is scarce any sensible part of it that is not Compos'd of both the metslls; Yet if You cast this mixture into *Aqua Fortis*, the Silver will be dissolv'd in the *Men-*

Menstruum, and the Gold like a dark or black Powder will fall to the Bottom of it, and either Body may be again reduc'd into such a Metal as it was before; which shews, that it retain'd its Nature, notwithstanding its being mixt *per Minima* with the other: We likewise see, that though one part of pure Silver be mingled with eight or ten Parts, or more, of Lead; yet the Fire will upon the Cuppel easily and perfectly separate them again. And that which I would have you peculiarly Consider on this Occasion is, that not only in Chymicall Anatomies there is a Separation made of the Elementary Ingredients, but that some Mixt Bodies afford a very much greater Quantity of this or that Element or Principle, than of another; as we see, that Turpentine and Amber yeeld much more Oyl and Sulphur than they do Water; whereas Wine, which is confess'd to be a perfectly mixt Bodie, yeelds but a little Inflamable Spirit, or Sulphur, and not much more Earth; but affords a vast proportion of Phlegm or water: which could not be, if, as the Peripateticks suppose, every, even of the minutest Particles, were of the same

Nature with the whole, and consequently did contain both Earth and Water, and Aire, and Fire; Wherefore as to what *Aristotle* principally, and almost only Objects, that unless his Opinion be admitted, there would be no true and perfect Mistion, but onely Aggregates or Heaps of contiguous Corpuscles, which, though the Eye of Man cannot discerne, yet the Eye of a *Lynx* might perceive not to be of the same Nature with one another and with their *Totum*, as the Nature of Mistion requires, if he do not beg the Question, and make Mistion to consist in what other Naturalists deny to be requisite to it, yet He at least objects That as a great Inconvenience which I cannot take for such, till he have brought as Considerable Arguments as I have propos'd to prove the contrary, to evince that Nature makes other Mistions than such as I have allowed, wherein the *Miscibilia* are reduc'd into minute Parts, and United as farr as sense can discerne: which if You will not grant to be sufficient for a true Mistion, he must have the same Quarrel with Nature her self, as with his Adversaries.

Where-

VVherefore (Continues *Eleutherius*) I cannot but somewhat marvail that *Carneades* should oppose the Doctrine of the Chymists in a Particular, wherein they do as well agree with his old Mistress, Nature, as dissent from his old Adversary, *Aristotle*.

I must not (replies *Carneades*) engage my self at present to examine throughly the Controversies concerning Mistion: And if there were no third thing, but that I were reduc'd to embrace absolutely and unreservedly either the Opinion of *Aristotle*, or that of the Philosophers that went before him, I should look upon the latter, which the Chymists have adopted, as the more defensible Opinion: But because differing in the Opinions about the Elements from both Parties, I think I can take a middle Course, and Discourse to you of Mistion after a way that does neither perfectly agree, nor perfectly disagree with either, as I will not peremtorily define, whether there be not Cases wherein some *Phænomena* of Mistion seem to favour the Opinion that the Chymists Patrons borrow'd of the Antients, I shall only endeavour to shew You that there

are ſome caſes which may keep the Doubt, which makes up my ſecond General Conſideration from being unreaſonable.

I ſhall then freely acknowledge to You (ſaies *Carneades*) that I am not over-well ſatisfi'd with the Doctrine that is aſcribed to *Ariſtotle*, concerning Miſtion, eſpecially ſince it teaches that the four Elements may again be ſeparated from the mixt Body; whereas if they continu'd not in it, it would not be ſo much a Separation as a Production. And I think the Ancient Philoſophers that Preceded *Ariſtotle*, and Chymiſts who have ſince receiv'd the ſame Opinion, do ſpeak of this matter more intelligibly, if not more probably, than the Peripateticks: but though they ſpeak Congruouſly enough, to their believing, that there are a certain Number of Primogeneal Bodies, by whoſe Concourſe all thoſe we call Mixt are Generated, and which in the Deſtruction of mixt Bodies do barely part company, and reduce from one another, juſt ſuch as they were when they came together; yet I, who meet with very few Opinions that I can entirely Acquieſce in, muſt

muſt confeſs to You that I am inclin'd to differ not only from the *Ariſtotelians*, but from the old Philoſophers and the Chymiſts, about the Nature of Miſtion: And if You will give me leave, I ſhall Briefly propoſe to you my preſent Notion of it, provided you will look upon it, not ſo much as an Aſſertion as an *Hypotheſis*; in talking of which I do not now pretend to propoſe and debate the whole Doctrine of Miſtion, but to ſhew that 'tis not Improbable, that ſometimes mingl'd ſubſtances may be ſo ſtrictly united, that it doth not by the uſuall Operations of the Fire, by which Chymiſts are wont to ſuppoſe themſelves to have made the *Analyſis* of mixt Bodies, ſufficiently appear, that in ſuch Bodies the *Miſcibilia*, that concurr'd to make them up, do each of them retain its own peculiar Nature: and by the *Spagyriſts* Fires may be more eaſily extricated and Recover'd, than Alter'd; either by a Change of Texture in the Parts of the ſame Ingredient, or by an Aſſociation with ſome parts of another Ingredient more ſtrict than was that of the parts of this or that *Miſcibile* among themſelves. At theſe words *Eleu-*

having preſs'd him to do what he propos'd,& promis'd to do what he deſir'd;

I conſider then (reſumes *Carneades*) that, not to mention thoſe improper Kinds of Miſtion, wherein *Homogeneous* Bodies are Joyn'd, as when Water is mingl'd with water, or two Veſſels full of the ſame kind of Wine with one another, the miſtion I am now to diſcourſe of ſeems, Generally ſpeaking, to be but an Union *per Minima* of any two or more Bodies of differing Denominations; as when Aſhes and Sand are Colliquated into Glaſs; or Antimony and Iron into *Regulus Martis*; or Wine and Water are mingl'd, and Sugar is diſſolv'd in the Mixture. Now in this general notion of Miſtion it does not appear clearly comprehended, that the *Miſcibilia* or Ingredients do in their ſmall Parts ſo retain their Nature and remain diſtinct in the Compound, that they may thence by the Fire be again taken aſunder: For though I deny not that in ſome Miſtions of certain permanent Bodies this Recovery of the ſame Ingredients may be made: yet I am not convinc'd that it will hold in all or even in moſt, or that it is neceſſarily deducible from Chymicall

micall Experiments, and the true Notion of Miſtion. To explain this a little, I aſſume, that Bodies may be mingl'd, and that very durably, that are not Elementary, nor have been reſolv'd into Elements or Principles, that they may be mingl'd; as is evident in the *Regulus* of Colliquated Antimony, and Iron newly mention'd; and in Gold Coyne, which laſts ſo many ages; wherein generally the Gold is alloy'd by the mixture of a quantity, greater or leſſer, (in our Mints they uſe about a 12th. part) of either ſilver, or Copper, or both. Next, I conſider, that there being but one Univerſal matter of things, as 'tis known that the *Ariſtotelians* themſelves acknowledge, who call it *Materia Prima* (about which nevertheleſs I like not all their Opinions) the Portions of this matter ſeem to differ from One Another, but in certain Qualities or Accidents, fewer or more; upon whoſe Account the Corporeal Subſtance they belong to receives its Denomination, and is referr'd to this or that particular ſort of Bodies; ſo that if it come to loſe, or be depriv'd of thoſe Qualities, though it ceaſes not to be a Body, yet it ceaſes

from being that kind of Body as a Plant, or Animal, or Red, Green, Sweet, Sowre, or the like. I conſider that it very often happens that the ſmall parts of Bodies cohere together but by immediate Contact and Reſt, and that however, there are few Bodies whoſe minute Parts ſtick ſo cloſe together, to what cauſe ſoever their Combination be aſcrib'd, but that it is poſſible to meet with ſome other Body, whoſe ſmall Parts may get between them, and ſo diſ-joyn them; or may be fitted to cohere more ſtrongly with ſome of them, than thoſe ſome do with the reſt; or at leaſt may be combin'd ſo cloſely with them, as that neither the Fire, nor the other uſual Inſtruments of Chymical Anatomies will ſeparate them. Theſe things being premis'd, I will not peremptorily deny, but that there may be ſome Cluſters of Particles, wherein the Particles are ſo minute, and the Coherence ſo ſtrict, or both, that when Bodies of Differing Denominations, and conſiſting of ſuch durable Cluſters, happen to be mingl'd, though the Compound Body made up of them may be very Differing from either of the

the Ingredients, yet each of the little Maſſes or Cluſters may ſo retain its own Nature, as to be again ſeparable, ſuch as it was before. As when Gold and Silver being melted together in a Due Proportion (for in every Proportion, the Refiners will tell You that the Experiment will not ſucceed) *Aqua Fortis* will diſſolve the Silver, and leave the Gold untoucht; by which means, as you lately noted, both the Metalls may be recover'd from the mixed Maſs. But (Continues *Carneades*) there are other Cluſters wherein the Particles ſtick not ſo cloſe together, but that they may meet with Corpuſcles of another Denomination, which are diſpos'd to be more cloſely United with ſome of them, than they were among themſelves. And in ſuch caſe, two thus combining Corpuſcles loſing that Shape, or Size, or Motion, or other Accident, upon whoſe Account they were endow'd with ſuch a Determinate Quality or Nature, each of them really ceaſes to be a Corpuſcle of the ſame Denomination it was before; and from the Coalition of theſe there may emerge a new Body, as really one, as either of the Corpuſcles was before they

they were mingl'd, or , if you pleaſe, Confounded: Since this Concretion is really endow'd with its own Diſtinct qualities, and can no more by the Fire, or any other known way of *Analyſis*, be divided again into the Corpuſcles that at firſt concurr'd to make it, than either of them could by the ſame means be ſubdivided into other Particles. But (ſaies *Eleutherius*) to make this more intelligible by particular examples; If you diſſolve Copper in *Aqua Fortis*, or Spirit of Nitre, (for I remember not which I us'd, nor do I think it much Material) You may by Chryſtalizing the Solution Obtain a goodly Vitriol; which though by Vertue of the Compoſition it have manifeſtly diverſe Qualities, not to be met with in either of the Ingredients, yet it ſeems that the Nitrous Spirits, or at leaſt many of them, may in this Compounded Maſs retain their former Nature; for having for tryal ſake Diſtill'd this Vitriol Spirit, there came over ſtore of Red Fumes, which by that Colour, by their peculiar ſtinke, and by their Sowrneſs, manifeſted themſelves to be, Nitrous Spirits; and that the remaining Calx continu'd Copper,

I ſuppoſe you'l eaſily beleeve. But if you diſſolve *Minium*, which is but Lead Powder'd by the Fire, in good Spirit of Vinegar, and Chryſtalize the Solution, you ſhall not only have a Saccharine Salt exceedingly differing from both its Ingredients; but the Union of ſome Parts of the *Menſtruum* with ſome of thoſe of the Metal is ſo ſtrict, that the Spirit of Vinegar ſeems to be, as ſuch, deſtroy'd; ſince the Saline Corpuſcles have quite loſt that acidity, upon whoſe Account the Liquor was call'd Spirit of Vinegar; nor can any ſuch Acid Parts as were put to the *Minium* be Separated by any known way from the *Saccharum Saturni* reſulting from them both; for not only there is no Sowrneſs at all, but an admirable Sweetneſs to be taſted in the Concretion; and not only I found not that Spirit of Wine, which otherwiſe will immediately hiſs when mingl'd with ſtrong Spirit of Vinegar, would hiſs being pour'd upon *Saccharum Saturni*, wherein yet the Acid Salt of Vinegar, did it Survive, may ſeem to be concentrated; but upon the Diſtillation of *Saccharum Saturni* by it Self I found indeed a Liquor very Penetrant

netrant, but not at all Acid, and differing as well in ſmell and other Qualities, as in taſt, from the Spirit of Vinegar; which likewiſe ſeem'd to have left ſome of its Parts very firmly united to the *Caput Mortuum*, which though of a Leaden Nature was in ſmell, Colour, &c. differing from *Minium*; which brings into my mind, that though two Powders, the one Blew, and the other Yellow, may appear a Green mixture, without either of them loſing its own Colour, as a good Microſcope has ſometimes inform'd me; yet having mingl'd *Minium* and *Sal Armoniack*, in a requiſite Proportion, and expos'd them in a Glaſs Veſſel to the Fire, the whole Maſs became White, and the Red Corpuſcles were deſtroy'd; for though the Calcin'd Lead was ſeparable from the Salt, yet you'l eaſily beleeve it did not part from it in the Forme of a Red Powder, ſuch as was the *Minium*, when it was put to the *Sal Armoniack*. I leave it alſo to be conſider'd, whether in Blood, and divers other Bodies, it be probable, that each of the Corpuſcles that concurr to make a Compound Body doth, though ſome of them in ſome

ſome Caſes may, retain its own Nature in it, ſo that Chymiſts may Extricate each ſort of them from all the others, wherewith it concurr'd to make a Body of one Denomination.

I know there may be a Diſtinction betwixt Matter *Immanent*, when the material Parts remain and retain their own Nature in the things materiated, as ſome of the Schoolmen ſpeak, (in which ſence Wood, Stones and Lime are the matter of a Houſe,) and *Tranſient*, which in the materiated thing is ſo alter'd, as to receive a new Forme, without being capable of re-admitting again the Old. In which ſence the Friends of this Diſtinction ſay, that *Chyle* is the matter of Blood, and Blood that of a Humane Body, of all whoſe Parts 'tis preſum'd to be the Aliment. I know alſo that it may be ſaid, that of material Principles, ſome are *Common* to all mixt Bodies, as *Ariſtotles* four Elements, or the Chymiſts *Tria Prima*; others *Peculiar*, which belong to this or that ſort of Bodies; as Butter and a kind of whey may be ſaid to be the Proper Principles of Cream: and I deny not, but that theſe Diſtinctions may in ſome Caſes

be

be of Uſe; but partly by what I have ſaid already, and partly by what I am to ſay, You may eaſily enough gueſs in what ſence I admit them, and diſcerne that in ſuch a ſence they will either illuſtrate ſome of my Opinions, or at leaſt will not overthrow any of them.

To proſecute then what I was saying before, I will add to this purpoſe, That ſince the Major part of Chymiſts Credit, what theſe they call Philoſophers affirme of their Stone, I may repreſent to them, that though when Common Gold and Lead are mingled Together, the Lead may be ſever'd almoſt un-alter'd from the Gold; yet if inſtead of Gold a *Tantillum* of the Red *Elixir* be mingled with the Saturn, their Union will be ſo indiſſoluble in the perfect Gold that will be produc'd by it, that there is no known, nor perhaps no poſſible way of ſeparating the diffus'd *Elixir* from the fixed Lead, but they both Conſtitute a moſt permanent Body, wherein the Saturn ſeems to have quite loſt its Properties that made it be call'd Lead, and to have been rather tranſmuted by the *Elixir*, than barely aſſociated to it. So that it ſeems not alwaies

waies neceſſary, that the Bodies that are put together *per minima*, ſhould each retain its own Nature; So as when the Maſs it Self is diſſipated by the Fire, to be more diſpos'd to re-appear in its Priſtine Forme, than in any new one, which by a ſtricter aſſociation of its Parts with thoſe of ſome of the other Ingredients of the *Compoſitum*, than with one another, it may have acquired.

And if it be objected, that unleſs the *Hypotheſis* I oppoſe be admitted, in ſuch Caſes as I have propoſed, there would not be an Union, but a Deſtruction of mingled Bodies, which ſeems all one as to ſay, that of ſuch Bodies there is no miſtion at all; I anſwer, that though the Subſtances that are mingl'd remain, only their Accidents are Deſtroy'd, and though we may with tolerable Congruity call them *Miſcibilia*, becauſe they are Diſtinct Bodies before they are put together, however afterwards they are ſo Confounded that I ſhould rather call them Concretions, or Reſulting Bodies, than mixt ones; and though, perhaps ſome other and better Account may be propos'd, upon which the name

of

of miſtion may remain; yet if what I have ſaid be thought Reaſon, I ſhall not wrangle about words, though I think it fitter to alter a Terme of Art, than reject a new Truth, becauſe it ſuits not with it. If it be alſo Objected that this Notion of mine, concerning miſtion, though it may be allow'd, when Bodies already Compounded are put to be mingl'd, yet it is not applicable to thoſe miſtions that are immediately made of the Elements, or Principles themſelves; I Anſwer in the firſt place, that I here Conſider the Nature of miſtion ſomewhat more Generally, than the Chymiſts; who yet cannot deny that there are oftentimes Mixtures, and thoſe very durable ones, made of Bodies that are not Elementary. And in the next place, that though it may be probably pretended that in thoſe Mixtures that are made immediately of the Bodies, that are call'd Principles or Elements, the mingl'd Ingredients may better retain their own Nature in the Compounded Maſs, and be more eaſily ſeparated from thence; yet, beſides that it may be doubted, whether there be any ſuch Primary Bodies, I ſee not why the reaſon

reaſon I alledg'd, of the deſtructibility of the Ingredients of Bodies in General, may not ſometimes be Applicable to Salt, Sulphur, or Mercury; 'till it be ſhewn upon what account we are to beleeve them Priviledged. And however, (if you pleaſe but to recall to mind, to what purpoſe I told you at Firſt, I meant to ſpeak of Miſtion at this Time) you will perhaps allow, that what I have hitherto Diſcourſed about it, may not only give ſome Light to the Nature of it in general, (eſpecially when I ſhall have an Opportunity to Declare to you my thoughts on that ſubject more fully) but may on ſome Occaſions alſo be Serviceable to me in the Inſuing Part of this Diſcourſe.

But to look back now to that part of our Diſcourſe, whence this Excurſion concerning Miſtion has ſo long diverted us, though we there Deduc'd from the differing Subſtances obtained from a Plant nouriſhed only with Water, and from ſome other things, that it was not neceſſary that nature ſhould alwaies compound a Body at firſt of all ſuch differing bodies as the fire could afterwards make it afford; yet this is not all

that may be collected from thoſe Experiments. For from them there ſeems alſo Deducible ſomething that Subverts an other Foundation of the Chymical Doctrine. For ſince that (as we have ſeen) out of fair Water alone, not only Spirit, but Oyle, and Salt, and Earth may be Produced; It will follow that Salt and Sulphur are not Primogeneal Bodies, and principles, ſince they are every Day made out of plain Water by the Texture which the Seed or Seminal principle of plants put it into. And this would not perhaps ſeem ſo ſtrange, if through pride or negligence, We were not Wont to Overlook the Obvious and Familiar Workings of Nature; For if We conſider what ſlight Qualities they are that ſerve to denominate one of the *Tria Prima*, We ſhall find that Nature do's frequently enough work as great Alterations in divers parcells of matter: For to be readily diſſoluble in water, is enough to make the body that is ſo, paſs for a Salt. And yet I ſee not why from a new ſhufling and Diſpoſition of the Component Particles of a body, it ſhould be much harder for Nature to compoſe a body diſſoluble in Water

Water, of a portion of Water that was not ſo before, than of the Liquid ſubſtance of an Egg, which will eaſily mix with Water, to produce by the bare warmth of a hatching Hen, Membrans, Feathers, Tendons, and other parts, that are not diſſoluble in Water as that Liquid Subſtance was: Nor is the Hardneſs and Brittleneſs of Salt more difficult for Nature to introduce into ſuch a yeelding body as Water, than it is for her to make the Bones of a Chick out of the tender Subſtance of the Liquors of an Egg. But inſtead of proſecuting this conſideration, as I eaſily might, I will proceed, as ſoon as I have taken notice of an objection that lies in my way. For I eaſily foreſee it will be alledged, that the above mentioned Examples are all taken from Plants, and Animals, in whom the Matter is Faſhioned by the Plaſtick power of the ſeed, or ſomething analogous thereunto. Whereas the Fire do's not act like any of the Seminal Principles, but deſtroyes them all when they come within its Reach. But to this I ſhall need at preſent to make but this eaſy Anſwer, That whether it be a Seminal Principle, or any other which

fashions that Matter after those various manners I have mentioned to You, yet 'tis Evident, that either by the Plastick principle Alone, or that and Heat Together, or by some Other cause capable to contex the matter, it is yet possible that the matter may be Anew contriv'd into such Bodies. And 'tis only for the Possibility of this that I am now contending.

The

THE

SCEPTICAL CHYMIST

The Third Part.

WHat I have hitherto Discours'd, *Eleutherius*, (saies his Friend to Him) has, I presume, shew'n You, that a Considering Man may very well question the Truth of those very Suppositions which Chymists as well as Peripatericks, without proving, take for granted; and upon which Depends the Validity of the Inferences they draw from their Experiments. Wherefore having dispatch'd that, which though a Chymist Perhaps will not, yet I do, look upon as the most Important, as well as Difficult, part of my Task, it will now be Seasonable for me to pro-

ceed to the Conſideration of the Experiments themſelves, wherein they are wont ſo much to Triumph and Glory. And theſe will the rather deſerve a ſerious Examination, becauſe thoſe that Alledge them are wont to do it with ſo much Confidence and Oſtentation, that they have hitherto impos'd upon almoſt all Perſons, without excepting Philoſophers and Phyſitians themſelves, who have read their Books, or heard them talk. For ſome learned Men have been content rather to beleeve what they ſo boldly Affirme, than be at the trouble and charge, to try whether or no it be True. Others again, who have Curioſity enough to Examine the Truth of what is Averr'd, want Skill and Opportunity to do what they Deſire. And the Generality even of Learned Men, ſeeing the Chymiſts (not contenting themſelves with the Schools to amuſe the World with empty words) Actually Perform divers ſtrange things, and, among thoſe Reſolve Compound Bodies into ſeveral Subſtances not known by former Philoſophers to be contain'd in them: Men I ſay, ſeeing theſe Things, and Hearing

Hearing with what Confidence Chymiſts Averr the Subſtances Obtain'd from Compound Bodies by the Fire to be the True Elements, or, (as they ſpeak) Hypoſtatical Principles of them, are forward to think it but Juſt as well as Modeſt, that according to the *Logicians* Rule, the Skilfull *Artiſts* ſhould be Credited in their own Art; Eſpecially when thoſe things whoſe Nature they ſo Confidently take upon them to teach others, are not only Productions of their own Skill, but ſuch as others Know not elſe what to make of.

But though (Continues *Carneades*) the Chymiſts have been able upon ſome or other of the mention'd Accounts, not only to Delight but Amaze, and almoſt to bewitch even Learned Men; yet ſuch as You and I, who are not unpractis'd in the Trade, muſt not ſuffer our Selves to be impos'd upon by hard Names, or bold Aſſertions; nor to be dazl'd by that Light which ſhould but aſſiſt us to diſcern things the more clearly. It is one thing to be able to help Nature to produce things, and another thing to Underſtand well the Nature

of the things produc'd. As we see, that many Persons that can beget Children, are for all that as Ignorant of the Number and Nature of the parts, especially the internal ones, that Constitute a Childs Body, as they that never were Parents. Nor do I Doubt, but you'l excuse me, if as I thank the Chymists for the things their *Analysis* shews me, so I take the Liberty to consider how many, and what they are, without being astonish't at them; as if, whosoever hath Skill enough to shew men some new thing of his own making, had the Right to make them beleeve whatsoever he pleases to tell them concerning it.

Wherefore I will now proceed to my Third General Consideration, which is, That it does not appear, that *Three* is precisely and Universally the Number of the Distinct Substances or Elements, whereinto mixt Bodies are resoluble by the Fire, I mean that 'tis not prov'd by Chymists, that all the Compound Bodies, which are granted to be perfectly mixt, are upon their Chymical *Analysis* divisible each of them into just Three Distinct Substances, neither

ther more nor less, which are wont to be lookt upon as Elementary, or may as well be reputed so as those that are so reputed. Which last Clause I subjoyne, to prevent your Objecting that some of the Substances I may have occasion to mention by and by, are not perfectly Homogeneous, nor Consequently worthy of the name of Principles. For that which I am now to consider, is, into how many Differing Substances, that may plausibly pass for the Elementary Ingredients of a mix'd Body, it may be Analyz'd by the Fire; but whether each of these be un-compounded, I reserve to examine, when I shall come to the next General Consideration; where I hope to evince, that the Substances which the Chymists not only allow, but assert to be the Component Principles of the Body resolv'd into them, are not wont to be uncompounded.

Now there are two Kind of Arguments (pursues *Carneades*) which may be brought to make my Third Proposition seem probable; one sort of them being of a more Speculative Nature, and the other drawn from Experience.

rience. To begin then with the first of these.

But as *Carneades* was going to do as he had said, *Eleutherius* interrupted him, by saying with a somewhat smiling countenance;

If you have no mind I should think, that the Proverb, *That Good Wits have bad Memories*, is Rational and Applicable to You, You must not Forget now you are upon the Speculative Considerations, that may relate to the Number of the Elements; that your Self did not long since Deliver and Concede some Propositions in Favour of the Chymical Doctrine, which I may without disparagement to you think it uneasie, even for *Carneades* to answer.

I have not, replies he, Forgot the Concessions you mean; but I hope too, that you have not forgot neither with what Cautions they were made, when I had not yet assumed the Person I am now sustaining. But however, I shall to content You, so discourse of my Third general consideration, as to let You see, That I am not Unmindful of the things you would have me remember.

To

To talk then again according to such principles as I then made use of, I shall represent, that if it be granted rational to suppose, as I then did, that the Elements consisted at first of certain small and primary Coalitions of the minute Particles of matter into Corpuscles very numerous, and very like each other, It will not be absurd to conceive, that such primary Clusters may be of far more sorts than three or five; and consequently, that we need not suppose, that in each of the compound Bodies we are treating of, there should be found just three sorts of such primitive Coalitions, as we are speaking of.

And if according to this Notion we allow a considerable number of differing Elements, I may add, that it seems very possible, that to the constitution of one sort of mixt Bodies two kinds of Elementary ones may suffice (as I lately Exemplify'd to you, in that most durable Concrete, Glass,) another sort of Mixts may be compos'd of three Elements, another of four, another of five, and another perhaps of many more. So that according to this Notion, there can be no determinate number assign'd, as

that

that of the Elements, of all ſorts of compound Bodies whatſoever, it being very probable that ſome Concretes conſiſt of fewer, ſome of more Elements. Nay, it does not ſeem Impoſſible, according to theſe Principles, but that there may be two ſorts of Mixts, whereof the one may not have any of all the ſame Elements as the other conſiſts of; as we oftentimes ſee two words, whereof the one has not any one of the Letters to be met with in the other; or as we often meet with diverſe Electuaries, in which no Ingredient (except Sugar) is common to any two of them. I will not here debate whether there may not be a multitude of theſe Corpuſcles, which by reaſon of their being primary and ſimple, might be called Elementary, if ſeveral ſorts of them ſhould convene to compoſe any Body, which are as yet free, and neither as yet contex'd & entangl'd with primary Corpuſcles of other kinds, but remains liable to be ſubdu'd and faſhion'd by Seminal Principles, or the like powerful and Tranſmuting Agent, by whom they may be ſo connected among themſelves, or with the parts of one of the bodies, as to make the compound

pound Bodies, whoſe Ingredients they are, reſoluble into more, or other Elements than thoſe that Chymiſts have hitherto taken notice of.

To all which *I* may add, that ſince it appears, by what *I* obſerv'd to you of the permanency of Gold and Silver, that even Corpuſcles that are not of an Elementary but compounded Nature, may be of ſo durable a Texture, as to remain indiſſoluble in the ordinary *Analyſis* that Chymiſts make of Bodies by the Fire; 'Tis not impoſſible but that, though there were but three Elements, yet there may be a greater number of Bodies, which the wonted waies of Anatomy will not diſcover to be no Elementary Bodies.

But, (ſaies *Carneades*) having thus far, in compliance to you, talk't conjecturally of the number of the Elements, 'tis now time to conſider, not of how many Elements it is poſſible that Nature may compound mix'd Bodies, but (at leaſt as farr as the ordinary Experiments of Chymiſts will informe us) of how many ſhe doth make them up.

I ſay then, that it does not by theſe ſufficiently appear to me, that there is any

any one determinate Number of Elements to be uniformly met with in all the ſeveral ſorts of Bodies allow'd to be perfectly mixt.

And for the more diſtinct proof of this Propoſition, I ſhall in the firſt place Repreſent, That there are divers Bodies, which I could never ſee by fire divided into ſo many as three Elementary ſubſtances. I would fain (as I ſaid lately to *Philoponus*) ſee that fixt and noble Metal we call Gold ſeparated into Salt, Sulphur and Mercury: and if any man will ſubmit to a competent forfeiture in caſe of failing, I ſhall willingly in caſe of proſperous ſucceſſe pay for both the Materials and the charges of ſuch an Experiment. 'Tis not, that after what I have try'd my ſelf I dare peremptorily deny, that there may out of Gold be extracted a certain ſubſtance, which I cannot hinder Chymiſts from calling its Tincture or Sulphur; and which leaves the remaining Body depriv'd of its wonted colour. Nor am I ſure, that there cannot be drawn out of the ſame Metal a real quick and running Mercury. But for the Salt of Gold, *I* never could either ſee it, or be ſatisfied that there was ever ſuch a thing ſeparated,

ſeparated, *in rerum natura*, by the relation of any credible eye witneſs. And for the ſeveral Proceſſes that Promiſe that effect, the materials that muſt be wrought upon are ſomewhat too precious and coſtly to be waſted upon ſo groundleſſe adventures, of which not only the ſucceſſe is doubtful, but the very poſſibility is not yet demonſtrated. Yet that which moſt deterrs me from ſuch tryalls, is not their chargeableneſs, but their unſatisfactorineſſe, though they ſhould ſucceed. For the Extraction of this golden Salt being in Chymiſts Proceſſes preſcribed to be effected by corroſive *Menſtruums*, or the Intervention of other Saline Bodies, it will remain doubtfull to a wary perſon, whether the Emergent Salt be that of the Gold it ſelf; or of the Saline Bodies or Spirits employ'd to prepare it; For that ſuch diſguiſes of Metals do often impoſe upon Artiſts, I am ſure *Eleutherius* is not ſo much a ſtranger to Chymiſtry as to ignore. I would likewiſe willingly ſee the three principles ſeparated from the pure ſort of Virgin-Sand, from *Oſteocalla*, from refined Silver, from Quickſilver, freed from its adventitious Sulphur, from *Venetian* Talck,

Talck, which by long detention in an extreme *Reverberium*, I could but divide into ſmaller Particles, not the conſtituent principles; Nay, which, when I cauſed it to be kept, I know not how long, in a Glaſs-houſe fire, came out in the Figure it's Lumps had when put in, though alter'd to an almoſt *Amethyſtine* colour; and from divers other Bodies, which it were now unneceſſary to enumerate. For though I dare not abſolutely affirme it to be impoſſible to Analyze theſe Bodies into their *Tria Prima*; yet becauſe, neither my own Experiments, nor any competent Teſtimony hath hitherto either taught me how ſuch an *Analyſis* may be made, or ſatisfy'd me, that it hath been ſo, I muſt take the Liberty to refrain from beleeving it, till the Chymiſts prove it, or give us intelligible and practicable Proceſſes to perform what they pretend. For whilſt they affect that *Ænigmatical* obſcurity with which they are wont to puzzle the Readers of their divulg'd Proceſſes concerning the Analytical Preparation of Gold or Mercury, they leave wary perſons much unſatisfyed whether or no the differing Subſtances, they promiſe to produce, be truly

ly the Hypoſtatical Principles, or only ſome intermixtures of the divided Bodies with thoſe employ'd to work upon them, as is Evident in the ſeeming Chryſtalls of Silver, and thoſe of Mercury; which though by ſome inconſiderately ſuppoſed to be the Salts of thoſe Metalls, are plainly but mixtures of the Metalline Bodies, with the Saline parts of *Aqua Fortis* or other corroſive Liquors; as is evident by their being reducible into Silver or Quickſilver, as they were before.

I cannot but Confeſs (ſaith *Eleutherius*) that though Chymiſts may upon probable grounds affirme themſelves Able to obtain their *Tria Prima*, from Animals and Vegetables, yet I have often wondred that they ſhould ſo confidently pretend alſo to reſolve all Metalline and other Mineral bodies into Salt, Sulphur, and Mercury. For 'tis a ſaying almoſt Proverbial, among thoſe Chymiſts themſelves that are accounted Philoſophers; and our famous Countryman *Roger Bacon* has particularly adopted it; that, *Facilius eſt aurum facere, quam deſtruere*. And I fear, with You, that Gold is not the only Mineral from which Chymiſts

mists are wont fruitlesly to attempt the separating of their three Principles. I know indeed (continues *Eleutherius*) that the Learned *Sennertus*, even in that book where he takes not upon him to play the Advocate for the Chymists, but the Umpier betwixt them and the Peripateticks, expresses himself roundly, thus; *Salem omnibus inesse (mixtis scilicet) & ex iis fieri posse omnibus in resolutionibus Chymicis versatis notissimum est.* And in the next Page, *Quod de sale dixi*, saies he, *Idem de Sulphure dici potest*: but by his favour I must see very good proofs, before I beleeve such general Assertions, how boldly soever made; and he that would convince me of their truth, must first teach me some true and practicable way of separating Salt and Sulphur from Gold, Silver, and those many different sorts of Stones, that a violent Fire does not bring to Lime, but to Fusion; and not only I, for my own part, never saw any of those newly nam'd Bodies so resolved; but *Helmont*, who was much better vers'd in the Chymical Anatomizing of Bodies than either *Sennertus* or I, has somewhere this resolute passage; *Scio* (saies he) *ex arenis, silicibus & saxis, non*

Sennert. lib. de conf. & diffenf. Pag. 147.

Helmon. Pag. 409.

non Calcariis, numquam Sulphur aut Mercurium trahi posse; Nay *Quercetanus* himself, though the grand stickler for the *Tria Prima*, has this Confession of the Irresolubleness of Diamonds; *Adamas* (saith he) *omnium factus Lapidum solidissimus ac durissimus ex arctissima videlicet trium principiorum unione ac Cohærentia, quæ nulla arte separationis in solutionem principiorum suorum spiritualium disjungi potest.* And indeed, pursues *Eleutherius*, I was not only glad but somewhat surprized to find you inclined to Admit that there may be a Sulphur and a running Mercury drawn from Gold; for unless you do (as your expression seem'd to intimate) take the word Sulphur in a very loose sence, I must doubt whether our Chymists can separate a Sulphur from Gold: For when I saw you make the experiment that I suppose invited you to speak as you did, I did not judge the golden Tincture to be the true principle of Sulphur extracted from the Body, but an aggregate of some such highly colour'd parts of the Gold, as a Chymist would have called a *Sulphur incombustible*, which in plain English seems to be little better than to call it a Sulphur & no

Quercet. apud Billich. in Thessalo redivivo, pag. 994.

no Sulphur. And as for Metalline Mercuries, I had not wondred at it, though you had expreſſed much more ſeverity in ſpeaking of them: For I remember that having once met an old and famous Artiſt, who had long been (and ſtill is) Chymiſt to a great Monarch, the repute he had of a very honeſt man invited me to deſire him to tell me ingenuouſly whether or no among his many labours, he had ever really extracted a true and running Mercury out of Metalls; to which queſtion he freely replyed, that he had never ſeparated a true Mercury from any Metal; nor had ever ſeen it really done by any man elſe. And though Gold is, of all Metalls, That, whoſe Mercury Chymiſts have moſt endeavoured to extract, and which they do the moſt brag they have extracted; yet the Experienced *Angelus Sala*, in his *Spagyrical* account of the ſeven *Terreſtrial* Planets (that is the ſeven metalls) affords us this memorable Teſtimony, to our preſent purpoſe; *Quanquam* (ſaies he) &c. *experientia tamen (quam ſtultorum Magiſtram vocamus) certe Comprobavit, Mercurium auri adeo fixum, maturum, & arcte cum reliquis ejuſdem corporis ſubſtantiis conjungi,*

conjungi, ut nullo modo retrogredi poſſit. To which he ſub-joynes that he himſelf had ſeen much Labour ſpent upon that Deſign, but could never ſee any ſuch Mercury produc'd thereby. And I eaſily beleeve what he annexes; *that he had often ſeen Detected many tricks and Impoſtures of Cheating Alchymiſts*: For, the moſt part of thoſe that are fond of ſuch *Charlatans*, being unskilful or Credulous, or both, 'tis very eaſie for ſuch as have ſome Skill, much craft, more boldneſs, and no Conſcience, to impoſe upon them; and therefore, though many profes'd *Alchymiſts*, and divers Perſons of Quality have told me that they have made or ſeen the Mercury of Gold, or of this or that other Metal; yet I have been ſtill apt to fear that either theſe perſons have had a Deſign to deceive others; or have had not Skill and circumſpection enough to keep themſelves from being deceived.

You recall to my mind (ſaies *Carneades*) a certain Experiment I once devis'd, innocently to deceive ſome perſons and let them and others ſee how little is to be built upon the affirmation of thoſe that are either unskilfull

or unwary, when they tell us they have seen *Alchymists* make the Mercury of this or that Metal; and to make this the more evident, I made my Experiment much more Slight, Short and Simple, than the Chymists usuall processes to Extract Metalline Mercuries; which Operations being commonly more Elaborate and Intricate, and requiring a much more longer time, give the *Alchymists* a greater opportunity to Cozen, and Consequently are more Obnoxious to the Spectators suspition. And that wherein I endeavour'd to make my Experiment look the more like a True *Analysis*, was, that I not only pretended as well as others to extract a Mercury from the Metal I wrought upon, but likewise to separate a large proportion of manifest and inflamable Sulphur. I take then, of the filings of Copper, about a Drachme or two; of common sublimate, powder'd, the like Weight; and *Sal Armoniack* near about as much as of Sublimate; these three being well mingl'd together I put into a small Vial with a long neck, or, which I find better, into a Glass Urinall, which (having first stopped it with Cotton) to avoid the

the Noxious Fumes, I approach by degrees to a competent Fire of well kindled coals, or (which looks better, but more endangers the Glass) to the Flame of a candle; and after a while the bottom of the Glass being held Just upon the Kindled Coals, or in the flame, You may in about a quarter of an Hour, or perchance in halfe that time, perceive in the Bottom of the Glass some running Mercury; and if then You take away the Glass and break it, You shall find a Parcel of Quicksilver, Perhaps altogether, and perhaps part of it in the pores of the Solid Mass; You shall find too, that the remaining Lump being held to the Flame of the Candle will readily burn with a greenish Flame, and after a little while (perchance presently) will in the Air Acquire a Greenish Blew, which being the Colour that is ascrib'd to Copper, when its Body is unlocked, 'Tis easie to perswade Men that this is the True Sulphur of *Venus*, especially since not only the Salts may be Suppos'd partly to be Flown away, and partly to be Sublim'd to the upper part of the Glass, whose inside (will

Commonly appear Whitened by them) but the Metal ſeems to be quite Deſtroy'd, the Copper no longer appearing in a Metalline Forme, but almoſt in that of a Reſinous Lump; whereas indeed the Caſe is only this, That the Saline parts of the Sublimate together with the *Sal Armoniack*, being excited and actuated by the Vehement heat, fall upon the Copper, (which is a Metal they can more eaſily corrode, than Silver) whereby the ſmall parts of the Mercury being freed from the Salts that kept them aſunder, and being by the heat tumbled up and down after many Occurſions, they Convene into a Conſpicuous Maſs of Liquor; and as for the Salts, ſome of the more Volatile of them Subliming to the upper part of the Glaſs, the others Corrode the Copper, and uniting themſelves with it do ſtrangely alter and Diſguiſe its Metallick Form, and compoſe with it a new kind of Concrete inflamable like Sulphur; concerning which I ſhall not now ſay any thing, ſince I can Referr You to the Diligent Obſervations which I remember Mr. *Boyle* has made concerning this Odde kind of Verdigreaſe. But Continues

tinues *Carneades* ſmiling, you know I was not cut out for a Mountebank, and therefore I will haſten to reſume the perſon of a Sceptick, and take up my diſcourſe where You diverted me from proſecuting it.

In the next place, then, I conſider, that, as there are ſome Bodies which yeeld not ſo many as the three Principles; ſo there are many others, that in their Reſolution Exhibite more principles than three; and that therefore the Ternary number is not that of the Univerſal and Adequate Principles of Bodies. If you allow of the Diſcourſe I lately made You, touching the primary Aſſociations of the ſmall Particles of matter, You will ſcarce think it improbable, that of ſuch Elementary Corpuſcles there may be more ſorts than either three, or four, or five. And if you will grant, what will ſcarce be deny'd, that Corpuſcles of a compounded Nature may in all the wonted Examples of Chymiſts paſs for Elementary, I ſee not why you ſhould think it impoſſible, that as *Aqua Fortis*, or *Aqua Regis* will make a Separation of colliquated Silver and Gold, though the Fire cannot; ſo there may

may be ſome Agent found out ſo ſubtile and ſo powerfull, at leaſt in reſpect of thoſe particular compounded Corpuſcles, as to be able to reſolve them into thoſe more ſimple ones, whereof they conſiſt, and conſequently encreaſe the number of the Diſtinct Subſtances, whereinto the mixt Body has been hitherto thought reſoluble. And if that be true, which I recited to you a while ago out of *Helmont* concerning the Operations of the *Alkaheſt*, which divides Bodies into other Diſtinct Subſtances, both as to number and Nature, than the Fire does; it will not a little countenance my Conjecture. But confining our ſelves to ſuch waies of Analyzing mix'd Bodies, as are already not unknown to Chymiſts, it may without Abſurdity be Queſtion'd, whether beſides thoſe groſſer Elements of Bodies, which they call Salt Sulphur and Mercury, there may not be Ingredients of a more Subtile Nature, which being extreamly little, and not being in themſelves Viſible, may eſcape unheeded at the Junctures of the Deſtillatory Veſſels, though never ſo carefully Luted. For let me obſerve to you one thing, which though not

not taken notice of by Chymiſts, may be a notion of good uſe in divers Caſes to a Naturaliſt, that we may well ſuſpect, that there may be ſeverall Sorts of Bodies, which are not Immediate Objects of any one of our ſenſes; ſince we See, that not only thoſe little Corpuſcles that iſſue out of the Loadſtone, and perform the Wonders for which it is juſtly admired; But the *effluviums* of Amber, Jet, and other Electricall Concretes, though by their effects upon the particular Bodies diſpos'd to receive their Action, they ſeem to fall under the Cognizance of our Sight, yet do they not as Electrical immediately Affect any of our ſenſes, as do the bodies, whether minute or greater, that we See, Feel, Taſte, &c. But, (Continues *Carneades*) becauſe you may expect I ſhould, as the Chymiſts do, conſider only the ſenſible Ingredients of Mixt Bodies, let us now ſee, what Experience will, even as to theſe, ſuggeſt to us.

It ſeems then queſtionable enough, whether from Grapes variouſly order'd there may not be drawn more diſtinct Subſtances by the help of the Fire, than from moſt other mixt Bodies. For the Grapes

Grapes themſelves being dryed into Raiſins and diſtill'd, will (beſides *Alcali*, Phlegm, and Earth) yeeld a conſiderable quantity of an Empyreumatical Oyle, and a Spirit of a very different nature from that of Wine. Alſo the unfermented Juice of Grapes affords other diſtill'd Liquors than Wine doth. The Juice of Grapes after fermentation will yeeld a *Spiritus Ardens*; which if competently rectifyed will all burn away without leaving any thing remaining. The ſame fermented Juice degenerating into Vinegar, yeelds an acid and corroding Spirit. The ſame Juice tunn'd up, armes it ſelf with Tartar; out of which may be ſeparated, as out of other Bodies, Phlegme, Spirit, Oyle, Salt and Earth: not to mention what Subſtances may be drawn from the Vine it ſelfe, probably differing from thoſe which are ſeparated from Tartar, which is a body by it ſelf, that has few reſemblers in the World. And I will further conſider that what force ſoever you will allow this inſtance, to evince that there are ſome Bodies that yeeld more Elements than others, it can ſcarce be deny'd but that the Major part of bodies that are diviſible into

into Elements yeeld more than three. For, beſides thoſe which the Chymiſts are pleaſed to name Hypoſtatical, moſt bodies contain two others, Phlegme and Earth, which concurring as well as the reſt to the conſtitution of Mixts, and being as generally, if not more, found in their *Analyſis*, I ſee no ſufficient cauſe why they ſhould be excluded from the number of Elements. Nor will it ſuffice to object, as the *Paracelſians* are wont to do, that the *Tria prima* are the moſt uſeful Elements, and the Earth and Water but worthleſs and unactive; for Elements being call'd ſo in relation to the conſtituting of mixt Bodies, it ſhould be upon the account of its Ingrediency, not of its uſe, that any thing ſhould be affirmed or denyed to be an Element: and as for the pretended uſeleſsneſs of Earth and Water, it would be conſider'd that uſefulneſs, or the want of it, denotes only a Reſpect or Relation to us; and therefore the preſence, or abſence of it, alters not the Intrinſick nature of the thing. The hurtful Teeth of Vipers are for ought I know uſeleſs to us, and yet are not to be deny'd to be parts of their Bodies; and it were hard to ſhew of

what

what greater Uſe to Us, than Phlegme and Earth, are thoſe Undiſcern'd Stars, which our New *Teleſcopes* diſcover to Us, in many Blanched places of the Sky; and yet we cannot but acknowledge them Conſtituent and Conſiderably great parts of the Univerſe. Beſides that whether or no the Phlegm and Earth be immediately Uſeful; but neceſſary to conſtitute the Body whence they are ſeparated; and conſequently, if the mixt Body be not Uſeleſs to us, thoſe conſtituent parts, without which it could not have been That mixt Body, may be ſaid not to be Unuſeful to Us: and though the Earth and Water be not ſo conſpicuouſly Operative (after ſeparation) as the other three more active Principles, yet in this caſe it will not be amiſs to remember the lucky Fable of *Menenius Agrippa*, of the dangerous Sedition of the Hands and Legs, and other more buſie parts of the Body, againſt the ſeemingly unactive Stomack. And to this caſe alſo we may not unfitly apply that Reaſoning of an Apoſtle, to another purpoſe; *If the Ear ſhall ſay, becauſe I am not the Eye, I am not of the Body; Is it therefore not of the Body? If the whole Body*

Body were Eye, where were the Hearing? If the whole were for hearing, where the ſmelling? In a word, ſince Earth and water appear, as clearly and as generally as the other Principles upon the reſolution of Bodies, to be the Ingredients whereof they are made up; and ſince they are uſeful (if not immediately to us, or rather to Phyſitians) to the Bodies they conſtitute, and ſo though in ſomewhat a remoter way, are ſerviceable to us; to exclude them out of the number of Elements, is not to imitate Nature.

And on this occaſion I cannot but take notice, that whereas the great Argument which the Chymiſts are wont to employ to vilify Earth and Water, and make them be look'd upon as uſeleſs & unworthy to be reckon'd among the Principles of Mixt Bodies, is, that they are not endow'd with Specifick Properties, but only with Elementary qualities; of which they uſe to ſpeak very ſlightingly, as of qualities contemptible and unactive: I ſee no ſufficient Reaſon for this Practice of the Chymiſts: For 'tis confeſs'd that Heat is an Elementary Quality, and yet that an almoſt innumerable company of conſiderable Things

are

are perform'd by Heat, is manifeſt to them that duly conſider the various *Phænomena* wherein it intervenes as a principall Actor; and none ought leſs to ignore or diſtruſt this Truth than a Chymiſt. Since almoſt all the operations and Productions of his Art are performed chiefly by the means of Heat. And as for Cold it ſelf, upon whoſe account they ſo deſpiſe the Earth and Water, if they pleaſe to read in the Voyages of our Engliſh and Dutch Navigators in *Nova Zembla* and other Northern Regions what ſtupendous Things may be effected by Cold, they would not perhaps think it ſo deſpicable. And not to repeat what I lately recited to You out of *Paracelſus* himſelf, who by the help of an intenſe Cold teaches to ſeparate the Quinteſſence of Wines; I will only now obſerve to You, that the Conſervation of the Texture of many Bodies both animate and inanimate, do's ſo much depend upon the convenient motion both of their own Fluid and Looſer Parts, & of the ambient Bodies, whether Air, Water, &c. that not only in humane Bodies we ſee that the immoderate or unſeaſonable coldneſs of the Air (eſpecially

cially when it finds ſuch Bodies overheated) do's very frequently diſcompoſe the *Oeconomie* of them; and occaſion variety of Diſeaſes; but in the ſolid and durable Body of Iron it ſelf, in which one would not expect that ſuddain Cold ſhould produce any notable change, it may have ſo great an operation, that if you take a Wire, or other ſlender piece of ſteel, and having brought it in the fire to a white heat, You ſuffer it afterwards to cool leaſurely in the Air, it will when it is cold be much of the ſame hardneſs it was of before. Whereas if as ſoon as You remove it from the fire, you plunge it into cold water, it will upon the ſuddain Refrigeration acquire a very much greater hardneſs than it had before; Nay, and will become manifeſtly brittle. And that you may not impute this to any peculiar Quality in the Water, or other Liquor, or Unctuous matter, wherein ſuch heated ſteel is wont to be quenched that it may be temper'd; I know a very skilful Tradeſman, that divers times hardens ſteel by ſuddenly cooling it in a Body that is neither a liquor, nor ſo much as moiſt. A tryal of that Nature I remem-

ber I have ſeen made. And however by the operation that Water has upon ſteel quenched in it, whether upon the Account of its coldneſs and moiſture, or upon that of any other of its qualities, it appears, that water is not alwaies ſo inefficacious and contemptible a Body, as our Chymiſts would have it paſs for. And what I have ſaid of the Efficacy of Cold and Heat, might perhaps be eaſily enough carried further by other conſiderations and experiments; were it not that having been mention'd only upon the By, I muſt not inſiſt on it, but proceed to another Subject.

But, (purſues *Carneades*) though I think it Evident, that Earth and Phlegme are to be reckon'd among the Elements of moſt Animal and Vegetable Bodies, yet 'tis not upon that Account alone, that I think divers Bodies reſoluble into more Subſtances than three. For there are two Experiments, that I have ſometimes made to ſhew, that at leaſt ſome Mixts are divisible into more Diſtinct Subſtances than five. The one of theſe Experiments, though 'twill be more ſeaſonable for me to mention it fully anon, yet in the mean time, I ſhall tell

tell you thus much of it, That out of two Diſtill'd Liquors which paſs for Elements of the Bodies whence they are drawn, I can without Addition make a true Yellow and Inflamable Sulphur, notwithſtanding that the two Liquors remain afterwards Diſtinct. Of the other Experiment, which perhaps will not be altogether unworthy your Notice, I muſt now give you this particular Account. I had long obſerv'd, that by the Deſtillation of divers Woods, both in Ordinary, and ſome unuſuall ſorts of Veſſels, the Copious Spirit that came over, had beſides a ſtrong taſt, to be met with in the Empyreumatical Spirits of many other Bodies, an Acidity almoſt like that of Vinegar: Wherefore I ſuſpected, that though the ſowriſh Liquor Diſtill'd, for Inſtance, from Box-Wood, be lookt upon by Chymiſts as barely the Spirit of it, and therefore as one ſingle Element or Principle; yet it does really conſiſt of two Differing Subſtances, and may be diviſible into them; and conſequently, that ſuch Woods and other Mixts as abound with ſuch a Vinegar, may be ſaid to conſiſt of one Element or Principle, more than the Chymiſts as yet

are Aware of, Wherefore bethinking my ſelf, how the ſeparation of theſe two Spirits might be made, I Quickly found, that there were ſeveral waies of Compaſſing it. But that of them which I ſhall at preſent mention was this, Having Deſtill'd a Quantity of Box-Wood *per ſe*, and ſlowly rectify'd the ſowriſh Spirit, the better to free it both from Oyle and Phlegme, I caſt into this Rectify'd Liquor a convenient Quantity of Powder'd Coral, expecting that the Acid part of the Liquor, would Corrode the Coral, and being aſſociated with it would be ſo retain'd by it, that the other part of the Liquor, which was not of an acid Nature, nor fit to faſten upon the Corals, would be permitted to aſcend alone. Nor was I deceiv'd in my Expectation; For having gently abſtracted the Liquor from the Corals, there came over a Spirit of a Strong ſmell, and of a taſt very piercing but without any ſowrneſs; and which was in diverſe qualities manifeſtly different, not only from a Spirit of Vinegar, but from ſome Spirit of the ſame Wood, that I purpoſely kept by me without depriving it of its acid Ingredient. And to ſatisfy you,

you, that theſe two Subſtances were of a very differing Nature, I might informe you of ſeveral Tryals that I made, but muſt not name ſome of them, becauſe I cannot do ſo without making ſome unſeaſonable diſcoveries. Yet this I ſhall tell you at preſent that the ſowre Spirit of *Box*, not only would, as I juſt now related, diſſolve Corals, which the other would not faſten on, but being pour'd upon Salt of Tartar would immediately boyle and hiſs, whereas the other would lye quietly upon it. The acid Spirit pour'd upon *Minium* made a Sugar of Lead, which I did not find the other to do; ſome drops of this penetrant ſpirit being mingl'd with ſome drops of the blew Syrup of Violets ſeem'd rather to dilute than otherwiſe alter the colour; whereas the Acid Spirit turn'd the Syrup of a reddiſh colour, and would probably have made it of as pure a red, as Acid Salts are wont to do, had not its operation been hindered by the mixture of the other Spirit. A few drops of the compound Spirit being ſhaken into a pretty quantity of the infuſion of *Lignum Nephriticum*, preſently deſtroyed all the blewiſh colour, whereas the other Spirit

would not take it away. To all which it might be added, that having for tryals ſake pour'd fair water upon the Corals that remained in the bottom of the glaſs wherein I had rectifyed the double ſpirit (if I may ſo call it) that was firſt drawn from the Box, I found according to my expectation that the Acid Spirit had really diſſolved the Corals and had coagulated with them. For by the affuſion of fair Water, I Obtain'd a Solution, which (to note that ſingularity upon the by) was red, whence the Water being evaporated, there remained a ſoluble Subſtance much like the Ordinary Salt of Coral, as Chymiſts are pleas'd to call that Magiſtery of Corals, which they make by diſſolving them in common ſpirit of Vinegar, and abſtracting the *Menſtruum ad Siccitatem*. I know not whether I ſhould ſubjoyne on this occaſion, that the ſimple ſpirit of Box, if Chymiſts will have it therefore *Saline* becauſe it has a ſtrong taſt, will furniſh us with a new kind of *Saline* Bodies, differing from thoſe hitherto taken notice of. For whereas of the three chief ſorts of *Salts*, the Acid, the Alcalizate, and the *Sulphureous*, there is none that ſeems

ſeems to be friends with both the other two, as I may, e're it be long, have occaſion to ſhew; I did not find but that the ſimple ſpirit of Box did agree very well (at leaſt as farr as I had occaſion to try it) both with the Acid and the other Salts. For though it would lye very quiet with ſalt of Tartar, Spirit of Urine, or other Bodies, whoſe Salts were either of an Alcalizate or fugitive Nature; yet did not the mingling of Oyle of Vitriol it ſelf produce any hiſſing or Effervescence, which you know is wont to enſue upon the Affuſion of that highly Acid Liquor upon either of the Bodies newly mentioned.

I think my ſelf, (ſaies *Eleutherius*) beholden to you, for this Experiment; not only becauſe I foreſee you will make it helpful to you in the Enquiry you are now upon, but becauſe it teaches us a Method, whereby we may prepare a numerous ſort of new ſpirits, which though more ſimple than any that are thought Elementary, are manifeſtly endow'd with peculiar and powerful qualities, ſome of which may probably be of conſiderable uſe in Phyſick, as well alone as aſſociated with other things; as

one may hopefully guess by the redness of that Solution your sowre Spirit made of Corals, and by some other circumstances of your Narrative. And suppose (pursues *Eleutherius*) that you are not so confin'd, for the separation of the Acid parts of these compound Spirits from the other, to employ Corals; but that you may as well make use of any Alcalizate Salt, or of Pearls, or Crabs eyes, or any other Body, upon which common Spirit of Vinegar will easily work, and, to speak in an *Helmontian* Phrase, Exantlate it self.

I have not yet tryed, (saies *Carneades*) of what use the mention'd liquors may be in Physick, either as Medicines or as *Menstruums*: But I could mention now (and may another time) divers of the tryals that I made to satisfy my self of the difference of these two Liquors. But that, as I allow your thinking what you newly told me about Corals, I presume you will allow me, from what I have said already, to deduce this Corollary; That there are divers compound bodies, which may be resolv'd into four such differing Substances, as may as well merit the name of Principles, as those to which the Chymists

mists freely give it For since they scruple not to reckon that which I call the compound Spirit of Box, for the spirit, or as others would have it, the Mercury of that Wood, I see not, why the Acid liquor, and the other, should not each of them, especially that last named, be lookt upon as more worthy to be called an Elementary Principle; since it must needs be of a more simple nature than the Liquor, which was found to be divisible into that, and the Acid Spirit. And this further use (continues *Carneades*) may be made of our experiment to my present purpose, that it may give us a rise to suspect, that since a Liquor reputed by the Chymists to be, without dispute, Homogeneous [illegible] so slight a way divisible into two [illegible] simple Ingredients, some [illegible] or happier Experimenter [illegible] may find a way either further to divide one of these Spirits, or to resolve some or other, if not all, of those other Ingredients of mixt Bodies, that have hitherto pass'd among Chymists for their Elements or Principles.

THE

THE SCEPTICAL CHYMIST

The Fourth Part.

AND thus much (ſaies *Carneades*) may ſuffice to be ſaid of the *Number* of the Diſtinct ſubſtances ſeparable from mixt Bodies by the Fire: Wherefore I now proceed to conſider the *nature* of them, and ſhew you, That though they ſeem *Homogeneous* Bodies, yet have they not the purity and ſimplicity that is requiſite to Elements. And I ſhould immediately proceed to the proof of my Aſſertion, but that the Confidence wherewith Chymiſts are wont to call each of the Subſtances we ſpeak of by the name of *Sulphur* or Mercury, or the other of the Hypoſta-

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ticall Principles, and the intolerable Ambiguity they allow themselves in their Writings and Expressions, makes it necessary for me in Order to the Keeping you either from mistaking me, or thinking I mistake the Controversie, to take Notice to you and complain of the unreasonable Liberty they give themselves of playing with Names at pleasure. And indeed if I were oblig'd in this Dispute, to have such regard to the Phraseology of each particular Chymist, as not to Write any thing which this or that Author may not pretend, not to contradict this or that sence, which he may give us as Occasion serves to his Ambiguous Expressions, I should scarce know how to dispute, nor which way to turn my self. For I find that even Eminent Writers, (such as *Raymund Lully*, *Paracelsus* and others) do so abuse the termes they employ, that as they will now and then give divers things, one name; so they will oftentimes give one thing, many Names; and some of them (perhaps) such, as do much more properly signifie some Distinct Body of another kind; nay even in Technical Words or Termes of Art, they

they refrain not from this Confounding Liberty; but will, as I have Observ'd, call the same Substance, sometimes the Sulphur, and Sometimes the Mercury of a Body. And now I speak of Mercury, I cannot but take Notice, that the Descriptions they give us of that Principle or Ingredient of mixt Bodies, are so intricate, that even those that have Endeavour'd to Polish and Illustrate the Notions of the Chymists, are fain to confess that they know not what to make of it either by Ingenuous Acknowledgments, or Descriptions that are not intelligible.

I must confess (saies *Eleutherius*) I have, in the reading of *Paracelsus* and other Chymical Authors, been troubled to find, that such hard Words and Equivocal Expressions, as You justly complain of, do even when they treat of Principles, seem to be studiously affected by those Writers; whether to make themselves to be admir'd by their Readers, and their Art appear more Venerable and Mysterious, or, (as they would have us think) to conceal from them a Knowledge themselves judge inestimable But

But whatever (ſaies *Carneades*) theſe Men may promiſe themſelves from a Canting way of delivering the Principles of Nature, they will find the Major part of Knowing Men ſo vain, as when they underſtand not what they read, to conclude, that it is rather the Writers fault than their own. And thoſe that are ſo ambitious to be admir'd by the Vulgar, that rather than go without the Admiration of the Ignorant they will expoſe themſelves to the contempt of the Learned, thoſe ſhall, by my conſent, freely enjoy their Option. As for the Myſtical Writers ſcrupling to Communicate their Knowledge, they might leſs to their own Diſparagement, and to the trouble of their Readers, have conceal'd it by writing no Books, than by Writing bad ones. If *Themiſtius* were here, he would not ſtick to ſay, that Chymiſts write thus darkly, not becauſe they think their Notions too precious to be explain'd, but becauſe they fear that if they were explain'd, men would diſcern, that they are farr from being precious. And indeed, I fear that the chief Reaſon why Chymiſts have written ſo ob-

obſcurely of their three Principles, may be, That not having Clear and Diſtinct Notions of them themſelves, they cannot write otherwiſe than Confuſedly of what they but Confuſedly Apprehend: not to ſay that divers of them, being Conſcious to the Invalidity of their Doctrine, might well enough diſcerne that they could ſcarce keep themſelves from being confuted, but by keeping themſelves from being clearly underſtood. But though much may be ſaid to Excuſe the Chymiſts when they write Darkly, and Ænigmatically, about the Preparation of their *Elixir*, and Some few other grand *Arcana*, the divulging of which they may upon Grounds Plauſible enough eſteem unfit; yet when they pretend to teach the General Principles of Natural Philoſophers, this Equivocal Way of Writing is not to be endur'd. For in ſuch Speculative Enquiries, where the naked Knowledge of the Truth is the thing Principally aim'd at, what does he teach me worth thanks that does not, if he can, make his Notion intelligible to me, but by Myſtical Termes, and Ambiguous Phraſes darkens what he ſhould clear up; and makes

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me add the Trouble of guessing at the Sence of what he Equivocally expresses; to that of examining the Truth of what he seems to deliver. And if the matter of the Philosophers Stone, and the manner of preparing it, be such Mysteries as they would have the World believe them, they may Write Intelligibly and Clearly of the Principles of mixt Bodies in General, without Discovering what they call the Great Work. But for my part (Continues *Carneades*) what my Indignation at this Un-philosophical way of teaching Principles has now extorted from me, is meant chiefly to excuse my self, if I shall hereafter oppose any Particular Opinion or assertion, that some Follower of *Paracelsus* or any Eminent Artist may pretend not to be his Masters. For, as I told you long since, I am not Oblig'd to examine private mens writings, (which were a Labour as endless as unprofitable) being only engag'd to examine those Opinions about the *Tria Prima*, which I find those Chymists I have met with to agree in most: And I Doubt not but my Arguments against their Doctrine will be in great part easily

sily enough applicable ev'n to those private Opinions, which they do not so directly and expresly oppose. And indeed, that which I am now entering upon being the Consideration of the things themselves whereinto *Spagyrists* resolve mixt Bodies by the Fire, if I can shew that these are not of an Elementary Nature, it will be no great matter what names these or those Chymists have been pleased to give them. And I question not that to a Wise man, and consequently to *Eleutherius*, it will be lesse considerable to know, what Men Have thought of Things, than what they Should have thought.

In the fourth and last place, then, I consider, that as generally as Chymists are wont to appeal to Experience, and as confidently as they use to instance the several substances separated by the Fire from a Mixt Body, as a sufficient proof of their being its component Elements: Yet those differing Substances are many of them farr enough from Elementary simplicity, and may be yet look'd upon as mixt Bodies, most of them also retaining, somewhat at least, if not v. y much, of the Nature of those

Concretes whence they were forc'd: I am glad (ſaies *Eleutherius*) to ſee the Vanity or Envy of the canting Chymiſts thus diſcover'd and chaſtis'd; and I could wiſh, that Learned Men would conſpire together to make theſe deluding Writers ſenſible, that they muſt no longer hope with Impunity to abuſe the World. For whilſt ſuch Men are quietly permitted to publiſh Books with promiſing Titles, and therein to Aſſert what they pleaſe, and contradict others, and ev'n themſelves as they pleaſe, with as little danger of being confuted as of being underſtood, they are encourag'd to get themſelves a name, at the coſt of the Readers, by finding that intelligent Men are wont for the reaſon newly mention'd, to let their Books and Them alone: And the ignorant and credulous (of which the number is ſtill much greater than that of the other) are forward to admire moſt what they leaſt underſtand. But if Judicious men skill'd in Chymical affaires ſhall once agree to write clearly and plainly of them, and thereby keep men from being ſtunn'd, as it were, or impos'd upon by dark or empty Words; 'tis to be hop'd that theſe

theſe men finding that they can no longer write impertinently and abſurdly, without being laugh'd at for doing ſo, will be reduc'd either to write nothing, or Books that may teach us ſomething, and not rob men, as formerly, of invaluable Time; and ſo ceaſing to trouble the World with Riddles or Impertinencies, we ſhall either by their Books receive an Advantage, or by their ſilence eſcape an Inconvenience.

But after all this is ſaid (Continues *Eleutherius*) it may be repreſented in favour of the Chymiſts, that, in one regard the Liberty they take in uſing names, if it be excuſable at any time, may be more ſo when they ſpeak of the ſubſtances whereinto their *Analyſis* reſolves mixt Bodies: Since as Parents have the Right to name their own Children, it has ever been allow'd to the Authors of new Inventions, to Impoſe Names upon them. And therefore the ſubjects we ſpeak of being ſo the Productions of the Chymiſts Art, as not to be otherwiſe, but by it, obtainable; it ſeems but equitable to give the Artiſts leave to name them as they pleaſe: conſidering alſo that none are ſo fit and likely to teach us what thoſe Bo-

dies are, as they to whom we ow'd them.

I told You already (ſaies *Carneades*) that there is great Difference betwixt the being able to make Experiments, and the being able to give a Philoſophical Account of them. And I will not now add, that many a Mine-digger may meet, whil'ſt he follows his work, with a Gemm or a Mineral which he knowes not what to make of, till he ſhewes it a Jeweller or a Mineraliſt to be inform'd what it is. But that which I would rather have here obſerv'd, is, That the Chymiſts I am now in debate with have given up the Liberty You challeng'd for them, of uſing Names at Pleaſure, and confin'd themſelves by their Deſcriptions, though but ſuch as they are, of their Principles; ſo that although they might freely have call'd any thing their *Analyſis* preſents them with, either Sulphur, or Mercury, or Gas, or Blas, or what they pleas'd; yet when they have told me that Sulphur (for inſtance) is a Primogeneal and ſimple Body, Inflamable, Odorous, &c. they muſt give me leave to diſ-believe them, if they tell me that a Body that is either compounded or uninflamable is ſuch

ſuch a Sulphur; and to think they play with words, when they teach that Gold and ſome other Minerals abound with an Incombuſtible Sulphur, which is as proper an Expreſſion, as a Sun-ſhine Night, or Fluid Ice.

But before I deſcend to the Mention of Particulars belonging to my Fourth Conſideration, I think it convenient to premiſe a few Generals; ſome of which I ſhall the leſs need to inſiſt on at preſent, becauſe I have Touched on them already.

And firſt *I* muſt invite you to take notice of a certain paſſage in *Helmont*; which though I have not found much heeded by his Readers, He Himſelf *mentions* as a notable thing, and I take to be a very conſiderable one; for whereas the Diſtill'd oyle of *oyle-olive*, though drawn

Illud notabile, in vino eſſe Spiritum quendam mitiorem ulteriorisque & nobilioris qualitatis participem, quam qui immediatè per diſtillationem elicitur, dicitúrque aqua vitæ dephlegmata, quòd facilius in ſimplici Olivarum oleo ad oculum ſpectatur. Quippe diſtillatum oleum abſque lateram aut tegularum additamento, quodque oleum Philoſophorum dicitur, multum differt ab ejus oleitate, quæ elicitur prius reducto oleo ſimplici in partes diſſimulares ſola digeſtione & Salis circulati Paracelſici appoſitione; ſiquidem ſal circulatum idem in pondere & quantitatibus priſtinis ab oleo ſegregatur poſtquam oleum olivarum in ſui heterogencitates eſt diſpoſitum. Tunc enim tunc Oleum Olivarum ex oleo prout & ſuaviſſimus vini ſpiritus a vino hoc pacto ſeparantur, longéq; ab aquæ vitæ acrimonia diſtinctus.
Helmont. Aura vitalis, pag. 725.

per se is (as I have try'd) of a very sharp and fretting Quality, and of an odious taſt, He tells us that Simple oyle being only digeſted with *Paracelſus*'s *ſal circulatum*, is reduc'd into diſſimilar parts,& yeelds a ſweet Oyle, very differing from the oyle diſtill'd, from ſallet oyle; as alſo that by the ſame way there may be ſeparated from Wine a very ſweet and gentle Spirit, partaking of a far other and nobler quality than that which is immediately drawn by diſtillation and call'd *Dephlegm'd Aqua vitæ*, from whoſe Acrimony this other ſpirit is exceedingly remote, although the *ſal circulatum* that makes theſe *Anatomies* be ſeparated from the Analyz'd Bodies, in the ſame weight and with the ſame qualities it had before; which Affirmation of *Helmont* if we admit to be true, we muſt acknowledge that there may be a very great diſparity betwixt bodies of the ſame denomination (as ſeveral oyles, or ſeveral ſpirits) ſeparable from compound Bodies: For, beſides the differences I ſhall anon take notice of, betwixt thoſe diſtill'd Oyles that are commonly known to Chymiſts, it appears by this, that by means of the *Sal Circulatum*, There may be

be quite another ſort of Oyles obtain'd from the ſame Body; and who knowes but that there may be yet other Agents found in Nature, by whoſe help there may, whether by Tranſmutation or otherwiſe, be obtain'd from the Bodies Vulgarly call'd Mixt, Oyles or other ſubſtances, Differing from thoſe of the ſame Denomination, known either to Vulgar Chymiſts, or even to *Helmont* Himſelf: but for fear You ſhould tell me, that this is but a conjecture grounded upon another Man's Relation, whoſe Truth we have not the means to Experiment, I will not Inſiſt upon it; but leaving You to Conſider of it at leaſure, I ſhall proceed to what is next.

Secondly, then, If that be True which was the Opinion of *Leucippus*, *Democritus*, and other prime *Anatomiſts* of old, and is in our dayes reviv'd by no mean Philoſophers; namely, That our Culinary Fire, ſuch as Chymiſts uſe, conſiſts of ſwarmes of little Bodies ſwiftly moving, which by their ſmallneſs and motion are able to permeate the ſollideſt and Compacteſt Bodies, and even Glaſs it Self; If this (I ſay) be True, ſince we ſee that In flints and other Concretes,

the Fiery part is Incorporated with the Groſſer, it will not be Irrational to conjecture, that multitudes of theſe Fiery Corpuſcles, getting in at the Pores of the Glaſs, may aſſociate themſelves with the parts of the mixt Body whereon they work, and with them Conſtitute new Kinds of Compound Bodies, according as the Shape, Size, and other Affections of the Parts of the Diſſipated Body happen to diſpoſe them, in Reference to ſuch Combinations; of which alſo there may be the greater Number; if it be likewiſe granted that the Corpuſcles of the Fire, though all exceeding minute, and very ſwiftly moved, are not all of the ſame bigneſs, nor Figure: And if I had not Weightier Conſiderations to Diſcourſe to you of, I could name to you, to Countenance what I have newly ſaid, ſome particular Experiments by which I have been Deduc'd to think, that the Particles of an open Fire working upon ſome Bodies may really Aſſociate themſelves therewith, and add to the Quantity. But becauſe I am not ſure, that when the Fire works upon Bodies included in Glaſſes, it does it by a reall Tra-

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jection of the Fiery Corpuſcles themſelves, through the Subſtance of the Glaſs, I will proceed to what is next to be mention'd.

I could (ſaies *Eleutherius*) help you to ſome Proofs, whereby I think it may be made very probable, that when the Fire acts immediately upon a Body, ſome of its Corpuſcles may ſtick to thoſe of the burnt Body, as they ſeem to do in Quicklime, but in greater numbers and more permanently. But for fear of retarding your Progreſs, I ſhall deſire you to deferr this Enquiry till another time, and proceed as you intended.

You may then in the next place (ſaies *Carneades*) obſerve with me, that not only there are ſome Bodies, as Gold, and Silver, which do not by the uſual Examens, made by Fire, Diſcover themſelves to be mixt; but if (as You may Remember I formerly told You) it be a De-compound Body that is Diſſipable into ſeveral Subſtances, by being expos'd to the Fire it may be reſolv'd into ſuch as are neither Elementary, nor ſuch as it was upon its laſt mixture Compounded of; but into new

Kinds

Kinds of mixts. Of this I have already given You ſome Examples in Sope, Sugar of Lead, and Vitriol. Now if we ſhall Conſider that there are ſome Bodies, as well Natural, (as that I laſt nam'd) as Factitious, manifeſtly Decompounded; That in the Bowells of the Earth Nature may, as we ſee ſhe ſometimes does, make ſtrange Mixtures; That Animals are nouri'ſhd with other Animals and Plants; And, that theſe themſelves have almoſt all of them their Nutriment and Growth, either from a certain Nitrous Juice Harbour'd in the Pores of the Earth, or from the Excrements of Animalls, or from the putrify'd Bodies, either of living Creatures or Vegetables, or from other Subſtances of a Compounded Nature; if, I ſay, we conſider this, it may ſeem probable, that there may be among the Works of Nature (not to mention thoſe of Art) a greater number of De-compound Bodies, than men take Notice of; And indeed, as I have formerly alſo obſerv'd, it does not at all appear, that all Mixtures muſt be of Elementary Bodies; but it ſeems farr more probable, that there are divers ſorts of com-

compound Bodies, even in regard of all or ſome of their Ingredients, conſider'd Antecedently to their Mixture. For though ſome ſeem to be made up by the immediate Coalitions of the Elements, or Principles themſelves, and therefore may be call'd *Prima Miſta*, or *Miſta Primaria*; yet it ſeems that many other Bodies are mingl'd (if I may ſo ſpeak) at the ſecond hand, their immediate Ingredients being not Elementary, but theſe primary Mixt newly ſpoken of; And from divers of thoſe Secondary ſorts of Mixts may reſult, by a further Compoſition, a Third ſort, and ſo onwards. Nor is it improbable, that ſome Bodies are made up of Mixt Bodies, not all of the ſame Order, but of ſeveral; as (for Inſtance) a Concrete may conſiſt of Ingredients, whereof the one may have been a primary, the other a Secondary Mixt Body; (as I have in Native Cinnaber, by my way of Reſolving it, found both that Courſer part that ſeems more properly to be Oar, and a Combuſtible Sulphur, and a Running Mercury:) or perhaps without any Ingredient of this latter ſort, it may be compos'd of Mixt Bodies, ſome of them

them of the first, and some of the third Kind; And this may perhaps be somewhat Illustrated by reflecting upon what happens in some Chymical Preparations of those Medicines which they call their *Bezoardicum*'s. For first, they take Antimony and Iron, which may be look'd upon as *Prima Mista*; of these they compound a Starry *Regulus*, and to this they add according to their Intention, either Gold, or Silver, which makes with it a new and further Composition. To this they add Sublimate, which is it self a De-compound body, (consisting of common Quicksilver, and divers Salts United by Sublimation into a Chrystalline Substance) and from this Sublimate, and the other Metalline Mixtures, they draw a Liquor, which may be allow'd to be of a yet more Compounded Nature. If it be true, as Chymists affirm it, that by this Art some of the Gold or Silver mingl'd with the *Regulus* may be carry'd over the Helme with it by the Sublimate; as indeed a Skilfull and Candid person complain'd to me a while since, That an experienc'd Friend of His and mine, having by such a way brought over a great

great Deal of Gold, in hope to do something further with it, which might be gainful to him, has not only miss'd of his Aim, but is unable to recover his Volatiliz'd Gold out of the Antimonial butter, wherewith it is strictly united.

Now (Continues *Carneades*) if a Compound body consist of Ingredients that are not meerly Elementary; it is not hard to conceive, that the Substances into which the Fire Dissolves it, though seemingly Homogeneous enough, may be of a Compounded Nature, those parts of each body that are most of Kin associating themselves into a Compound of a new Kind. As when (for example sake) I have caus'd Vitriol and *Sal Armoniack*, and Salt Petre to be mingl'd and Distill'd together, the Liquor that came over manifested it self not to be either Spirit of Nitre, or of *Sal Armoniack*, or of Vitriol. For none of these would dissolve crude gold, which yet my Liquor was able readily to do; and thereby manifested it self to be a new Compound, consisting at least of Spirit of Nitre, and *Sal Armoniack*, (for the latter dissolv'd in the former, will

will Work on Gold) which nevertheleſs are not by any known way ſeparable, and conſequently would not paſs for a Mixt Body, if we our ſelves did not, to obtain it, put and Diſtill together divers Concretes, whoſe Diſtinct Operations were known before hand. And, to add on this Occaſion the Experiment I lately promis'd You, becauſe it is Applicable to our preſent purpoſe, I ſhall Acquaint You, that ſuſpecting the Common Oyle of Vitriol not to be altogether ſuch a ſimple Liquor as Chymiſts preſume it, I mingl'd it with an equal or a Double Quantity (for I try'd the Experiment more than once) of common Oyle of Turpentine, ſuch as together with the other Liquor I bought at the Drugſters. And having carefully (for the Experiment is Nice, and ſomewhat dangerous) Diſtill'd the Mixture in a ſmall Glaſs Retort, I obtain'd according to my Deſire, (beſides the two Liquors I had put in) a pretty Quantity of a certaine ſubſtance, which ſticking all about the Neck of the Retort Diſcover'd it ſelf to be Sulphur, not only by a very ſtrong Sulphureous ſmell, and by the colour of Brimſtone,

Brimſtone; but alſo by this, That being put upon a coal, it was immediately kindl'd, and burn'd like common Sulphur. And of this Subſtance I have yet by me ſome little Parcells, which You may command and examine when you pleaſe. So that from this Experiment I may deduce either one, or both of theſe Propoſitions, That a real Sulphur may be made by the Conjunction of two ſuch Subſtances as Chymiſts take for Elementary, And which did not either of them apart appear to have any ſuch body in it; or that Oyle of Vitriol though a Diſtill'd Liquor, and taken for part of the Saline Principle of the Concrete that yeelds it, may yet be ſo Compounded a body as to contain, beſides its Saline part, a Sulphur like common Brimſtone, which would hardly be it ſelf a ſimple or un-compounded body.

I might (purſues *Carneades*) remind You, that I formerly repreſented it, as poſſible, That as there may be more Elements than five, or ſix; ſo the Elements of one body may be Different from thoſe of another; whence it would follow, that from the Reſolution of Decompound

compound Bodies, there may result Mixts of an altogether new kind, by the Coalition of Elements that never perhaps conven'd before. I might, I say, mind You of this, and add divers things to this second Consideration; but for fear of wanting time I willingly pretermit them to pass on to the third, which is this, That the Fire does not alwaies barely resolve or take asunder, but may also after a new manner mingle and compound together the parts (whether Elementary or not) of the Body Dissipated by it.

This is so evident, (saies *Carneades*) in some obvious Examples, that I cannot but wonder at their Supineness that have not taken notice of it. For when Wood being burnt in a Chimney is dissipated by the Fire into Smoake and Ashes, that smoake composes soot, which is so far from being any one of the principles of the Wood, that (as I noted above) you may by a further *Analysis* separate five or six distinct substances from it. And as for the remaining Ashes, the Chymists themselves teach us, that by a further degree of fire they may be indissolubly united into glass. 'Tis true, that the *Analysis*

nalysis which the Chymists principally build upon is made, not in the open air, but in close Vessels; but however, the Examples lately produc'd may invite you shrewdly to suspect, That heat may as well compound as dissipate the Parts of mixt Bodies: and not to tell you, that I have known a Vitrification made even in close vessels; I must remind you that the Flowers of Antimony, and those of Sulphur, are very mix'd Bodies, though they ascend in close vessels: And that 'twas in stopt glasses that I brought up the whole Body of Camphire. And whereas it may be objected, that all these Examples are of Bodies forc'd up in a dry, not a Fluid forme, as are the Liquors wont to be obtain'd by distillation; I answer, That besides 'tis possible, that a Body may be chang'd from Consistent to Fluid, or from Fluid to Consistent, without being otherwise much altered, as may appear by the Easiness wherewith in Winter, without any Addition or Separation of Visible Ingredients, the same substance may be quickly harden'd into brittle Ice, and thaw'd again into Fluid Water; Besides this, I say it would be consider'd, that common

Quick-silver it self, which the Eminentest Chymists confess to be a mixt Body, may be Driven over the Helme in its Pristine forme of Quicksilver, and consequently, in that of a Liquor. And certainly 'tis possible that very compounded Bodies may concurr to Constitute Liquors; Since, not to mention that I have found it possible, by the help of a certain *Menstruum*, to distill Gold it self through a Retort, even with a Moderate Fire: Let us but consider what happens in Butter of Antimony. For if that be carefully rectify'd, it may be reduc'd into a very clear Liquor; and yet if You cast a quantity of fair water upon it, there will quickly precipitate a Ponderous and Vomitive Calx, which made before a considerable part of the Liquor, and yet is indeed (though some eminent Chymists would have it Mercurial) an Antimonial Body carryed over and kept dissolv'd by the Salts of the Sublimate, and consequently a compounded one; as You may find, if You will have the Curiosity to Examine this White powder by a skilful Reduction. And that You may not think that Bodies as compounded, as flowers of Brimstone, cannot be brought

brought to Concurr to Constitute Distill'd Liquors; And also That You may not imagine with Divers Learned Men that pretend no small skill in Chymistry, that at least no mixt Body can be brought over the Helme, but by corrosive Salts, I am ready to shew You, when You please, among other waies of bringing over Flowers of Brimstone (perhaps I might add even Mineral Sulphurs) some, wherein I employ none but Oleaginous bodies to make Volatile Liquors, in which not only the colour, but (which is a much surer mark) the smell and some Operations manifest that there is brought over a Sulphur that makes part of the Liquor.

One thing more there is, *Eleutherius*, (saies *Carneades*) which is so pertinent to my present purpose, that though I have touch'd upon it before, I cannot but on this occasion take notice of it. And it is this, That the Qualities or Accidents, upon whose account Chymists are wont to call a portion of Matter by the name of Mercury or some other of their Principles, are not such but that 'tis possible as Great (and therefore why not the like) may be produc'd by such changes

of Texture, and other Alterations, as the Fire may make in the small Parts of a Body. I have already prov'd, when I discours'd of the second General Consideration, by what happens to plants nourish'd only with fair water, and Eggs hatch'd into Chickens, that by changing the disposition of the component parts of a Body, Nature is able to effect as great Changes in a parcell of Matter reputed similar, as those requisite to Denominate one of the *Tria Prima*. And though *Helmont* do somewhere wittily call the Fire the Destructor and the Artificial Death of Things; And although another Eminent Chymist and Physitian be pleas'd to build upon this, That Fire can never generate any thing but Fire; Yet You will, I doubt not, be of another mind; If You consider how many new sorts of mixt Bodies Chymists themselves have produc'd by means of the Fire: and particularly, if You consider how that Noble and Permanent Body, Glass, is not only manifestly produc'd by the violent action of the Fire, but has never, for ought we know, been produc'd any other way. And indeed it seems but an inconsiderate Assertion of some

some *Helmontians*, that every sort of Body of a Peculiar Denomination must be produc'd by some Seminal power; as I think I could evince, if I thought it so necessary, as it is for me to hasten to what I have further to discourse. Nor need it much move us, that there are some who look upon whatsoever the Fire is employ'd to produce, not as upon Natural but Artificial Bodies. For there is not alwaies such a difference as many imagine betwixt the one and the other: Nor is it so easy as they think, clearly to assigne that which Properly, Constantly, and Sufficiently, Discriminates them. But not to engage my self in so nice a Disquisition, it may now suffice to observe, that a thing is commonly termed Artificial, when a parcel of matter is by the Artificers hand, or Tools, or both, brought to such a shape or Form, as he Design'd before-hand in his Mind: Whereas in many of the Chymical Productions the effect would be produc'd whether the Artificer intended it or no; and is oftentimes very much other than he Intended or Look't for; and the Instruments employ'd, are not Tools Artificially fashion'd and

ſhaped, like thoſe of Tradeſmen, for this or that particular Work; but, for the moſt part, Agents of Nature's own providing, and whoſe chief Powers of Operation they receive from their own Nature or Texture, not the Artificer. And indeed, the Fire is as well a Natural Agent as Seed: And the Chymiſt that imployes it, does but apply Natural Agents and Patients, who being thus brought together, and acting according to their reſpective Natures, performe the work themſelves; as Apples, Plums, or other fruit, are natural Productions, though the Garden bring and faſten together the Sciens & the Stock, and both Water, and do perhaps divers other waies Contribute to its bearing fruit. But, to proceed to what I was going to ſay; You may obſerve with me, *Eleutherius*, that, as I told You once before, Qualities ſleight enough may ſerve to Denominate a Chymical Principle. For, when they anatomize a compound Body by the Fire, if they get a Subſtance inflamable, and that will not mingle with Water, that they preſently call Sulphur; what is ſapid and Diſſoluble in Water, that muſt paſſe for Salt; Whatſoever is fix'd

fi'xd and indiſſoluble in Water, that they name Earth. And I was going to add, that Whatſoever Volatile ſubſtance they know not what to make of, not to ſay, whatſoever they pleaſe, that they call Mercury. But that theſe Qualities may either be produc'd, otherwiſe than by ſuch as they call Seminal Agents, or may belong to bodies of a compounded Nature, may be ſhewn, among other Inſtances, in Glaſs made of aſhes, where the exceeding ſtrong-taſted *Alcalizate* Salt joyning with the Earth becomes inſipid, and with it conſtitutes a Body; which though alſo dry, fixt and indiſſoluble in Water, is yet manifeſtly a mixt Body; and made ſo by the Fire it ſelf.

And I remember to our preſent purpoſe, that *Helmont*, amongſt other Medicines that he commends, has a ſhort proceſs, wherein, though the Directions for Practice are but obſcurely intimated; yet I have ſome reaſon not to Diſbelieve the Proceſs, without affirming or denying any thing about the vertues of the remedy to be made by it. *Quando* (ſaies he) *oleum cinnamomi &c. ſuo ſali alcali miſcetur abſque omni aqua, trium menſium artificioſa occultaque circulatione, totum*

Helmont pag. 412.

totum in ſalem volatilem commutatum eſt, vere eſſentiam ſui ſimplicis in nobis exprimit & uſque in prima noſtri conſtitutiva ſeſe ingerit. A not unlike Proceſs he delivers in another place; from whence, if we ſuppoſe him to ſay true, I may argue, that ſince by the Fire there may be produc'd a ſubſtance that is as well Saline & volatile as the Salt of Hartshorn, blood, &c. which paſs for Elementary; and ſince that this Volatile Salt is really compounded of a Chymical Oyle and a fixt Salt, the one made Volatile by the other, and both aſſociated by the fire, it may well be ſuſpected that other Subſtances, emerging upon the Diſſipation of Bodies by the Fire, may be new ſorts of Mixts, and conſiſt of Subſtances of differing natures; and particularly, I have ſometimes ſuſpected, that ſince the Volatile Salts of Blood, Harts-horn, &c. are fugitive and endow'd with an exceeding ſtrong ſmell, either that Chymiſts do Erroneouſly aſcribe all odours to ſulphurs, or that ſuch Salts conſiſt of ſome oyly parts well incorporated with the Saline ones. And the like conjecture I have alſo made concerning Spirit of Vinegar, which, though the Chymiſts think one

one of the Principles of that Body, and though being an Acid Spirit it ſeems to be much leſs of kin than Volatile Salts to ſulphurs; yet, not to mention its piercing ſmell; which I know not with what congruity the Chymiſt will deduce from Salt, I wonder they have not taken notice of what their own *Tyrocinium Chymicum* teach us concerning the Diſtillation of *Saccharum Saturni*; out of which *Beguinus* aſſures Us, that he diſtill'd, beſides a very fine ſpirit, no leſs than two Oyles, the one blood-red and ponderous, but the other ſwimming upon the top of the Spirit, and of a yellow colour; of which he ſaies that he kept then ſome by him, to verify what he dilivers. And though I remember not that I have had two diſtinct Oyles from Sugar of Lead, yet that it will though diſtill'd without addition yeeld ſome Oyle, diſagrees not with my Experience. I know the Chymiſts will be apt to pretend, that theſe Oyles are but the volatiliz'd ſulphur of lead; and will perhaps argue it from what *Beguinus* relates, that when the Diſtillation is ended, you'l find a *Caput Mortuum* extreamly black, and (as he ſpeaks) *nullius momenti*, as if the Body, or

Tyroc. Chym. L.1.C.4.

at

at leaſt the chief part of the Metal it ſelf were by the diſtillation carried over the Helme. But ſince you know as well as I that *Saccharum Saturni* is a kind of Magiſtery, made only by calcining of Lead *per ſe*, diſſolving it in diſtill'd Vinegar, and Chryſtalyzing the ſolution; if I had leaſure to tell You how Differing a thing I did upon examination find the *Caput Mortuum*, ſo ſlighted by *Beguinus*, to be from what he repreſents it, I beleeve you would think the conjecture propos'd leſs probable than one or other of theſe three; either that this Oyle did formerly concurr to conſtitute the Spirit of Vinegar, and ſo that what paſſes for a Chymical Principle may yet be further reſoluble into diſtinct ſubſtances; or that ſome parts of the Spirit together with ſome parts of the Lead may conſtitute a Chymical Oyle, which therefore though it paſs for Homogeneous, may be a very compounded Body: or at leaſt that by the action of the Diſtill'd Vinegar and the Saturnine Calx one upon another, part of the Liquor may be ſo alter'd as to be tranſmuted from an Acid Spirit into an Oyle. And though the truth of either of the two former conjectures would

would make the example I have reflected on more pertinent to my preſent argument; yet you'l eaſily diſcern, the Third and laſt Conjecture cannot be unſerviceable to confirm ſome other paſſages of my diſcourſe.

To return then to what I was ſaying juſt before I mention'd *Helmont*'s Experiment, I ſhall ſubjoyne, That Chymiſts muſt confeſs alſo that in the perfectly Dephlegm'd ſpirit of Wine, or other Fermented Liquors, that which they call the Sulphur of the Concrete loſes, by the Fermentation, the Property of Oyle, (which the Chymiſts likewiſe take to be the true Sulphur of the Mixt) of being unminglable with the Water. And if You will credit *Helmont*, a pound of the pureſt Spirit of Wine may barely by the help of pure Salt of Tartar (which is but the fixed Salt of Wine) be reſolv'd or Tranſmuted into ſcarce half an ounce of Salt, and as much Elementary Water as amounts to the remaining part of the mention'd weight. And it may (as I think I formerly alſo noted) be doubted, whether that Fixt & Alcalizate Salt, which is ſo unanimouſly agreed on to be the Saline Principle of incinerated Bodies, be

Oſtendi alias, quomodo lib. una aquæ vitæ combibita in ſale Tartari ſiccato, vix ſixt ſcruncia ſalis, cæterum totum corpus fiat aqua Elementalis. Helmont. in Aura vitali.

be not, as 'tis Alcalizate, a Production of the Fire? For though the taſt of Tartar, for Example, ſeem to argue that it contains a Salt before it be burn'd, yet that Salt being very Acid is of a quite Differing Taſt from the Lixiviate Salt of Calcin'd Tartar. And though it be not truly Objected againſt the Chymiſts, that they obtain all Salts they make, by reducing the Body they work on into Aſhes with Violent Fires, (ſince Hartshorn, Amber, Blood, and divers other Mixts yeeld a copious Salt before they be burn'd to Aſhes) yet this Volatile Salt Differs much, as we ſhall ſee anon, from the Fixt Alcalizate Salt I ſpeak of; which for ought I remember is not producible by any known Way, without Incineration. 'Tis not unknown to Chymiſts, that Quickſilver may be Precipitated, without Addition, into a dry Powder, that remains ſo in Water. And ſome eminent *Spagyriſts*, and even *Raimund Lully* himſelf, teach, that meerly by the Fire Quickſilver may in convenient Veſſels be reduc'd (at leaſt in great part) into a thin Liquor like Water, and minglable with it. So that by the bare Action of

of the Fire, 'tis poſſible, that the parts of a mixt Body ſhould be ſo diſpos'd after new and differing manners, that it may be ſometimes of one conſiſtence, ſometimes of another; And may in one State be diſpos'd to be mingl'd with Water, and in another not. I could alſo ſhew you, that Bodies from which apart Chymiſts cannot obtain any thing that is Combuſtible, may by being aſſociated together, and by the help of the Fire, afford an inflamable Subſtance. And that on the other ſide, 'tis poſſible for a Body to be inflamable, from which it would very much puzzle any ordinary Chymiſt, and perhaps any other, to ſeparate an inflamable Principle or Ingredient. Wherefore, ſince the Principles of Chymiſts may receive their Denominations from Qualities, which it often exceeds not the power of Art, nor alwaies that of the Fire to produce; And ſince ſuch Qualities may be found in Bodies that differ ſo much in other Qualities from one another, that they need not be allow'd to agree in that pure and ſimple Nature, which Principles, to be ſo indeed, muſt have; it may juſtly

justly be suspected, that many Productions of the Fire that are shew'd us by Chymists, as the Principles of the Concrete that afforded them, may be but a new kind of Mixts. And to annex, on this Occasion, to these arguments taken from the Nature of the thing, one of those which *Logicians* call *ad Hominem*, I shall desire You to take Notice, that though *Paracelsus* Himself, and some that are so mistaken as to think he could not be so, have ventur'd to teach, that not only the bodies here below, but the Elements themselves, and all the other Parts of the Universe, are compos'd of Salt, Sulphur and Mercury; yet the learned *Sennertus*, and all the more wary Chymists, have rejected that conceit, and do many of them confess, that the *Tria Prima* are each of them made up of the four Elements; and others of them make Earth and Water concurr with Salt, Sulphur and Mercury, to the Constitution of Mixt bodies. So that one sort of these *Spagyrists*, notwithstanding the specious Titles they give to the productions of the Fire, do in effect grant what I contend for. And, of the other

ther sort I may well demand, to what Kind of Bodies the Phlegm and dead Earth, to be met with in Chymical Resolutions, are to be referr'd? For either they must say, with *Paracelsus*, but against their own Concessions, as well as against Experience, that these are also compos'd of the *Tria Prima*, whereof they cannot separate any one from either of them; or else they must confess that two of the vastest Bodies here below, Earth, and Water, are neither of them compos'd of the *Tria Prima*; and that consequently those three are not the Universal, and Adequate Ingredients, neither of all Sublunary Bodies, nor even of all mixt Bodies.

I know that the chief of these Chymists represent, that though the Distinct Substances into which they divide mixt bodies by the Fire, are not pure and Homogeneous; yet since the four Elements into which the *Aristotelians* pretend to resolve the like bodies by the same Agent, are not simple neither, as themselves acknowledge, 'tis as allowable for the Chymists to call the one Principles, as for the Peripateticks to call the other Elements; since in both cases the Im-

Impoſition of the name is grounded only upon the Predominancy of that Element whoſe name is aſcrib'd to it. Nor ſhall I deny, that this Argument of the Chymiſts is no ill one againſt the *Ariſtotelians*. But what Anſwer can it prove to me, who you know am diſputing as well againſt the *Ariſtotelian* Elements, as the Chymical Principles, and muſt not look upon any body as a true Principle or Element, but as yet compounded, which is not perfectly Homogeneous, but is further Reſoluble into any number of Diſtinct Subſtances how ſmall ſoever. And as for the Chymiſts calling a body Salt, or Sulphur, or Mercury, upon pretence that the Principle of the ſame name is predominant in it, That it ſelf is an Acknowledgment of what I contend for; namely that theſe productions of the Fire, are yet compounded bodies. And yet whilſt this is granted, it is affirm'd, but not prov'd, that the reputed Salt, or Sulphur, or Mercury, conſiſts mainly of one body that deſerves the name of a principle of the ſame Denomination. For how do Chymiſts make it appear that there are any ſuch primitive and ſimple bodies

dies in thoſe we are ſpeaking of; ſince 'tis upon the matter confeſs'd by the anſwer lately made, that theſe are not ſuch? And if they pretend by Reaſon to evince what they affirm, what becomes of their confident boaſts, that the Chymiſt (whom they therefore, after *Beguinus*, call a *Philoſophus* or *Opifex Senſatus*) can convince our Eyes, by manifeſtly ſhewing in any mixt body thoſe ſimple ſubſtances he teaches them to be compos'd of? And indeed, for the Chymiſts to have recourſe in this caſe to other proofs than Experiments, as it is to wave the grand Argument that has all this while been given out for a Demonſtrative One; ſo it releaſes me from the obligation to proſecute a Diſpute wherein I am not engag'd to Examine any but Experimental proofs. I know it may plauſibly enough be Repreſented, in favour of the Chymiſts, that it being evident that much the greater part of any thing they call Salt, or Sulphur, or Mercury, is really ſuch; it would be very rigid to deny thoſe Subſtances the names aſcribed them, only becauſe of ſome ſlight mixture of another Body; ſince not only the Peripateticks call particu-

lar parcels of matter Elementary, though they acknowledge that Elements are not to be any where found pure, at leaſt here below; And ſince eſpecially there is a manifeſt Analogie & Reſemblance betwixt the bodies obtainable by Chymical Anatomies and the principles whoſe names are given them; I have, I ſay, conſider'd that theſe things may be repreſented; But as for what is drawn from the Cuſtome of the Peripateticks, I have already told You, that though it may be employ'd againſt Them, Yet it is not available againſt me, who allow nothing to be an Element that is not perfectly Homogeneous. And whereas it is alledg'd, that the Predominant Principle ought to give a name to the ſubſtance wherein it abounds; I anſwer, that that might much more reaſonably be ſaid, if either we or the Chymiſts had ſeen Nature take pure Salt, pure Sulphur, and pure Mercury, and compound of them every ſort of Mixt Bodies. But, ſince 'tis to experience that they appeal, we muſt not take it for granted, that the Diſtill'd Oyle (for inſtance) of a plant is mainly compos'd of the pure principle call'd Sulphur, till they

they have given us an ocular proof, that there is in that ſort of Plants ſuch an Homogeneous Sulphur. For as for the ſpecious argument, which is drawn from the Reſemblance betwixt the Productions of the Fire, and the Reſpective, either *Ariſtotelian* Elements, or *Chymical* Principles, by whoſe names they are call'd; it will appear more plauſible than cogent, if You will but recall to mind the ſtate of the controverſie; which is not, whether or no there be obtain'd from mixt Bodies certain ſubſtances that agree in outward appearance, or in ſome Qualities with Quickſilver or Brimſtone, or ſome ſuch obvious or copious Body; But whether or no all Bodies confeſs'd to be perfectly mixt were compos'd of, and are reſoluble into a determinate number of primary unmixt Bodies. For, if you keep the ſtate of the queſtion in your eye, you'l eaſily diſcerne that there is much of what ſhould be Demonſtrated, left unprov'd by thoſe Chymical Experiments we are Examining. But (not to repeat what I have already diſcover'd more at large) I ſhall now take notice, that it will not preſently follow, that becauſe a Production of the Fire has ſome

affinity with some of the greater Masses of matter here below, that therefore they are both of the same Nature, and deserve the same Name; for the Chymists are not content, that flame should be look't upon as a parcel of the Element of Fire, though it be hot, dry, and active, because it wants some other Qualities belonging to the nature of Elementary fire. Nor will they let the Peripateticks call Ashes, or Quicklime, Earth, notwithstanding the many likenesses between them; because they are not tastless, as Elementary Earth ought to be: But if you should ask me, what then it is, that all the Chymical Anatomies of Bodies do prove, if they prove not that they consist of the three Principles into which the fire resolves them? I answer that their Dissections may be granted to prove, that some mixt bodies (for in many it will not hold) are by the fire, when they are included in close Vessels, (for that Condition also is often requisite) dissoluble into several Substances differing in some Qualities, but principally in Consistence. So that out of most of them may be obtain'd a fixt Substance partly saline, and partly insipid, an unctuous

unctuous Liquor, and another Liquor or more that without being unctuous have a manifest taste. Now if Chymists will agree to call the dry and sapid substance Salt, the Unctuous liquor Sulphur, and the other Mercury, I shall not much quarrel with them for so doing: But if they will tell me that Salt, Sulphur, and Mercury, are simple and primary bodies whereof each mixt body was actually compounded, and which was really in it antecedently to the operation of the fire, they must give me leave to doubt whether (whatever their other arguments may do) their Experiments prove all this. And if they will also tell me that the Substances their Anatomies are wont to afford them, are pure and similar, as Principles ought to be, they must give me leave to beleeve my own senses; and their own confessions, before their bare Assertions. And that you may not (*Eleutherius*) think I deal so rigidly with them, because I scruple to Take these Productions of the Fire for such as the Chymists would have them pass for, upon the account of their having some affinity with them; consider a little with me, that in regard an Element or Princi-

He ought to be perfectly Similar and Homogeneous, there is no just cause why I should rather give the body propos'd the Name of this or that Element or Principle, because it has a resemblance to it in some obvious Quality, rather than deny it that name upon the account of divers other Qualities, wherein the propos'd Bodies are unlike; and if you do but consider what slight and easily producible qualities they are that suffice, as I have already more than once observ'd, to Denominate a Chymical Principle or an Element, you'l not, I hope, think my wariness to be destitute either of Example, or else of Reason. For we see that the Chymists will not allow the *Aristotelians* that the Salt in Ashes ought to be called Earth, though the Saline and Terrestrial part symbolize in weight, in dryness, in fixness and fusibility, only because the one is sapid and dissoluble in Water, and the other not: Besides, we see that sapidness and volatility are wont to denominate the Chymists Mercury or Spirit; and yet how many Bodies, think you, may agree in those Qualities which may yet be of very differing natures, and disagree in qualities either more numerous, or more considerable, or both. For not only Spirit of Nitre, Aqua Fortis, Spirit of Salt, Spirit of Oyle of Vitriol, Spirit of Allume, Spirit of Vinegar, and all Saline Liquors Distill'd from Animal Bodies, but all the Acetous Spirits of Woods freed from their Vinegar; All these, I say, and many others must belong to the Chymists Mercury, though it appear not why some of them should more be comprehended under one denomination than the Chymists Sulphurs, or Oyle should likewise be; for their Distill'd Oyles are also Fluid, Volatile, and Tasteable, as well as their Mercury; Nor is it Necessary, that their Sulphur should be Unctuous or Dissoluble in Water, since they generally referr Spirit of Wine to Sulphurs, although that Spirit be not Unctuous, and will freely mingle with Water. So that here Inflamability must constitute the Essence of the Chymists Sulphur; as uninflamableness joyned with any taste is enough to intitle a Distill'd Liquor to be their Mercury. Now since I can further observe to You, that Spirit of Nitre and Spirit of Hartshorne being pour'd together will boyle and

and hiſſe and toſſe up one another into the air, which the Chymiſts make ſignes of great Antipathy in the Natures of Bodies, (as indeed theſe Spirits differ much both in Taſte, Smell, and Operations) Since I elſewhere tell you of my having made two ſorts of Oyle out of the ſame mans blood, that would not mingle with one another; And ſince I might tell You Divers Examples I have met with, of the Contrariety of Bodies which according to the Chymiſts muſt be huddl'd up together under one Denomination; I leave you to Judge whether ſuch a multitude of Subſtances as may agree in theſe ſlight Qualities, and yet Diſagree in Others more Conſiderable, are more worthy to be call'd by the Name of a Principle (which ought to be pure and homogeneous) than to have appellations given them that may make them differ, in name too, from the bodies from which they ſo wildly differ in Nature. And hence alſo, by the by, you may perceive that 'tis not unreaſonable to diſtruſt the Chymiſts way of Argumentation, when being unable to ſhew us that ſuch a Liquor is (for Example) purely

purely ſaline, they prove, that at leaſt ſalt is much the predominant principle, becauſe that the propos'd ſubſtance is ſtrongly Taſted, and all Taſt proceeds from ſalt; whereas thoſe Spirits, ſuch as ſpirit of Tartar, ſpirit of Harts-horn, and the like, which are reckoned to be the Mercuries of the Bodies that afford them, have manifeſtly a ſtrong and piercing taſt, and ſo has (according to what I formerly noted) the ſpirit of Box &c. even after the acid Liquor that concurr'd to compoſe it has been ſeparated from it. And indeed, if ſapidneſs belong not to the ſpirit or Mercurial Principle of Vegetables and Animals: I ſcarce know how it will be diſcriminated from their Phlegm, ſince by the abſence of Inflamability it muſt be diſtinguiſh'd from their ſulphur which affords me another Example, to prove how unacurate the Chymical Doctrine is in our preſent Caſe; ſince not only the ſpirits of Vegetables and Animals, but their Oyles are very ſtrongly taſted, as he that ſhall but wet his tongue with Chymical Oyle of Cinnamon or of Cloves, or even of Turpentine, may quickly find, to his ſmart. And not only

I never try'd any Chymical Oyles whose taſt was not very manifeſt and ſtrong; but a skilful and inquisitive perſon who made it his buſineſs by elaborate operations to depurate Chymical Oyles, & reduce them to an Elementary ſimplicity, Informes us, that he never was able to make them at all Taſteleſs; whence I might inferr, that the proof Chymiſts confidently give us of a bodies being ſaline, is ſo far from demonſtrating the Predominancy, that it does not clearly Evince ſo much as the preſence of the ſaline Principle in it. But I will not (purſues *Carneades*) remind you, that the Volatile ſalt of Harts-horn, Amber, Blood &c. are exceeding ſtrongly ſcented, notwithſtanding that moſt Chymiſts deduce Odours from Sulphur, and from them argue the Predominancy of that Principle in the Odorous body, becauſe I muſt not ſo much as add any new Examples of the incompetency of this ſort of Chymical arguments; ſince having already detain'd You but too long in thoſe generals that appertain to my fourth conſideration 'tis time that I proceed to the particulars themſelves, to which I thought fit they ſhould be previous:

Theſe

Theſe Generals (continues *Carneades*) being thus premis'd, we might the better ſurvey the Unlikeneſs that an attentive and unprepoſſeſs'd obſerver may take notice of in each ſort of Bodies which the Chymiſts are wont to call the ſalts or ſulphurs or Mercuries of the Concretes that yeeld Them, as if they had all a ſimplicity, & Identity of Nature: whereas ſalts if they were all Elementary would as little differ as do the Drops of pure and ſimple Water. 'Tis known that both Chymiſts and Phyſicians aſcribe to the fixt ſalts of calcin'd Bodies the vertues of their concretes; and conſequently very differing Operations. So we find the *Alcali* of Wormwood much commended in diſtempers of the ſtomach; that of Eyebright for thoſe that have a weak ſight; and that of *Guaiacum* (of which a great Quantity yeelds but a very little ſalt) is not only much commended in Venerical Diſeaſes, but is beleeved to have a peculiar purgative vertue, which yet I have not had occaſion to try. And though, I confeſs, I have long thought, that theſe *Alcalizate* ſalts are, for the moſt part, very neer of kin, and retain very little of the properties

of

of the Concretes whence they were ſeparated; Yet being minded to Obſerve watchfully whether I could meet with any Exceptions to this General Obſervation, I obſerv'd at the Glaſs-houſe, that ſometimes the Metal (as the Workmen call it) or Maſs of colliquated Ingredients, wch by Blowing they faſhion into Veſſels of divers ſhapes, did ſometimes prove of a very differing colour, and a ſomewhat differing Texture, from what was uſual. And having enquired whether the cauſe of ſuch Accidents might not be derived from the peculiar Nature of the fixt ſalt employ'd to bring the ſand to fuſion, I found that the knowingſt Workmen imputed theſe Miſ-adventures to the Aſhes, of ſome certain kind of Wood; as having obſerv'd the ignobler kind of Glaſs I lately mention'd to be frequently produc'd, when they had employ'd ſuch ſorts of Aſhes, which therefore they ſcruple to make uſe of, if they took notice of them beforehand. I remember alſo, that an Induſtrious Man of my acquaintance having bought a vaſt quantity of Tobacco ſtalks to make a fixt Salt with, I had the Curioſity to go ſee whether that Exotick Plant,

Plant, wch ſo much abounds in volatile ſalt, would afford a peculiar kind of *Alcali*; and I was pleas'd to find that in the *Lixivium* of it, it was not neceſſary, as is uſual, to evaporate all the Liquor, that there might be obtain'd a Saline Calx, conſiſting like lime quench'd in the Air of a heap of little Corpuſcles of unregarded ſhapes: but the fixt ſalt ſhot into figur'd Chryſtal, almoſt as Nitre or *Sal armoniack* and other uncalcin'd ſalts are wont to do; And I further remember that I have obſerv'd that in the fixt ſalt of Urine, brought by depuration to be very white, a taſt not ſo unlike to that of common ſalt, and very differing from the wonted cauſtick Lixiviate taſt of other ſalts made by Incineration. But becauſe the Inſtances I have alledg'd of the Difference of *Alcalizate* ſalt are but few, and therefore I am ſtill inclin'd to think, that moſt Chymiſts and many Phyſitians do, inconſiderately enough and without Warrant from Experience, aſcribe the Vertues of the Concretes expos'd to Calcination, to the ſalts obtain'd by it; I ſhall rather to ſhew the Diſparity of ſalts mention in the firſt Place the apparent Difference betwixt the

the Vegetable fixt salts and the Animal Volatile ones: As (for Example) betwixt salt of Tartar, and salt of Harts-horn; whereof the former is so fixt that 'twill indure the brunt of a violent Fire, and stand in fusion like a Metal; whereas the other (besides that it has a differing tast and a very differing smell) is so far from being fixt, that it will fly away in a gentle heat as easily as spirit of Wine it self. And to this I shall add, in the next place, That even among the Volatile salts themselves, there is a considerable Difference, as appears by the distinct Properties of (for Instance) salt of Amber, salt of Urine, salt of Mans Skull, (so much extoll'd against the falling Sickness) and divers others which cannot escape an ordinary Observer. And this Diversity of Volatile salts I have observ'd to be sometimes Discernable even to the Eye, in their Figures. For the salt of Harts-horn I have observ'd to adhere to the Receiver in the forme almost of a *Parallelipipedon*; and of the Volatile salt of humane blood (long digested before distillation, with spirit of Wine) I can shew you store of grains of that Figure which *Geometricians*

ans call a *Rhombus*; though I dare not undertake that the Figures of these or other Saline Chrystals (if I may so call Them) will be alwaies the same, whatever degree of Fire have been employ'd to force them up, or how hastily soever they have been made to convene in the spirits or liquors, in the lower part of which I have usually observ'd them after a while to shoot. And although, as I lately told You, I seldom found any Difference, as to Medical Vertues, in the fixt Salts of Divers Vegetables; and accordingly I have suspected that most of these volatile Salts, having so great a Resemblance in smell, in tast, and fugitiveness, differ but little, if at all, in their Medicinal properties: As indeed I have found them generally to agree in divers of them (as in their being somewhat Diaphoretick and very Deopilative) Yet I remember *Helmont* somewhere informs us, that there is this Difference betwixt the saline spirit of Urine and that of Mans blood, that the former

Error vero per distillationem nobis monstrat etiam Spiritum salinum plane volatilem odore nequiquam ut nec gustu distinguibilem a Spiritu Urinæ; In eo tamen essentialiter diversum, quod spiritus talis cruoris curat Epilepsiam, non autem spiritus salis lotii.

Helmont. Aura Vitalis.

former will not cure the Epilepsy, but the Latter will. Of the Efficacy also of the Salt of Common Amber against the same Disease in Children, (for in Grown Persons it is not a specifick) I may elsewhere have an Occasion to Entertain You. And when I consider that to the obtaining of these Volatile Salts (especially that of Urine) there is not requisite such a Destructive Violence of the Fire, as there is to get those Salts that must be made by Incineration, I am the more invited to conclude, that they may differ from one another and consequently recede from an Elementary Simplicity. And, if I could here shew You what Mr. *Boyle* has Observ'd, touching the Various Chymical Distinctions of Salts; You would quickly discern, not only that Chymists do give themselves a strange Liberty to call Concretes Salts, that are according to their own Rules to be look'd upon as very Compounded Bodies; but that among those very Salts that seem Elementary, because produc'd upon the Anatomy of the Bodies that yeeld them, there is not only a visible Disparity, but, to speak in the common Language,

guage, a manifest Antipathy or Contrariety: As is evident in the Ebullition and hissing that is wont to ensue, when the Acid Spirit of Vitriol, for Instance, is pour'd upon pot ashes, or Salt of Tartar. And I shall beg leave of this Gentleman, (saies *Carneades*) casting his Eyes on me, to let me observe to You out of some of his papers, particularly those wherein he treats of some Preparations of Urine, that not only one and the same body may have two Salts of a contrary Nature, as he exemplifies in the Spirit and *Alkali* of Nitre; but that from the same body there may without addition be obtain'd three differing and Visible Salts For He Relates, that he observ'd in Urine, not only a Volatile and Chrystalline Salt, and a fixt Salt, but likewise a kind of *Sal Armoniack*, or such a Salt as would sublime in the form of a salt, and therefore was not fixt, and yet was far from being so fugitive as the Volatile salt; from which it seem'd also otherwise to differ. I have indeed suspected that this may be a *Sal Armoniack* properly enough so call'd, as Compounded of the Volatile salt of Urine, and the

fixt of the same Liquor, which, as I noted, is not unlike sea-salt; but that it self argues a manifest Difference betwixt the salts, since such a Volatile salt is not wont to Unite thus with an ordinary *Alcali*, but to fly away from it in the Heat. And on this occasion I remember, that to give some of my Friends an Ocular proof of the difference betwixt the fixt and Volatile salt of (the same Concrete) Wood, I devis'd the following Experiment. I took common Venetian sublimate, and dissolv'd as much of it as I well could in fair Water: then I took Wood Ashes, and pouring on them Warme Water, Dissolv'd their salt; and filtrating the Water, as soon as I found the *Lixivium* sufficiently sharp upon the tongue, I reserv'd it for use: Then one part of the former solution of sublimate dropping a little of this Dissolv'd Fixt salt of Wood, the Liquors presently turn'd of an Orange Colour; but upon the other part of the clear solution of sublimate putting some of the Volatile salt of Wood (which abounds in the spirit of soot) the Liquor immediately turn'd white, almost like Milke, and after a while let fall a white sediment, as the other Liquor did a Yellow one.

To all this that I have said concerning the Difference of salts, I might add what I formerly told you, concerning the simple spirit of Box, and such like Woods, which differ much from the other salts hitherto mention'd, and yet would belong to the saline Principle, if Chymists did truly teach that all Tasts proceed from it. And I might also annex, what I noted to you out of *Helmont* concerning Bodies, which, though they consist in great part of Chymical Oyles, do yet appear but Volatile salts; But to insist on these things, were to repeat; and therefore I shall proceed.

Aliquando oleum Cinnamomi, &c. suo sali Alcali miscetur absque omni aqua, trium mensium Artificiosa occultaque circulatione, totum in salem volatilem commutatum est. Helmont. Tria Prima Chymicorum, &c. pag. 412.

This Disparity is also highly eminent in the separated sulphurs or Chymical Oyles of things. For they contain so much of the scent, and tast, and vertues, of the Bodies whence they were drawn, that they seem to be but the Material *Crasis* (if *I* may so speak) of their Concretes. Thus the Oyles of Cinna-

mon, Cloves, Nutmegs and other ſpices, ſeem to be but the United Aromatick parts that did ennoble thoſe Bodies. And 'tis a known thing, that Oyl of Cinnamon, and Oyle of Cloves, (which I have likewiſe obſerv'd in the Oyles of ſeveral Woods) will ſink to the Bottom of Water: whereas thoſe of Nutmegs and divers other Vegetables will ſwim upon it. The Oyle (abuſively call'd ſpirit) of Roſes ſwims at the Top of the Water in the forme of a white butter, which I remember not to have obſerv'd in any other Oyle drawn in any Limbeck; yet there is a way (not here to be declar'd) by which I have ſeen it come over in the forme of other Aromatick Oyles, to the Delight and Wonder of thoſe that beheld it. In Oyle of Aniſeſeeds, which I drew both with, and without Fermentation, I obſerv'd the whole Body of the Oyle in a cool place to thicken into the Conſiſtence and Appearance of white Butter, which with the leaſt heat reſum'd its Former Liquidneſs. In the Oyle of Olive drawn over in a Retort, I have likewiſe more than once ſeen a ſpontaneous Coagulation in the Receiver:

Receiver: And I have of it by me thus Congeal'd; which is of ſuch a ſtrangely Penetrating ſcent, as if 'twould Perforate the Noſes that approach it. The like pungent Odour I alſo obſerv'd in the Diſtill'd Liquor of common ſope, which forc'd over from *Minium*, lately afforded an oyle of a moſt admirable Penetrancy. And he muſt be a great ſtranger, both to the Writings and preparations of Chymiſts, that ſees not in the Oyles they diſtil from Vegetables and Animals, a conſiderable and obvious Difference. Nay I ſhall venture to add, *Eleutherius* (what perhaps you will think of kin to a Paradox) that divers times out of the ſame Animal or Vegetable, there may be extracted Oyles of Natures obviouſly differing. To which purpoſe I ſhall not inſiſt on the ſwimming and ſinking Oyles, which I have ſometimes obſerv'd to float on, and ſubſide under the ſpirit of *Guajacum*, and that of divers other Vegetables Diſtill'd with a ſtrong and laſting Fire; Nor ſhall I inſiſt on the obſervation elſewhere mention'd, of the divers and unmingleable oyles afforded us by Humane Blood long fermented and

Digeſted with ſpirit of Wine, becauſe theſe kind of oyles may ſeem chiefly to differ in Conſiſtence and Weight, being all of them high colour'd and aduſt. But the Experiment, which I deviſ'd to make out this Difference of the oyles of the ſame Vegetable, *ad Oculum*, (as they ſpeak) was this that followes. I took a pound of Aniſeſeeds, and having groſly beaten them, cauſed them to be put into a very large glaſs Retort almoſt filled with fair Water; and placing this Retort in a ſand Furnace, I caus'd a very Gentle heat to be adminiſtred during the firſt day, and a great part of the ſecond, till the Water was for the moſt part drawn off, and had brought over with it at leaſt moſt of the Volatile and Aromatick Oyle of the ſeeds. And then encreaſing the Fire, and changing the Receiver, I obtain'd beſides an Empyreumatical Spirit, a quantity of aduſt oyle; whereof a little floated upon the Spirit, and the reſt was more heavy, and not eaſily ſeparable from it. And whereas theſe oyles were very dark, and ſmell'd (as Chymiſts ſpeak) ſo ſtrongly of the Fire, that their Odour did

did not betray from what Vegetables they had been forc'd; the other *Aromatick* Oyle was enrich'd with the genuine ſmell and taſt of the Concrete; & ſpontaneouſly coagulating it ſelf into white butter did manifeſt it ſelf to be the true Oyle of Aniſeſeeds; which Concrete I therefore choſe to employ about this Experiment, that the Difference of theſe Oyles might be more conſpicuous than it would have been, had I inſtead of it diſtill'd another Vegetable.

I had almoſt forgot to take notice, that there is another ſort of Bodies, which though not obtain'd from Concretes by Diſtillation, many Chymiſts are wont to call their Sulphurs; not only becauſe ſuch ſubſtances are, for the moſt part, high colour'd, (whence they are alſo, and that more properly, called Tinctures) as diſſolv'd Sulphurs are wont to be; but eſpecially becauſe they are, for the moſt part, abſtracted and ſeparated from the reſt of the Maſs by Spirit of Wine: which Liquor thoſe men ſuppoſing to be Sulphureous, they conclude, that what it works upon, and abſtracts, muſt be a Sulphur alſo. And upon this account they preſume, that they can ſequeſter

the sulphur even of Minerals and Metalls; from wch 'tis known that they cannot by fire alone separate it. To all This I shall answer; That if these sequestred substances were indeed the sulphurs of the Bodies whence they are drawn, there would as well be a great Disparity betwixt Chymical Sulphurs obtain'd by Spirit of Wine, as I have already shewn there is betwixt those obtain'd by Distillation in the forme of Oyles: which will be evident from hence, that not to urge that themselves ascribe distinct vertues to Mineral Tincture, extolling the Tincture of Gold against such and such Diseases; the Tincture of Antimony, or of its Glass, against others; and the Tincture of Emerald against others; 'tis plain, that in Tinctures drawn from Vegetables, if the superfluous spirit of Wine be distill'd off, it leaves at the bottom that thicker substance which Chymists use to call the Extract of the Vegetable. And that these Extracts are endow'd with very differing Qualities according to the Nature of the Particular Bodies that afforded them (though I fear seldom with so much of the specifick vertues as is wont to be imagin'd) is freely con-

confess'd both by Physitians and Chymists. But *Leutherius* (saies *Carneades*) we may here take Notice that the Chymists do as well in this case, as in many others allow themselves a License to abuse Words: For not again to argue from the differing properties of Tinctures, that they are not exactly pure and Elementary Sulphurs; they would easily appear not to be so much as Sulphurs, although we should allow Chymical Oyles to deserve that Name. For however in some Mineral Tinctures the Natural fixtness of the extracted Body does not alwaies suffer it to be easily further resoluble into differing substances; Yet in very many extracts drawn from Vegetables, it may very easily be manifested that the spirit of Wine has not sequestred the sulphureous Ingredient from the saline and Mercurial ones; but has dissolv'd (for I take it to be a Solution) the finer Parts of the Concrete (without making any nice distinction of their being perfectly Sulphureous or not) and united it self with them into a kind of Magistery which consequently must contain Ingredients or Parts of several sorts. For we see that the stones

ſtones that are rich in vitriol, being often drench'd with rain-Water, the Liquor will then extract a fine and tranſparent ſubſtance coagulable into Vitriol; and yet though this Vitriol be readily diſſoluble in Water, it is not a true Elementary Salt, but, as You know, a body reſoluble into very differing Parts, whereof one (as I ſhall have occaſion to tell You anon) is yet of a Metalline, and conſequently not of an Elementary Nature. You may conſider alſo, that common Sulphur is readily diſſoluble in Oyle of Turpentine, though notwithſtanding its Name it abounds as well, if not as much, in Salt as in true Sulphur; witneſs the great quantity of ſaline Liquor it affords being ſet to flume away under a glaſs Bell. Nay I have, which perhaps You will think ſtrange, with the ſame Oyle of Turpentine alone eaſily enough diſſolv'd crude Antimony finely powder'd into a Blood-red Balſam, wherewith perhaps conſiderable things may be perform'd in Surgery. And if it were now Requiſite, I could tell You of ſome other Bodies, (ſuch as Perhaps You would not ſuſpect) that I have been able to work upon with certain Chymical Oyles.

But

But inſtead of digreſſing further I ſhall make this uſe of the Example I have nam'd. That 'tis not unlikely, but that Spirit of Wine which by its pungent taſt, and by ſome other Qualities that argue it better, (eſpecially its Reducibleneſs, according to *Helmont*, into *Alcali*, and Water,) ſeems to be as well of a Saline as of a Sulphureous Nature, may well be ſuppos'd Capable of Diſſolving Subſtances, That are not meerly Elementary ſuphurs', though perhaps they may abound with Parts that are of kin thereunto. For I find that Spirit of Wine will diſſolve *Gumm Lacca*, *Benzoine*, and the *Reſinous* Parts of *Jallap*, and even of *Guajacum*; whence we may well ſuſpect that it may from Spices, Herbs, and other leſs compacted Vegetables, extract ſubſtances that are not perfect Sulphurs but mixt Bodies. And to put it paſt Diſpute, there is many a Vulgar Extract drawn with Spirit of Wine, which committed to Diſtillation will afford ſuch differing ſubſtances as will Loudly proclaim it to have been a very compounded Body. So that we may juſtly ſuſpect, that even in Mineral Tinctures it will not alwaies follow, that becauſe a red ſubſtance

ſtance is drawn from the Concrete by ſpirit of Wine, that Subſtance is its true and Elementary Sulphur. And though ſome of theſe Extracts may perhaps be inflamable; Yet, beſides that others are not, and beſides that their being reduc'd to ſuch Minuteneſs of Parts may much facilitate their taking Fire; beſides this, I ſay, We ſee that common Sulphur, common Oyle, Gumm Lac, and many Unctuous and Reſinous Bodies, will flame well enough, though they be of very compounded Natures: Nay Travellers of Unſuſpected Credit aſſure Us, as a known thing, that in ſome Northern Countries where Firr trees and Pines abound, the poorer ſort of Inhabitants uſe Long ſplinters of thoſe Reſinous Woods to burn inſtead of Candles. And as for the redneſs wont to be met with in ſuch ſolutions, I could eaſily ſhew, that 'tis not neceſſary it ſhould proceed from the Sulphur of the Concrete, Diſſolv'd by the Spirit of Wine; if I had leaſure to manifeſt how much Chymiſts are wont to delude themſelves and others, by the Ignorance of thoſe other cauſes, upon whoſe account ſpirit of Wine and other *Menſtruums* may acquire

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a red or ſome other high colour. But to returne to our Chymical Oyles, ſuppoſing that they were exactly pure; Yet I hope they would be, as the beſt ſpirit of Wine is, but the more inflamable and deflagrable. And therefore ſince an Oyle can be by the Fire alone immediately turn'd into flame, which is ſomething of a very differing Nature from it: I ſhall Demand how this Oyle can be a Primogeneal and Incorruptible Body, as moſt Chymiſts would have their Principles; Since it is further reſoluble into flame, which whether or no it be a portion of the Element of Fire, as an *Ariſtotelian* would conclude, is certainly ſomething of a very differing Nature from a Chymical Oyle, ſince it burnes, and ſhines, and mounts ſwiftly upwards; none of which a Chymical Oyle does, whilſt it continues ſuch. And if it ſhould be Objected, that the Diſſipated Parts of this flaming Oyle may be caught and collected again into Oyl or Sulphur; I ſhall demand, what Chymiſt appears to have ever done it; and without Examining whether it may not hence be as well ſaid that ſulphur is but compacted Fire, as that Fire is but

diffus'd

diffus'd Sulphur, I ſhall leave you to conſider whether it may not hence be argu'd, that neither Fire nor Sulphur are primitive and indeſtructible Bodies; and I ſhall further obſerve that at leaſt it will hence appear, that a portion of matter may, without being Compounded with new Ingredients, by having the Texture and Motion of its ſmall parts chang'd, be eaſily, by the means of the Fire, endow'd with new Qualities, more differing from them it had before, than are thoſe which ſuffice to diſcriminate the Chymiſts Principles from one another.

We are next to Conſider, whether in the Anatomy of mixt Bodies, that which Chymiſts call the Mercurial part of them be un-compounded, or no. But to tell You True, though Chymiſts do Unanimouſly affirm that their Reſolutions diſcover a Principle, which they call Mercury, yet I find them to give of it Deſcriptions ſo Differing, and ſo Ænigmatical, that I, who am not aſham'd to confeſs that I cannot underſtand what is not ſence, muſt acknowledge to you that I know not what to make of them. *Paracelſus* himſelf, and therefore, as you will eaſily beleeve, many of his Followers, does ſomewhere call that Mercury which aſcends upon the burning of Wood, as the Peripateticks are wont to take the ſame ſmoake for Air; and ſo ſeems to define Mercury by Volatility, or (if I may coyne ſuch a Word) Effumability. But ſince, in this Example, both Volatile Salt and Sulphur make part of the ſmoake, which does indeed conſiſt alſo both of Phlegmatick and Terrene Corpuſcles, this Notion is not to be admitted; And I find that the more ſober Chymiſts themſelves diſavow it. Yet to ſhew you how little of clearneſs we are to expect in the accounts even of later *Spagyriſts*, be pleas'd to take notice, that *Beguinus*, even in his *Tyrocinium Chymicum*, written for the Inſtruction of Novices, when he comes to tell us what are meant by the *Tria Prima*, which for their being Principles ought to be defin'd the more accurately and plainly, gives us this Deſcription of Mercury; *Mercurius* (ſaies he) *eſt liquor ille acidus, permeabilis, penetrabilis, æthereus, ac puriſſimus, à quo omnis Nutricatio, Senſus, Motus, Vires, Colores, Seneƈtutiſque Præproperæ retardatio.*

Chym. Tyrocin. lib. 1. Cap. 2.

datio. Which words are not so much a Definition of it, as an *Encomium*: and yet *Quercetanus* in his Description of the same Principle adds to these, divers other *Epithets*. But both of them, to skip very many other faults that may be found with their Metaphorical Descriptions, speak incongruously to the Chymists own Principles. For if Mercury be an Acid Liquor, either Hermetical Philosophy must err in ascribing all Tasts to Salt, or else Mercury must not be a Principle, but Compounded of a Saline Ingredient and somewhat else. *Libavius*, though he find great fault with the obscurity of what the Chymists write concerning their Mercurial Principle, does yet but give us such a Negative Description of it, as *Sennertus*, how favourable soever to the *Tria Prima*, is not satisfi'd with. And this *Sennertus* Himself, though the Learned'st Champion for the Hypostatical Principles, does almost as frequently as justly complain of the unsatisfactorines of what the Chymists teach concerning their Mercury; and yet he himself (but with his wonted modesty) Substitutes instead of the Description of

of *Libavius*, another, which many Readers, especially if they be not Peripateticks, will not know what to make of. For scarce telling us any more, than that in all bodies that which is found besides Salt and Sulphur, and the Elements, or, as they call them, Phlegm and Dead Earth, is that Spirit which in *Aristotles* Language may be call'd οὐσία ἀνάλογον τῶν ἄνω στοιχείων. He saies that which I confess is not at all satisfactory to me, who do not love to seem to acquiesce in any mans Mystical Doctrines, that I may be thought to understand them.

If (saies *Eleutherius*) I durst presume that the same thing would be thought clear by me, and those that are fond of such cloudy Expressions as You justly Tax the Chymists for, I should venture to offer to Consideration, whether or no, since the Mercurial Principle that arises from Distillation is unanimously asserted to be distinct from the salt and Sulphur of the same Concrete, that may not be call'd the Mercury of a Body, which though it ascend in Distillation, as do the Phlegme and Sulphur, is neither insipid like the former, nor infla-

mable like the latter. And therefore I would ſubſtitute to the too much abuſed Name of Mercury, the more clear and Familiar Appellation of Spirit, which is alſo now very much made uſe of even by the Chymiſts themſelves of our times, though they have not given us ſo Diſtinct an Explication, as were fit, of what may be call'd the Spirit of a mixt Body.

I ſhould not perhaps (ſaies *Carneades*) much quarrel with your Notion of Mercury. But as for the Chymiſts, what they can mean, with congruity to their own Principles, by the Mercury of Animals and Vegetables, 'twill not be ſo eaſie to find out; for they aſcribe Taſts only to the Saline Principle, and conſequently would be much put to it to ſhew what Liquor it is, in the Reſolution of bodies, that not being inſipid, for that they call Phlegme, neither is inflamable as Oyle or Sulphur, nor has any Taſt; which according to them muſt proceed from a Mixture, at leaſt, of Salt. And if we ſhould take Spirit in the ſence of the Word receiv'd among Modern Chymiſts and Phyſitians, for any Diſtill'd Liquor that is

is neither Phlegme nor oyle, the Appellation would yet appear Ambiguous enough. For plainly, that which firſt aſcends in the Diſtillation of Wine and Fermented Liquors, is generally as well by Chymiſts as others reputed a Spirit. And yet pure Spirit of Wine being wholly inflamable ought according to them to be reckon'd to the Sulphureous, not the Mercurial Principle. And among the other Liquors that go under the name of Spirits, there are divers which ſeem to belong to the family of Salts, ſuch as are the Spirits of Nitre, Vitriol, Sea-Salt and others, and even the Spirit of Harts-horn, being, as I have try'd, in great part, if not totally reducible into Salt and Phlegme, may be ſuſpected to be but a Volatile Salt diſguis'd by the Phlegme mingl'd with it into the forme of a Liquor. However if this be a Spirit, it manifeſtly differs very much from that of Vinegar, the Taſt of the one being Acid, and the other Salt, and their Mixture in caſe they be very pure, ſometimes occaſioning an Effervescence like that of thoſe Liquors the Chymiſts count moſt contrary to one another. And even among

thoſe Liquors that ſeem to have a better title, than thoſe hitherto mention'd, to the name of Spirits, there appears a ſenſible Diverſity; For ſpirit of Oak, for inſtance, differs from that of Tartar, and this from that of Box, or of *Guajacum*. And in ſhort, even theſe ſpirits as well as other Diſtill'd Liquors manifeſt a great Diſparity betwixt themſelves, either in their Actions on our ſenſes, or in their other operations.

And (continues *Carneades*) beſides this Diſparity that is to be met with among thoſe Liquors that the Moderns call ſpirits, and take for ſimilar bodies, what I have formerly told you concerning the Spirit of Box-wood may let you ſee that ſome of thoſe Liquors not only have qualities very differing from others, but may be further reſolved into ſubſtances differing from one another.

And ſince many moderne Chymiſts and other Naturaliſts are pleaſed to take the Mercurial ſpirit of Bodies for the ſame Principle, under differing names, I muſt invite you to obſerve, with me, the great difference that is conſpicuous betwixt all the Vegetable and Animal ſpirits I have mention'd and running

Mercury. I ſpeak not of that which is commonly ſold in ſhops that many of themſelves will confeſſe to be a mixt Body; but of that which is ſeparated from Metals, which by ſome Chymiſts that ſeem more Philoſophers than the reſt, and eſpecially by the above mentioned *Claveus*, is (for diſtinction ſake) called *Mercurius Corporum*. Now this Metalline Liquor being one of thoſe three Principles of which Mineral Bodies are by *Spagyriſts* affirmed to be compos'd and to be reſoluble into them, the many notorious Differences betwixt them and the Mercuries, as They call Them, of Vegetables and Animals will allow me to inferr, either that Minerals and the other two ſorts of Mixt Bodies conſiſt not of the ſame Elements, or that thoſe Principles whereinto Minerals are immediately reſolved, which Chymiſts with great oſtentation ſhew us as the true principles of them, are but Secundary Principles, or Mixts of a peculiar ſort, which muſt be themſelves reduc'd to a very differing forme, to be of the ſame kind with Vegetable and Animal Liquors.

But this is not all; for although I formerly

merly told You how Little Credit there is to be given to the Chymical Processes commonly to be met with, of Extracting the Mercuries of Metals, Yet I will now add, that supposing that the more Judicious of Them do not untruly affirme that they have really drawn true and running Mercury from several Metals (which I wish they had clearly taught Us how to do also,) yet it may be still doubted whether such extracted Mercuries do not as well differ from common Quicksilver, and from one another, as from the Mercuries of Vegetables and Animals. *Claveus*, in his Apology, speaking of some *experiments* whereby Metalline Mercuries may be fixt into the nobler metals, adds, that he spake of the Mercuries drawn from metals; because common Quicksilver by reason of its excessive coldness and moisture is unfit for that particular kind of operation; for which though a few lines before he prescribes in general the Mercuries of Metalline Bodies, yet he chiefly commends that drawn by art from silver. And

Dixi autem de argento vivo à metallis prolicito, quod vulgare ob nimiam frigiditatem & humiditatem nimiam concoctioni est contumax, nec ab auro solum alteratio coerceri potest. Gast. Clave. in Apol.

And elsewhere, in the same Book, he tells us, that he himself tryed, that by bare coction the quicksilver of Tin or Pewter (*argentum vivum ex stanno prolicitum*) may by an efficient cause, (as he speaks) be turn'd into pure Gold. And the Experienc'd *Alexander van Suchten*, somewhere tells us, that by a way he intimates may be made a Mercury of Copper, not of the Silver colour of other Mercuries, but green; to which I shall add, that an eminent person, whose name his travells and learned writings have made famous, lately assur'd me that he had more than once seen the Mercury of Lead (which what ever Authors promise, you will find it very difficult to make, at least in any considerable quantity) fixt into perfect Gold. And being by me demanded whether or no any other Mercury would not as well have been changed by the same Operations, he assured me of the Negative.

And since I am fallen upon the mention of the Mercuries of metals, you will perhaps expect, (*Eleutherius*) that I should say something of their two other principles; but I must freely confess to you, that what Disparity there may be

between the salts and sulphurs of Metals or other Minerals, I am not my self experienced enough in the separations and examens of them, to venture to determine: (for as for the salts of Metals, I formerly represented it as a thing much to be question'd, whether they have any at all.) And for the processes of separation I find in Authors, if they were (what many of them are not) successfully practicable, as I noted above, yet they are to be performed by the assistance of other bodies, so hardly, if upon any termes at all, separable from them, that it is very difficult to give the separated principles all their due, and no more. But the Sulphur of Antimony which is vehemently vomitive, and the strongly scented Anodyne Sulphur of Vitriol inclines me to think that not only Mineral Sulphurs differ from Vegetable ones, but also from one another, retaining much of the nature of their Concretes. The salts of merals, and of some sort of minerals, You will easily guesse (by the doubts I formerly express'd, whether metals have any salt at all) that I have not been so happy as yet too see, perhaps not for want of curiosity.

ty. But if *Paracelsus* did alwaies write so consentaneously to himself that his opinion were confidently to be collected from every place of his writings where he seems to expresse it, I might safely take upon me to tell you, that he both countenances in general what I have delivered in my Fourth main consideration, and in particular warrants me to suspect that there may be a difference in metalline and mineral Salts, as well as we find it in those of other bodies. For, *Sulphur* (saies he) *aliud in auro, aliud in argento, aliud in ferro, aliud in plumbo, stanno, &c. sic aliud in Saphyro, aliud in Smaragdo, aliud in rubino, chrysolitho, amethysto, magnete, &c. Item aliud in lapidibus, silice, salibus, fontibus, &c. nec vero tot sulphura tantum, sed & totidem salia; sal aliud in metallis, aliud in gemmis, aliud in lapidibus, aliud in salibus, aliud in vitriolo, aliud in alumine: similis etiam Mercurii est ratio. Alius in Metallis, alius in Gemmis, &c. Ita ut unicuique speciei suus peculiaris Mercurius sit. Et tamen res saltem tres sunt; una essentia est sulphur; una est sal; una est Mercurius. Addo quod & specialius adhuc singula dividantur; aurum enim non unum, sed multiplex, ut & non unum pyrum, pomum,* Paracel. de Mineral. Tract. 1. pag. 141.

pomum, ſed idem multiplex, totidem etiam ſulphura auri, ſalia auri, mercurii auri; idem competit etiam metallis & gemmis; ut quot ſaphyri præſtantiores, læviores, &c. tot etiam ſaphyrica ſulphura, ſaphyrica ſalia, ſaphyrici Mercurii, &c. Idem verum etiam eſt de turconibus & gemmis aliis univerſis. From which paſſage (*I leutherius*) I ſuppoſe you will think I might without raſhneſs conclude, either that my opinion is favoured by that of *Paracelſus*, or that *Paracelſus* his opinion was not alwaies the ſame. But becauſe in divers other places of his writings he ſeems to talk at a differing rate of the three Principles and the four Elements, I ſhall content my ſelf to inferr from the alledg'd paſſage, that if his doctrine be not conſiſtent with that Part of mine which it is brought to countenance, it is very difficult to know what his opinion concerning Salt, Sulphur and Mercury, was; and that conſequently we had reaſon about the beginning of our conferences, to decline taking upon us, either to examine or oppoſe it.

I know not whether I ſhould on this occaſion add, that thoſe very bodies, the Chymiſts call Phlegme and Earth, do yet recede

recede from an Elementary ſimplicity. That common Earth and Water frequently do ſo, notwithſtanding the received contrary opinion, is not deny'd by the more wary of the moderne Peripateticks themſelves: and certainly moſt Earths are much leſs ſimple bodies than is commonly imagined even by Chymiſts, who do not ſo conſiderately to preſcribe and employ Earths Promiſcuouſly in thoſe diſtillations that require the mixture of ſome *caput mortuum*, to hinder the flowing together of the matter, & to retain its groſſer parts. For I have found ſome Earths to yeeld by diſtillation a Liquor very far from being inodorous or inſipid; and 'tis a known obſervation that moſt kinds of fat Earth kept cover'd from the rain, and hindred from ſpending themſelves in the production of vegetables, will in time become impregnated with Salt Petre.

But I muſt remember that the Water and Earths I ought here to ſpeak of, are ſuch as are ſeparated from mixt Bodies by the fire; and therefore to reſtrain my Diſcourſe to ſuch, I ſhall tell you, That we ſee the Phlegme of Vitriol (for inſtance) is a very effectual remedie againſt

againſt burnes; and I know a very Famous and experienc'd *Physitian*, whoſe unſuſpected ſecret (himſelf confeſs'd to me) it is, for the diſcuſſing of hard and Obſtinate Tumours. The Phlegme of Vinegar, though drawn exceeding leaſurely in a digeſting Furnace, I have purpoſely made tryal of; and ſometimes found it able to draw, though ſlowly, a ſaccharine ſweetneſs out of Lead; and as I remember by long Digeſtion, I diſſolv'd Corals in it. The Phlegme of the ſugar of Saturne is ſaid to have very peculiar properties. Divers Eminent Chymiſts teach, that it will diſſolve Pearls, which being precipitated by the ſpirit of the ſame Concrete are thereby (as they ſay) rendred volatile; which has been confirmed to me, upon his own obſervation, by a perſon of great veracity. The Phlegme of Wine, and indeed divers other Liquors that are indiſcriminately condemn'd to be caſt away as phlegm, are endow'd with qualities that make them differ both from meer water, and from each other; and whereas the Chymiſts are pleas'd to call the *caput mortuum* of wt they have diſtill'd (after they have by affuſion of water drawn away its ſalt)

ſalt) *terra damnata*, or Earth, it may be doubted whether or no thoſe Earths are all of them perfectly alike: and it is ſcarce to be doubted, but that there are ſome of them which remain yet unreduc'd to an Elementary nature. The aſhes of wood depriv'd of all the ſalt, and bone-Aſhes, or calcin'd Harts-horn, which Refiners chooſe to make Teſts of, as freeſt from Salt, ſeem unlike: and he that ſhall compare either of theſe inſipid aſhes to Lime, and much more to the *calx* of Talck, (though by the affuſion of water they be exquiſitely dulcify'd) will perhaps ſee cauſe to think them things of a ſomewhat differing nature. And it is evident in Colcothar that the exacteſt calcination, follow'd by an exquiſite dulcification, does not alwaies reduce the remaining body into Elementary Earth; for after the ſalt or Vitriol (if the Calcination have been too faint) is drawn out of the Calcothar, the reſidue is not earth, but a mixt body, rich in Medical vertues (as experience has inform'd me) and which *Angelus Sala* affirmes to be partly reducible into malleable Copper; which I judge very probable; for though when I was making

king Experiments upon Colcothar, I was destitute of a Furnace capable of giving a heat intense Enough to bring such a Calx to Fusion; yet having conjectur'd that if Colcothar abounded with that Metal, *Aqua Fortis* would find it out there, I put some dulcifi'd Colcothar into that *Menstruum*, and found the Liquor according to my Expectation presently Colour'd as Highly as if it had been an Ordinary Solution of Copper.

THE

THE SCEPTICAL CHYMIST

The Fifth Part.

HEre *Carneades* making a pause, I must not deny (saies his Friend to him) that I think You have sufficiently prov'd that these distinct Substances which Chymists are wont to obtain from Mixt Bodies, by their Vulgar Distillation, are not pure and simple enough to deserve, in Rigor of speaking, the Name of Elements, or Principles. But I suppose You have heard, that there are some Modern *Spagyrists*, who give out that they can by further and more Skilfull Purifications, so reduce the separated Ingredients of Mixt Bodies to an Elementary simplicity, That the

the Oyles (for Inſtance) extracted from all Mixts ſhall as perfectly reſemble one another, as the Drops of Water do.

If you remember (replies *Carneades*) that at the Beginning of our Conference with *Philoponus*, I declar'd to him before the reſt of the Company, that I would not engage my ſelf at preſent to do any more than examine the uſual proofs alledg'd by Chymiſts, for the Vulgar doctrine of their three Hypoſtatical Principles; You will eaſily perceive that I am not oblig'd to make anſwer to what you newly propos'd; and that it rather grants, than diſproves what I have been contending for: Since by pretending to make ſo great a change in the reputed Principles that Diſtillation affords the common *Spagyriſts*, 'tis plainly enough preſuppos'd, that before ſuch Artificial Depurations be made, the Subſtances to be made more ſimple were not yet ſimple enough to be look'd upon as Elementary; Wherefore in caſe the *Artiſts* you ſpeak of could perform what they give out they can, yet I ſhould not need to be aſham'd of having queſtion'd the Vulgar Opinion touching

touching the *Tria Prima*. And as to the thing it ſelf, I ſhall freely acknowledge to you, that I love not to be forward in determining things to be impoſſible, till I know and have conſider'd the means by which they are propos'd to be effected. And therefore I ſhall not peremptorily deny either the poſſibility of what theſe *Artiſts* promiſe, or my Aſſent to any juſt Inference; however deſtructive to my conjectures, that may be drawn from their performances. But give me leave to tell you withall, that becauſe ſuch promiſes are wont (as Experience has more than once inform'd me) to be much more eaſily made, than made good by Chymiſts, I muſt withhold my Beleef from their aſſertions, till their Experiments exact it; and muſt not be ſo eaſie as to expect before hand, an unlikely thing upon no ſtronger Inducements than are yet given me: Beſides that I have not yet found by what I have heard of theſe Artiſts, that though they pretend to bring the ſeveral Subſtances into which the Fire has divided the Concrete, to an exquiſite ſimplicity, They pretend alſo to be able by the Fire to divide all Concretes,

Minerals; and others, into the same number of Distinct Substances. And in the mean time I must think it improbable, that they can either truly separate as many differing Bodies from Gold (for Instance) or *Ostiocolla*, as we can do from Wine, or Vitriol; or that the Mercury (for Example) of Gold or Saturn would be perfectly of the same Nature with that of Hartshorn; and that the sulphur of Antimony would be but Numerically different from the Distill'd butter or Oyle of Roses.

But suppose (saies *Eleutherius*) that you should meet with Chymists, who would allow you to take in Earth and Water into the number of the principles of Mixt Bodies; and being also content to change the Ambiguous Name of Mercury for that more intelligible one of Spirit, should consequently make the principles of Compound Bodies to be Five; would you not think it something hard to reject so plausible an Opinion, only because the Five substances into which the Fire divides mixt Bodies are not exactly pure, and Homogeneous? For my part

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(Continues *Eleutherius*) I cannot but think it somewhat strange, in case this Opinion be not true, that it should fall out so luckily, that so great a Variety of Bodies should be Analyz'd by the Fire into just five Distinct substances; which so little differing from the Bodies that bear those names, may so Plausibly be call'd Oyle, Spirit, Salt, Water, and Earth.

The Opinion You now propose (answers *Carneades*) being another than that I was engag'd to examine, it is not requisite for me to Debate at this present; nor should I have leasure to do it throughly. Wherefore I shall only tell you in General, that though I think this Opinion in some respects more defensible than that of the Vulgar Chymists; yet you may easily enough learn from the past Discourse what may be thought of it: Since many of the Objections made against the Vulgar Doctrine of the Chymists seem, without much alteration, employable against this *Hypothesis* also. For, besides that this Doctrine does as well as the other take it for granted, (what is not easie to be prov'd) that the Fire is the true and Adequate Ana-

lyzer of Bodies, and that all the Distinct substances obtainable from a mixt Body by the Fire, were so pre-existent in it, that they were but extricated from each other by the *Analysis*; Besides that this Opinion, too, ascribes to the Productions of the Fire an Elementary simplicity, which I have shewn not to belong to them; and besides that this Doctrine is lyable to some of the other Difficulties, wherewith That of the *Tria Prima* is incumber'd; Besides all this, I say, this quinary number of Elements, (if you pardon the Expression) ought at least to have been restrain'd to the Generality of Animal and Vegetable Bodies, since not only among these there are some Bodies, (as I formerly argu'd) which, for ought yet has been made to appear, do consist, either of fewer or more similar substances than precisely Five. But in the Mineral Kingdom, there is scarce one Concrete that has been evinc'd to be adequatly divisible into such five Principles or Elements, and neither more nor lesse, as this Opinion would have every mixt Body to consist of.

And this very thing (continues *Carneades*)

neades) may serve to take away or lessen your Wonder, that just so many Bodies as five should be found upon the Resolution of Concretes. For since we find not that the fire can make any such *Analysis* (into five Elements) of Metals and other Mineral Bodies whose Texture is more strong and permanent, it remains that the Five Substances under consideration be Obtain'd from Vegetable and Animal Bodies, which (probably by reason of their looser Contexture) are capable of being Distill'd. And as to such Bodies, 'tis natural enough, that, whether we suppose that there are, or are not, precisely five Elements, there should ordinarily occur in the Dissipated parts a five Fold Diversity of Scheme: (if I may so speak) For if the Parts do not remain all fix'd, as in Gold, Calcin'd Talck, &c. nor all ascend, as in the Sublimation of Brimstone, Camphire, &c. but after their Dissipation do associate themselves into new Schemes of Matter; it is very likely, that they will by the Fire be divided into fix'd and Volatile (I mean, in Reference to that degree of heat by which they are destill'd) and those Volatile

parts will, for the moſt part, aſcend either in a dry forme, which Chymiſts are pleas'd to call, if they be Taſtleſs, Flowers; if Sapid, Volatile Salt; or in a Liquid Forme. And this Liquor muſt be either inflamable, and ſo paſs for oyl, or not inflamable, and yet ſubtile and pungent, which may be call'd Spirit; or elſe ſtrengthleſs or inſipid, which may be nam'd Phlegme, or Water. And as for the fixt part, or *Caput Mortuum*, it will moſt commonly conſiſt of Corpuſcles, partly Soluble in Water, or Sapid, (eſpecially if the Saline parts were not ſo Volatile, as to fly away before) which make up its fixt ſalt; and partly inſoluble and inſipid, which therefore ſeems to challenge the name of Earth. But although upon this ground one might eaſily enough have foretold, that the differing ſubſtances obtain'd from a perfectly mixt Body by the Fire would for the moſt part be reducible to the five newly mention'd States of Matter; yet it will not preſently follow, that theſe five Diſtinct ſubſtances were ſimple and primogeneal bodies, ſo pre-exiſtent in the Concrete that the fire does but take them aſunder. Beſides that

that it does not appear, that all Mixt Bodies, (witneſs, Gold, Silver, Mercury, &c.) Nay nor perhaps all Vegetables, which may appear by what we ſaid above of *Camphire*, *Benzoin*, &c. are reſoluble by Fire into juſt ſuch differing Schemes of Matter. Nor will the Experiments formerly alledg'd permit us to look upon theſe ſeparated Subſtances as Elementary, or uncompounded. Neither will it be a ſufficient Argument of their being Bodies that deſerve the Names which Chymiſts are pleas'd to give them, that they have an Analogy in point of Conſiſtence, or either Volatility or Fixtneſs, or elſe ſome other obvious Quality, with the ſuppos'd Principles, whoſe names are aſcrib'd to them. For, as I told you above, notwithſtanding this Reſemblance in ſome one Quality, there may be ſuch a Diſparity in others, as may be more fit to give them Differing Appellations, than the Reſemblance is to give them one and the ſame. And indeed it ſeems but ſomewhat a groſs Way of judging of the Nature of Bodies, to conclude without Scruple, that thoſe muſt be of the ſame

Nature that agree in some such General Quality, as Fluidity, Dryness, Volatility, and the like: since each of those Qualities, or States of Matter, may Comprehend a great Variety of Bodies, otherwise of a very differing Nature; as we may see in the Calxes of Gold, of Vitriol, and of Venetian Talck, compar'd with common Ashes, which yet are very dry, and fix'd by the vehemence of the Fire, as well as they. And as we may likewise gather from what I have formerly Observ'd, touching the Spirit of Box-Wood, which though a Volatile, Sapid, and not inflamable Liquor, as well as the Spirits of Harts-horn, of Blood and others, (and therefore has been hitherto call'd, the Spirit, and esteem'd for one of the Principles of the Wood that affords it) may yet, as I told You, be subdivided into two Liquors, differing from one another, and one of them at least, from the Generality of other Chymical Spirits.

But you may your self, if you please; (pursues *Carneades*) accomodate to the *Hypothesis* you propos'd what other particulars you shall think applicable to it, in

in the foregoing Discourse. For I think it unseasonable for me to medle now any further with a Controversie, which since it does not now belong to me, Leaves me at Liberty to Take my Own time to Declare my Self about it.

Eleutherius perceiving that *Carneades* was somewhat unwilling to spend any more time upon the debate of this Opinion, and having perhaps some thoughts of taking hence a Rise to make him Discourse it more fully another time, thought not fit as then to make any further mention to him of the propos'd opinion, but told him;

I presume I need not mind you, *Carneades*, That both the Patrons of the ternary number of Principles, and those that would have five Elements, endeavour to back their Experiments with a specious Reason or two; and especially some of those Embracers of the Opinion last nam'd (whom I have convers'd with, and found them Learned men) assigne this Reason of the necessity of five distinct Elements; that otherwise mixt Bodies could not be so compounded and temper'd as to obtain a due consistence

ſiſtence and competent Duration. For Salt (ſay they) is the *Basis* of Solidity; and Permanency in Compound Bodies, without which the other four Elements might indeed be variouſly and looſly blended together, but would remain incompacted; but that Salt might be diſſolv'd into minute Parts, and convey'd to the other Subſtances to be compacted by it, and with it, there is a Neceſſity of Water. And that the mixture may not be too hard and brittle, a Sulphureous or Oyly Principle muſt intervene to make the maſs more tenacious; to this a Mercurial ſpirit muſt be ſuperadded; which by its activity may for a while permeate, and as it were leaven the whole Maſs, and thereby promote the more exquiſite mixture and incorporation of the Ingredients. To all which (laſtly) a portion of Earth muſt be added, which by its dryneſs and poroſity may ſoak up part of that water wherein the Salt was diſſolv'd, and eminently concurr with the other ingredients to give the whole body the requiſite conſiſtence.

I perceive (ſaies *Carneades* ſmiling) that if it be true, as 'twas lately noted from the Proverb, *That good Wits have bad*

bad Memories, You have that Title, as well as a better, to a place among the good Wits. For you have already more than once forgot, that I declar'd to you that I would at this Conference Examine only the Experiments of my Adverſaries, not their Speculative Reaſons. Yet 'tis not (Subjoynes *Carneades*) for fear of medling with the Argument you have propos'd, that I decline the examining it at preſent. For if when we are more at leaſure, you ſhall have a mind that we may Solemnly conſider of it together; I am confident we ſhall ſcarce finde it inſoluble. And in the mean time we may obſerve, that ſuch a way of Arguing may, it ſeems, be ſpecioufly accommodated to differing *Hypotheſes*. For I find that *Beguinus*, and other Aſſertors of the *Tria Prima*, pretend to make out by ſuch a way, the requiſiteneſs of their Salt, Sulphur and Mercury, to conſtitute mixt Bodies, without taking notice of any neceſſity of an Addition of Water and Earth.

And indeed neither ſort of Chymiſts ſeem to have duly conſider'd how great Variety there is in the Textures and Con-

Consistences of Compound Bodies; and how little the consistence and Duration of many of them seem to accommodate and be explicable by the propos'd Notion. And not to mention those almost incorruptible Substances obtainable by the Fire, which I have prov'd to be somewhat compounded, and which the Chymists will readily grant not to be perfectly mixt Bodies: (Not to mention these, I say) If you will but recall to mind some of those Experiments, whereby I shew'd You that out of common Water only mixt Bodies (and even living ones) of very differing consistences, and resoluble by Fire into as many Principles as other bodies acknowledg'd to be perfectly mixt; may be produced if you do this, I say, you will not, I suppose, be averse from believing, y^t Nature by a convenient disposition of the minute parts of a portion of matter may contrive bodies durable enough, & of this, or that, or the other Consistence, without being oblig'd to make use of all, much less of any Determinate quantity of each of the five Elements, or of the three Principles to compound such bodies of. And I have (pursues *Carneades*)

ades) something wonder'd, Chymists should not consider, that there is scarce any body in Nature so permanent and indissoluble as Glass; which yet themselves teach us may be made of bare Ashes, brought to fusion by the meer Violence of the Fire; so that, since Ashes are granted to consist but of pure Salt and simple Earth, sequestred from all the other Principles or Elements, they must acknowledge, That even Art it self can of two Elements only, or, if you please, one Principle and one Element, compound a Body more durable than almost any in the World. Which being undeniable, how will they prove that Nature cannot compound Mixt Bodies, and even durable Ones, under all the five Elements or Material Principles.

But to insist any longer on this Occasional Disquisition, Touching their Opinion that would Establish five Elements, were to remember as little as You did before, that the Debate of this matter is no part of my first undertaking; and consequently, that I have already spent time enough in what I look back upon but as a digression, or at best an Excursion. And

And thus, *Eleutherius*, (saies *Carneades*) having at length gone through the four Considerations I propos'd to Discourse unto you, I hold it not unfit, for fear my having insisted so long on each of them may have made you forget their *Series*, briefly to repeat them by telling you, that

Since, in the first place, it may justly be doubted whether or no the Fire be, as Chymists suppose it, the genuine and Universal Resolver of mixt Bodies;

Since we may doubt, in the next place, whether or no all the Distinct Substances that may be obtain'd from a mixt body by the Fire were pre-existent there in the formes in which they were separated from it;

Since also, though we should grant the Substances separable from mixt Bodies by the fire to have been their component Ingredients, yet the Number of such substances does not appear the same in all mixt Bodies; some of them being Resoluble into more differing substances than three, and Others not being Resoluble into so many as three;

And Since, Lastly, those very substances that are thus separated are not for the most

most part pure and Elementary bodies, but new kinds of mixts;

Since, I say, these things are so, I hope you will allow me to inferr, that the Vulgar Experiments (I might perchance have Added, the Arguments too) wont to be Alledg'd by Chymists to prove, that their three Hypostatical Principles do adequately compose all mixt Bodies, are not so demonstrative as to induce a wary Person to acquiesce in their Doctrine, which, till they Explain and prove it better, will by its perplexing darkness be more apt to puzzle than satisfy considering men, and will to them appear incumbred with no small Difficulties.

And from what has been hitherto deduc'd (Continues *Carneades*) we may Learn, what to Judge of the common Practice of those Chymists, who because they have found that diverse compound Bodies (for it will not hold in All) can be resolv'd into, or rather can be brought to afford two or three differing Substances more than the Soot and Ashes, whereinto the naked fire commonly divides them in our Chymnies, cry up their own Sect for the Invention of a New Philosophy, some of them, as *Helmont &c.* styling

ſtyling themſelves Philoſophers by the Fire; and the moſt part not only aſcribing, but as far as in them lies, engroſſing to thoſe of their Sect the Title of PHILOSOPHERS.

But alas, how narrow is this Philoſophy, that reaches but to ſome of thoſe compound Bodies, which we find but upon, or in the cruſt or outſide of our terreſtrial Globe, which is it ſelf but a point in compariſon of the vaſt extended Univerſe, of whoſe other and greater parts the Doctrine of the *Tria Prima* does not give us an Account! For what does it teach us, either of the Nature of the Sun, which Aſtronomers affirme to be eight-ſcore & odd times bigger than the whole Earth? or of that of thoſe numerous fixt Starrs, which, for ought we know, would very few, if any of them, appear inferiour in bulke and brightneſs to the Sun, if they were as neer us as He? What does the knowing that Salt, Sulphur and Mercury, are the Principles of Mixt Bodies, informe us of the Nature of that vaſt, fluid, and Ætherial Subſtance, that ſeems to make up the interſtellar, and conſequently much the greateſt part of the World? for as for the opinion commonly aſcrib'd to *Paracelſus*, as if he would have not only the four Peripatetick Elements, but even the Celeſtial parts of the Univerſe to conſiſt of his three Principles, ſince the modern Chymiſts themſelves have not thought ſo groundleſs a conceit worth their owning, I ſhall not think it worth my confuting.

But I ſhould perchance forgive the Hypotheſis I have been all this while examining, if, though it reaches but to a very little part of the World, it did at leaſt give us a ſatisfactory account of thoſe things to which 'tis ſaid to reach. But I find not, that it gives us any other than a very imperfect information even about mixt Bodies themſelves: For how will the knowledge of the *Tria Prima* diſcover to us the Reaſon, why the Loadſtone drawes a Needle, and diſpoſes it to reſpect the Poles, and yet ſeldom preciſely points at them? how will this Hypotheſis teach Us how a Chick is formed in the Egge, or how the Seminal Principles of Mint, Pompions, and other Vegetables, that I mention'd to You above, can faſhion Water into Various Plants, each of them endow'd with its peculiar,

and determinate ſhape, and with divers ſpecifick and diſcriminating Qualities? How does this Hypotheſis ſhew us, how much Salt, how much Sulphur, and how much Mercury muſt be taken to make a Chick or a Pompion? and if We know that: what Principle is it, that manages theſe Ingredients, and contrives (for inſtance) ſuch Liquors as the White and Yolk of an Egge into ſuch a variety of Textures as is requiſite to faſhion the Bones, Veines, Arteries, Nerves, Tendons, Feathers, Blood, and other parts of a Chick; and not only to faſhion each Limbe, but to connect them altogether, after that manner that is moſt congruous to the perfection of the Animal which is to Conſiſt of Them? For to ſay, that ſome more fine and ſubtile part of either or all the Hypoſtatical Principles is the Director in all this buſineſs, and the Architect of all this Elaborate ſtructure, is to give one occaſion to demand again, what proportion and way of mixture of the *Tria Prima* afforded this *Architectonick* Spirit, and what Agent made ſo skilful and happy a mixture? And the Anſwer to this Queſtion, if the Chymiſts will keep themſelves within their three Principles, will be lyable to the ſame Inconvenience, that the Anſwer to the former was. And if it were not to intrench upon the Theame of a Friend of ours here preſent, I could eaſily proſecute the Imperfections of the Vulgar Chymiſts Philoſophy, and ſhew you, that by going about to explicate by their three Principles, I ſay not, all the abſtruſe Properties of mixt Bodies, but even ſuch Obvious and more familiar *Phænomena* as *Fluidity* & *Firmneſs*, The Colours and Figures of Stones, Minerals, and other compound Bodies, The Nutrition of either Plants or Animals, the Gravity of Gold or Quickſilver compar'd with Wine or Spirit of Wine; By attempting, I ſay, to render a reaſon of theſe (to omit a thouſand others as difficult to account for) from any proportion of the three ſimple Ingredients, Chymiſts will be much more likely to diſcredit themſelves and their *Hypotheſis*, than ſatisfy an intelligent Inquirer after Truth.

But (interpoſes *Eleutherius*) This Objection ſeems no more than may be made againſt the four Peripatetick Elements. And indeed almoſt againſt any other *Hy-*

potheſis, that pretends by any Determinate Number of Material Ingredients to render a reaſon of the *Phænomena* of Nature. And as for the uſe of the Chymical Doctrine of the three Principles, I ſuppoſe you need not be told by me, that The great Champion of it, The Learned *Sennertus*, aſſignes this noble uſe of the *Tria Prima*, That from Them, as the neereſt and moſt Proper Principles, may be Deduc'd and Demonſtrated the Properties which are in Mixt Bodies, and which cannot be Proximately (as They ſpeak) deduc'd from the Elements. And This, ſaies he, is chiefly Apparent, when we Inquire into the Properties and Faculties of Medicines. And I know (continues *Eleutherius*) That the Perſon You have aſſum'd, Of an Opponent of the *Hermetick Doctrine*, will not ſo far prevaile againſt your Native and wonted Equity, as To keep You from acknowledging that Philoſophy is much beholden to the Notions and Diſcoveries of Chymiſts.

Senn. de Conſ. & Diſſen. p. 165,

If the Chymiſts You ſpeak of (Replyes *Carneades*) had been ſo modeſt, or ſo Diſcreet, as to propoſe their Opinion

pinion of the *Tria Prima*, but as a Notion uſeful among Others, to increaſe Humane knowledge, they had deſerv'd more of our thanks, and leſs of our Oppoſition; but ſince the Thing, that they pretend, is not ſo much to contribute a Notion toward the Improvement of Philoſophy, as to make this Notion (attended by a few leſs conſiderable ones) paſs for a New Philoſophy it ſelf; Nay, ſince they boaſt ſo much of this phancie of theirs, that the famous *Quercetanus* ſcruples not to write, that if his moſt certain Doctrine of the three Principles were ſufficiently Learned, Examin'd, and Cultivated, it would eaſily Diſpel all the Darkneſs that benights our minds, and bring in a Clear Light, that would remove all Difficulties: This School affording Theorems and Axioms irrefragable, and to be admitted without Diſpute by impartial Judges; and ſo uſeful withal, as to exempt us from the neceſſity of having recourſe, for want of the knowledge of cauſes, to that Sanctuary of the ignorant, Occult Qualities; ſince I ſay, this Domeſtick Notion of the Chymiſts is ſo much overvalued by them, I cannot think it unfit, they ſhould be

made ſenſible of their miſtake; and be admoniſh'd to take in more fruitful and comprehenſive Principles, if they mean to give us an account of the *Phænomena* of Nature; and not confine themſelves, and (as far as they can) others, to ſuch narrow Principles, as I fear will ſcarce enable them to give an account (I mean an intelligible one) of the tenth part (I ſay not) of all the *Phænomena* of Nature; but even of all ſuch as by the *Leucippian* or ſome of the other ſorts of Principles may be plauſibly enough explicated. And though I be not unwilling to grant, that the incompetency I impute to the Chymical *Hypotheſis* is but the ſame which may be Objected againſt that of the four Elements, and divers other Doctrines that have been maintain'd by Learned men; yet ſince 'tis the Chymical *Hypothesis* only which I am now examining, I ſee not why, if what I impute to it be a real inconvenience, either it ſhould ceaſe to be ſo, or I ſhould ſcruple to object it, becauſe other Theories are lyable thereunto, as well as the Hermetical. For I know not why a Truth ſhould be thought leſs a Truth for the being fit to overthrow variety of Errors,

I am oblig'd to You (continues *Carneades*, a little ſmiling) for the favourable Opinion You are pleas'd to expreſs of my Equity, if there be no deſigne in it. But I need not be tempted by an Artifice, or invited by a Complement, to acknowledge the great ſervice that the Labours of Chymiſts have done the Lovers of uſeful Learning; nor even on this occaſion ſhall their Arrogance hinder my Gratitude. But ſince we are as well examining the truth of their Doctrine, as the merit of their induſtry, I muſt in order to the inveſtigation of the firſt, continue a reply, to talk at the rate of the part I have aſſum'd; And tell you, that when I acknowledge the uſefulneſs of the Labours of *Spagyriſts* to Natural Philoſophy, I do it upon the ſcore of their experiments, not upon that of Their Speculations; for it ſeems to me, that their Writings, as their Furnaces, afford as well ſmoak as light; and do little leſs obſcure ſome ſubjects, than they illuſtrate others. And though I am unwilling to deny, that 'tis difficult for a man to be an Accompliſht Naturaliſt, that is a ſtranger to Chymiſtry; yet I look upon the common Operations and

practices of Chymists, almost as I do on the Letters of the Alphabet, without whose knowledge 'tis very hard for a man to become a Philosopher; and yet that knowledge is very far from being sufficient to make him One.

But (saies *Carneades*, resuming a more serious Look) to consider a little more particularly what you alledg in favour of the Chymical Doctrine of the *Tria Prima*, though I shall readily acknowledge it not to be unuseful, and that the Divisers and Embracers of it have done the Common-Wealth of Learning some service, by helping to destroy that excessive esteem, or rather veneration, wherewith the Doctrine of the four Elements was almost as generally, as undeservedly entertain'd; yet what has been alledg'd concerning the usefulness of the *Tria Prima*, seems to me liable to no contemptible Difficulties.

And first, as for the very way of Probation, which the more Learned and more Sober Champions of the Chymical cause employ to evince the Chymical Principles in Mixt Bodies, it seems to me to be farr enough from being convincing. This grand and leading Argument, your

your *Sennertus* Himself, who layes Great weight upon it, and tells us, that the most Learned Philosophers employ this way of Reasoning to prove the most important things, proposes thus: *Ubicunque* (saies he) *pluribus eædem affectiones & qualitates insunt, per commune quoddam Principium insint necesse est, sicut omnia sunt Gravia propter terram, calida propter Ignem. At Colores, Odores, Sapores, esse φλογιστὸν, & similia alia, mineralibus, Metallis, Gemmis, Lapidibus, Plantis, Animalibus insunt. Ergo per commune aliquod principium, & subjectum, insunt. At tale principium non sunt Elementa. Nullam enim habent ad tales qualitates producendas potentiam. Ergo alia principia, unde fluant, inquirenda sunt.*

In the Recital of this Argument, (saies *Carneades*) I therefore thought fit to retain the Language wherein the Author proposes it, that I might also retaine the propriety of some Latine Termes, to which I do not readily remember any that fully answer in English. But as for the Argumentation it self, 'tis built upon a precarious supposition, that seems to me neither Demonstrable nor true; for, how does it appear

appear, that where the ſame Quality is to be met with in many Bodies, it muſt belong to them upon the Account of ſome one Body whereof they all partake? (For that the Major of our Authors Argument is to be Underſtood of the Material Ingredients of bodies, appears by the Inſtances of Earth and Fire he annexes to explain it.) For to begin with that very Example which he is pleas'd to alledge for himſelf; how can he prove, that the Gravity of all Bodies proceeds from what they participate of the Element of Earth? Since we ſee, that not only common Water, but the more pure Diſtill'd Rain Water is heavy; and Quickſilver is much heavier than Earth it ſelf; though none of my Adverſaries has yet prov'd, that it contains any of that Element. And I the Rather make uſe of this Example of Quickſilver, becauſe I ſee not how the Aſſertors of the Elements will give any better Account of it than the Chymiſts. For if it be demanded how it comes to be Fluid, they will anſwer, that it participates much of the Nature of Water. And indeed, according to them, Water may

may be the Predominant Element in it, ſince we ſee, that ſeverall Bodies, which by Diſtillation afford Liquors that weigh more than their *Caput Mortuum*, do not yet conſiſt of Liquor enough to be Fluid. Yet if it be demanded how Quickſilver comes to be ſo heavy, then 'tis reply'd, that 'tis by reaſon of the Earth that abounds in it; but ſince, according to them, it muſt conſiſt alſo of air, and partly of Fire, which they affirme to be light Elements, how comes it that it ſhould be ſo much heavier than Earth of the ſame bulk, though to fill up the poroſities and other Cavities it be made up into a maſs or paſte with Water, which it ſelf they allow to be a heavy Element. But to returne to our *Spagyriſts*, we ſee that Chymical Oyles and fixt Salts, though never ſo exquiſitely purify'd and freed from terreſtrial parts, do yet remain ponderous enough. And Experience has inform'd me, that a pound, (for inſtance) of ſome of the heavieſt Woods, as *Guajacum*, that will ſinke in Water, being burnt to Aſhes will yeeld a much leſs weight of them (whereof I found but a ſmall part to be Alcalizate) than much lighter

er Vegetables: As alſo that the black Charcoal of it will not ſink as did the wood, but ſwim; which argues that the Differing Gravity of Bodies proceeds chiefly from the particular Texture, as is manifeſt in Gold, the cloſeſt and Compacteſt of Bodies, which is many times heavier than we can poſſibly make any parcel of Earth of the ſame Bulk. I will not examine, what may be argu'd touching the Gravity or Quality Analogous thereunto, of even Celeſtial bodies, from the motion of the ſpots about the Sun, and from the appearing equality of the ſuppos'd Seas in the Moon; nor conſider how little thoſe *Phænomena* would agree with what *Sennertus* preſumes concerning Gravity. But further to invalidate his ſuppoſition, I ſhall demand, upon what Chymical Principle Fluidity depends? And yet Fluidity is, two or three perhaps excepted, the moſt diffuſed quality of the univerſe, and far more General than almoſt any other of thoſe that are to be met with in any of the Chymical Principles, or *Ariſtotelian* Elements; ſince not only the Air, but that vaſt expanſion we call Heaven, in compariſon of which our

our Terreſtrial Globe (ſuppoſing it were all Solid) is but a point; and perhaps too the Sun and the fixt Stars are fluid bodies. I demand alſo, from which of the Chymical Principles Motion flowes; which yet is an affection of matter much more General than any that can be deduc'd from any of the three Chymical Principles. I might ask the like Queſtion concerning Light, which is not only to be found in the Kindl'd Sulphur of Mixt Bodies but (not to mention thoſe ſorts of rotten Woods, and rotten Fiſh that ſhine in the Dark) in the tails of living Glow-wormes, and in the Vaſt bodies of the Sun and Stars. I would gladly alſo know, in which of the three Principles the Quality, we call Sound, reſides as in its proper Subject; ſince either Oyl falling upon Oyle, or Spirit upon Spirit, or Salt upon Salt, in a great quantity, and from a conſiderable height, will make a noiſe, or if you pleaſe, create a ſound, and (that the objection may reach the *Ariſtotelians*) ſo will alſo water upon water, and Earth upon Earth. And I could name other qualities to be met with in divers bodies, of which I

ſup-

suppose my Adversaries will not in haste assign any Subject, upon whose Account it must needs be, that the quality belongs to all the other several bodies.

And, before I proceed any further, I must here invite you to compare the supposition we are examining, with some other of the Chymical Tenents. For, first they do in effect teach, that more than one quality may belong to, and be deduc'd from, one Principle. For, they ascribe to Salt, Tasts, and the power of Coagulation; to sulphur, as well Odours as inflamableness; And some of them ascribe to Mercury, Colours; as all of them do effumability, as they speak. And on the other side, it is evident that Volatility belongs in common to all the three Principles, and to Water too. For 'tis manifest that Chymical Oyles are Volatile; That also divers Salts, Emerging upon the Analysis of many Concretes, are very Volatile, is plain from the fugitiveness of Salt, of Harts-horne, flesh, &c. ascending in the Distillation of those bodies. How easily water may be made to ascend in Vapours, there is scarce any body that has not observ'd. And as for

for what they call the Mercurial Principle of bodies, that is so apt to be rais'd in the form of Steam, that *Paracelsus* and others define it by that aptness to fly up; so that (to draw that inference by the way) it seems not that Chymists have been accurate in their Doctrine of qualities, and their respective Principles, since they both derive several qualities from the same Principle, and must ascribe the same quality to almost all their Principles and other bodies besides. And thus much for the first thing taken for granted, without sufficient proof, by your *Sennertus*: And to add that upon the By (continues *Carneades*) we may hence learn what to judge of the way of Argumentation, which that fierce Champion of the *Aristotelians* against the Chymists, *Anthonius Guntherus Billichius* employes, where he pretends to prove against *Beguinus*, that not only the four Elements do immediately concurr to Constitute every mixt body, and are both present in it, and obtainable from it upon its Dissolution; but that in the *Tria Prima* themselves, whereinto Chymists are wont to resolve mixt Bodies, each of them clearly discovers

In Thessalo redivivo. Cap. 10. pag. 73. & 74.

covers it self to consist of four Elements. The Ratiocination it self (pursues *Carneades*) being somewhat unusual, I did the other Day Transcribe it, and (saies He, pulling a Paper out of his Pocket) it is this. *Ordiamur, cum Beguino, à ligno viridi, quod si concremetur, videbis in sudore Aquam, in fumo Aerem, in flamma & Prunis Ignem, Terram in cineribus: Quod si Beguino placuerit ex eo colligere humidum aquosum, cohibere humidum oleaginosum, extrahere ex cineribus salem; Ego ipsi in unoquoque horum seorsim quatuor Elementa ad oculum demonstrabo, eodem artificio quo in ligno viridi ea demonstravi. Humorem aquosum admoveho Igni. Ipse Aquam Ebullire videbit, in Vapore Aerem conspiciet, Ignem sentiet in æstu, plus minus Terræ in sedimento apparebit. Humor porro Oleaginosus aquam humiditate & fluiditate per se, accensus vero Ignem flamma prodit, fumo Aerem, fuligine, nidore & amurca terram. Salem denique ipse Beguinus siccum vocat & Terrestrem, qui tamen nec fusus Aquam, nec caustica vi ignem celare potest; ignis vero violentia in halitus versus nec ab Aere se alienum esse demonstrat; Idem de Lacte, de Ovis, de semine Lini, de Caryophyllis, de Nitro, de*

de sale Marino, denique de Antimonio, quod fuit de Ligno viridi Judicium; eadem de illorum partibus, quas Beguinus *adducit, sententia, quæ de viridis ligni humore aquoso, quæ de liquore ejusdem oleoso, quæ de sale fuit.*

This bold Discourse (resumes *Carneades*, putting up again his Paper) I think it were not very difficult to confute, if his Arguments were as considerable, as our time will probably prove short for the remaining and more necessary Part of my Discourse; wherefore referring You for an Answer to what was said concerning the Dissipated Parts of a burnt piece of green Wood, to what I told *Themistius* on the like occasion, I might easily shew You, how slightly and superficially our *Guntherus* talks of the dividing the flame of Green Wood into his four Elements; when he makes that vapour to be Air, which being caught in Glasses and condens'd, presently discovers it self to have been but an Aggregate of innumerable very minute drops of Liquor; and when he would prove the Phlegmes being compos'd of Fire by that Heat which is adventitious to the Liquor, and ceases upon the absence of

what produc'd it (whether that be an Agitation proceeding from the motion of the External Fire, or the preſence of a Multitude of igneous Atomes pervading the pores of the Veſſel, and nimbly permeating the whole Body of the Water) I might, I ſay, urge theſe and divers other Weakneſſes of his Diſcourſe. But I will rather take Notice of what is more pertinent to the Occaſion of this Digreſſion, namely, that Taking it for Granted, that Fluidity (with which he unwarily ſeems to confound Humidity) muſt proceed from the Element of Water, he makes a Chymical Oyle to Conſiſt of that Elementary Liquor; and yet in the very next Words proves, that it conſiſts alſo of Fire, by its Inflamability; not remembring that exquiſitely pure Spirit of Wine is both more Fluid than Water it ſelf, and yet will Flame all away without leaving the Leaſt Aqueous Moiſture behind it; and without ſuch an *Amurca* and Soot as he would Deduce the preſence of Earth from. So that the ſame Liquor may according to his Doctrine be concluded by its great Fluidity to be almoſt all Water; and by its burning all away to be all diſguiſed Fire

Fire. And by the like way of Probation our Author would ſhew that the fixt ſalt of Wood is compounded of the four Elements. For (ſaies he) being turn'd by the violence of the Fire into ſteames, it ſhews it ſelf to be of kin to Air; whereas I doubt whether he ever ſaw a true fixt Salt (which to become ſo, muſt have already endur'd the violence of an Incinerating Fire) brought by the Fire alone to aſcend in the Forme of Exhalations; but I do not doubt that if he did, and had caught thoſe Exhalations in convenient Veſſels, he would have found them as well as the Steames of common Salt, &c. of a Saline, and not an Aëreal Nature. And whereas our Author takes it alſo for Granted, that the Fuſibility of Salt muſt be Deduc'd from Water, it is indeed ſo much the Effect of heat variouſly agitating the Minute Parts of a Body, without regard to Water, that Gold (which by its being the heavieſt and fixteſt of Bodies, ſhould be the moſt Earthy) will be brought to Fuſion by a ſtrong Fire; which ſure is more likely to drive away, than increaſe its Aqueous Ingredient, if it have any; and on the other ſide, for want of a ſufficient

agitation of its minute parts, Ice is not Fluid, but Solid; though he presumes also that the Mordicant Quality of Bodies must proceed from a fiery ingredient; whereas, not to urge that the Light and inflamable parts, which are the most likely to belong to the Element of Fire, must probably be driven away by that time the violence of the Fire has reduc'd the Body to ashes; Not to urge this, I say, nor that Oyle of Vitriol which quenches Fire, burnes the Tongue and flesh of those that Unwarily taste or apply it, as a Caustick doth, it is precarious to prove the Presence of Fire in fixt salts from their Caustick power, unless it were first shewn, that all the Qualities ascribed to salts must be deduc'd from those of the Elements; which, had I Time, I could easily manifest to be no easy task. And not to mention that our Author makes a Body, as Homogeneous, as any he can produce for Elementary, belong both to Water and Fire, Though it be neither Fluid nor Insipid, like Water; nor light and Volatile, like Fire; he seems to omit in this Anatomy the Element of Earth, save that he intimates, That the salt may pass for that:

that: But since a few lines before, he takes Ashes for Earth, I see not how he will avoid an Inconsistency either betwixt the Parts of his Discourse, or betwixt some of them and his Doctrine. For since there is a manifest Difference betwixt the Saline and the insipid Parts of Ashes, I see not how substances, That Disagree in such Notable Qualities, can be both said to be Portions of an Element, whose Nature requires that it be Homogeneous, especially in this case where an *Analysis* by the Fire is supposed to have separated it from the admixture of other Elements, which are confess'd by most *Aristotelians* to be Generally found in common Earth, and to render it impure. And sure if when we have consider'd for how little a Disparities sake the Peripateticks make these Symbolizing Bodies, Aire and Fire, to be two Distinct Elements, we shall also consider that the Saline part of Ashes is very strongly Tasted, and easily soluble in Water; whereas the other part of the same Ashes is insipid and indissoluble in the same Liquor: Not to add, that the one substance is Opacous, and the other some-

what Diaphanous, nor that they differ in Divers other Particulars; If we consider those things, I say, we shall hardly think that both these Substances are Elementary Earth; And as to what is sometimes objected, that their Saline Taste is only an Effect of Incineration and Adustion, it has been elsewhere fully reply'd to, when propos'd by *Themistius*, and where it has been prov'd against him, that however insipid Earth may perhaps by Additaments be turn'd into Salt, yet 'tis not like it should be so by the Fire alone: For we see that when we refine Gold and Silver, the violentest Fires We can Employ on them give them not the least Relish of Saltness. And I think *Philoponus* has rightly observ'd, that the Ashes of some Concretes contain very little salt if any at all; For Refiners suppose that bone-ashes are free from it, and therefore make use of them for Tests and Cuppels, which ought to be Destitute of Salt, lest the Violence of the Fire should bring them to Vitrification; And having purposely and heedfully tasted a Cuppel made of only bone-ashes and fair Water, which I had caus'd to be exposed

pos'd to a Very Violent Fire, acuated by the Blast of a large pair of Double Bellows, I could not perceive that the force of the Fire had imparted to it the least Saltness, or so much as made it less Insipid.

But (saies *Carneades*) since neither You nor I love Repetitions, I shall not now make any of what else was urg'd against *Themistius*, but rather invite You to take notice with me, that when our Authour, though a Learned Man, and one that pretends skill enough in Chymistry to reforme the whole Art, comes to make good his confident Undertaking, to give us an ocular Demonstration of the immediate Presence of the four Elements in the resolution of Green Wood, He is fain to say things that agree very little with one another. For about the beginning of that passage of His lately recited to you, he makes the sweat, as he calls it, of the green Wood to be Water, the smoak Aire, the shining Matter Fire, and the Ashes Earth; whereas a few lines after, he will in each of these, nay (as I just now noted) in one Distinct Part of the Ashes, shew the four Elements. So that either the former *Ana-*

lysis must be incompetent to prove that Number of Elements, since by it the burnt Concrete is not reduc'd into Elementary Bodies, but into such as are yet each of them compounded of the four Elements; or else these Qualities, from which he endeavours to deduce the presence of all the Elements in the fixt salt, and each of the other separated substances, will be but a precarious way of probation: especially if you consider, that the extracted *Alcali* of Wood, being, for ought appears, at least as similar a Body, as any that the Peripateticks can shew us, if its differing Qualities must argue the presence of Distinct Elements, it will scarce be possible for them by any way they know of employing the fire upon any Body, to shew that any Body is a Portion of a true Element: And this recals to my mind, that I am now but in an occasional excursion, which aiming only to shew, that the Peripateticks as well as the Chymists take in our present Controversie something for granted, which they ought to prove, I shall returne to my exceptions, where I ended the first of them, and further tell you, that neither is that the only precarious thing

thing that I take notice of in *Sennertus* his Argumentation; for when he inferrs, that because the Qualities he Mentions, as Colours, Smels, and the like, belong not to the Elements, they therefore must to the Chymical Principles; he takes that for granted; which will not in haste be prov'd; as I might here manifest, but that I may by and by have a fitter opportunity to take notice of it. And thus much at present may suffice to have Discours'd against the Supposition, that almost every Quality must have some δεκτικὸν πρῶτον, as they speak, some Native receptacle, wherein as in its proper Subject of inhesion it peculiarly resides; and on whose account that quality belongs to the other Bodies, Wherein it is to be met with. Now this Fundamental supposition being once Destroy'd, whatsoever is built upon it, must fall to ruine of it self.

But I consider further, that Chymists are (for ought I have found) far from being able to explicate by any of the *Tria Prima*, those qualities which they pretend to belong primarily unto it, and in mixt Bodies to Deduce from it. 'Tis true indeed, that such qualities

are

are not explicable by the four Elements; but it will not therefore follow, that they are so by the three Hermetical Principles; and this is it that seems to have deceiv'd the Chymists, and is indeed a very common mistake amongst most Disputants, who argue as if there could be but two Opinions concerning the Difficulty about which they contend; and consequently they inferr, that if their Adversaries Opinion be Erroneous, Their's must needs be the Truth; whereas many questions, and especially in matters Physiological, may admit of so many Differing *Hypotheses*, that 'twill be very inconsiderate and fallacious to conclude (except where the Opinions are precisely Contradictory) the Truth of one from the falsity of another. And in our particular case 'tis no way necessary, that the Properties of mixt Bodies must be explicable either by the Hermetical, or the *Aristotelian Hypothesis*; there being divers other and more plausible waies of explaining them, and especially that, which deduces qualities from the motion, figure, and contrivance of the small parts of Bodies; as I think might be shewn, if the attempt were

were as seasonable, as I fear it would be Tedious.

I will allow then, that the Chymists do not causelessly accuse the Doctrine of the four Elements of incompetency to explain the Properties of Compound bodies. And for this Rejection of a Vulgar Error, they ought not to be deny'd what praise men may deserve for exploding a Doctrine whose Imperfections are so conspicuous, that men needed but not to shut their Eyes, to discover them. But I am mistaken, if our Hermetical Philosophers Themselves need not, as well as the Peripatetick, have Recourse to more Fruitfull and Comprehensive Principles than the *Tria Prima*, to make out the Properties of the Bodies they converse with. Not to accumulate Examples to this purpose, (because I hope for a fitter opportunity to prosecute this Subject) let us at present only point at Colour, that you may guess by what they say of so obvious and familiar a Quality, how little Instruction we are to expect from the *Tria Prima* in those more abstruse ones, which they with the *Aristotelians* stile Occult. For about Colours, neither

ther do they at all agree among themselves, nor have I met with any one, of which of the three Perſwaſions ſoever, that does intelligibly explicate Them. The Vulgar Chymiſts are wont to aſcribe Colours to Mercury; *Paracelſus* in divers places attributes them to Salt; and *Sennertus*, having recited their differing Opinions, Diſſents from both; and referrs Colours rather unto Sulphur. But how Colours do, nay, how they may, ariſe from either of theſe Principles, I think you will ſcarce ſay that any has yet intelligibly explicated. And if Mr. *Boyle* will allow me to ſhew you the Experiments which he has collected about Colours, you will, I doubt not, confeſs that bodies exhibite colours, not upon the Account of the Predominancy of this or that Principle in them, but upon that of their Texture, and eſpecially the Diſpoſition of their ſuperficial parts, whereby the Light rebounding thence to the Eye is ſo modifi'd, as by differing Impreſſions variouſly to affect the Organs of Sight. I might here take notice of the pleaſing variety of Colours exhibited by the Triangular glaſs (as 'tis wont to be call'd) and demand,

De Conſ. & diſſen. cap. 11. *pag.* 186.

mand, what addition or decrement of either Salt, Sulphur, or Mercury, befalls the Body of the Glaſs by being Priſmatically figur'd; and yet 'tis known, that without that ſhape it would not afford thoſe colours as it does. But becauſe it may be objected, that theſe are not real, but apparent Colours; that I may not loſe time in examining the Diſtinction, I will alledge againſt the Chymiſts, a couple of examples of Real and Permanent Colours Drawn from Metalline Bodies; and repreſent, that without the addition of any extraneous body, Quickſilver may by the Fire alone, and that in glaſſe Veſſels, be depriv'd of its ſilver like Colour, and be turn'd into a red Body; and from this red Body without Addition likewiſe may be obtain'd a Mercury bright and Specular as it was before; So that I have here a laſting Colour Generated and Deſtroy'd (as I have ſeen) at pleaſure, without adding or taking away either Mercury, Salt, or Sulphur; and if you take a clean and ſlender piece of harden'd ſteel, and apply to it the flame of a candle at ſome little diſtance ſhort of the point, You ſhall not have held the

the Steel long in the flame, but You ſhall perceive divers Colours, as Yellow, Red and Blew, to appear upon the Surface of the metal, and as it were run along in chaſe of one another towards the point; So that the ſame body; and that in one and the ſame part, may not only have a new colour produc'd in it, but exhibite ſucceſſively divers Colours within a minute of an hour, or thereabouts; and any of theſe Colours may by Removing the Steel from the Fire, become Permanent, and laſt many years. And this Production and Variety of Colours cannot reaſonably be ſuppos'd to proceed from the Acceſſion of any of the three Principles, to which of them ſoever Chymiſts will be pleas'd to aſcribe Colours; eſpecially conſidering, that if you but ſuddenly Refrigerate that Iron, firſt made Red hot, it will be harden'd and Colourleſs again; and not only by the Flame of a Candle, but by any other equivalent heat Conveniently appli'd, the like Colours will again be made to appear and ſucceed one another, as at the Firſt. But I muſt not any further proſecute an Occaſional Diſcourſe, though that

that were not ſo Difficult for me to do, as I fear it would be for the Chymiſts to give a better Account of the other Qualities, by their Principles, than they have done of Colours. And your *Sennertus* Himſelf (though an Author I much value) would I fear have been exceedingly puzl'd to reſolve, by the *Tria Prima*, halfe that Catalogue of Problems, which he challenges the Vulgar Peripatetick to explicate by their four Elements. And ſuppoſing it were true, that Salt or Sulphur were the Principle to which this or that Quality may be peculiarly referr'd, yet though he that teaches us this, teaches us ſomething concerning That quality, yet he Teaches us but ſomething. For indeed he does not Teach us That which can in any Tolerable meaſure ſatisfie an inquiſitive Searcher after Truth. For what is it to me to know, that ſuch a quality reſides in ſuch a Principle or Element, whilſt I remain altogether ignorant of the Cauſe of that quality, and the manner of its production and Operation? How little do I know more than any Ordinary Man of Gravity, if I know but that the Heavineſs of mixt bodies

Sennert. de Conſens. & Diſſens. pag. 165. 166.

bodies proceeds from that of the Earth they are compos'd of, if I know not the reason why the Earth is Heavy? And how little does the Chymist teach the Philosopher of the Nature of Purgation, if he only tells him that the Purgative Vertue of Medicines resides in their Salts? For, besides that this must not be conceded without Limitation, since the purging parts of many Vegetables Extracted by the Water wherein they are infus'd, are at most but such compounded Salts, (I mean mingl'd with Oyle, and Spirit, and Earth, as Tartar and divers other Subjects of the Vegetable Kingdom afford) And since too that Quicksilver precipitated either with Gold, or without Addition, into a powder, is wont to be strongly enough Cathartical, though the Chymists have not yet prov'd, that either Gold or Mercury have any Salt at all, much less any that is Purgative; Besides this, I say, how little is it to me, to know That 'tis the Salt of the Rhubarb (for Instance) that purges, if I find That it does not purge as Salt; since scarce any Elementary Salt is in small quantity Cathartical. And if I know not how pur-

Purgation in general is effected in a Humane Body? In a word, as 'tis one thing to know a mans Lodging, and another, to be acquainted with him; so it may be one thing to know the subject wherein a Quality principally resides, and another thing to have a right notion and knowledg of the quality it self. Now that which I take to be the reason of this Chymical Deficiency, is the same upon whose account I think the *Aristotelian* and divers other Theories incompetent to explicate the Origine of Qualities. For I am apt to think, that men will never be able to explain the *Phænomena* of Nature, while they endeavour to deduce them only from the Presence and Proportion of such or such material Ingredients, and consider such ingredients or Elements as Bodies in a state of rest; whereas indeed the greatest part of the affections of matter, and consequently of the *Phænomena* of nature, seems to depend upon the motion and the contrivance of the small parts of Bodies. For 'tis by motion that one part of matter acts upon another; and 'tis, for the most part, the texture of the Body upon which the moving parts strike, that modifies y^e

motion or Impreſſion, and concurrs with it to the production of thoſe Effects which make up the chief part of the Naturaliſts Theme.

But (ſaies *Eleutherius*) me thinks for all this, you have left ſome part of what I alledg'd in behalf of the three principles, unanſwer'd. For all that you have ſaid will not keep this from being a uſeful Diſcovery, that ſince in the Salt of one Concrete, in the Sulphur of another, and the Mercury of a third, the Medicinal vertue of it reſides; that Principle ought to be ſeparated from the reſt, and there the deſired faculty muſt be ſought for.

I never denyed (Replies *Carneades*) that the Notion of the *Tria Prima* may be of ſome uſe, but (continues he laughing) by what you now alledg for it, it will but appear, That it is uſeful to Apothecaries, rather than to Philoſophers: The being able to make things Operative being ſufficient to thoſe, whereas the Knowledge of Cauſes is the Thing looked after by Theſe. And let me Tell You, *Eleutherius*, even this it ſelf will need to be entertained with ſome caution.

For

For firſt, it will not preſently follow, That if the Purgative or other vertue of a Simple may be eaſily extracted by Water or Spirit of Wine, it Reſides in the Salt or Sulphur of the Concrete; Since unleſs the Body hath before been reſolved by the Fire, or ſome Other Powerful Agent, it will, for the moſt part, afford in the Liquors I have named, rather the finer compounded parts of it ſelf, Than the Elementary ones. As I noted before, That Water will diſſolve not only pure Salts, but Chryſtals of Tartar, Gumme Arabick, Myrrhe and Other Compound Bodies. As alſo Spirit of Wine will Diſſolve not only the pure Sulphur of Concretes, but likewiſe the whole Subſtance of divers Reſinous Bodies, as Benzoin, the Gummous parts of Jalap, Gumme Lacca, and Other bodies that are counted perfectly Mixt. And we ſee that the Extracts made either with Water or Spirit of Wine are not of a ſimple and Elementary Nature, but Maſſes conſiſting of the looſer Corpuſcles, and finer parts of the Concretes whence they are Drawn; ſince by Diſtillation they may be Divided into more Elementary ſubſtances,

Next, we may consider That even when there intervenes a Chymical resolution by the Fire, 'tis seldom in the Saline or Sulphureous principle, as such, that the desir'd Faculty of the Concrete Resides; But, as that Titular Salt or Sulphur is yet a mixt Body, though the Saline or Sulphureous Nature be predominant in it. For, if in Chymical Resolutions the separated Substances were pure and simple Bodies, and of a perfect Elementary Nature; no one would be indued with more Specifick Vertues, than another; and their qualities would Differ as Little as do those of Water. And let me add this upon the by, That even Eminent Chymists have suffer'd themselves to be reprehended by me for their over great Diligence in purifying some of the things they obtain by Fire from mixt Bodies. For though such compleatly purifyed Ingredients of Bodies might perhaps be more satisfactory to our Understanding; yet others are often more useful to our Lives; the efficacy of such Chymical Productions depending most upon what they retain of the Bodies whence they are separated, or gain by the new associations of the Dissipated

sipated among themselves; whereas if they were meerly Elementary, their uses would be comparatively very small; and the vertues of Sulphurs, Salts, or Other such Substances of one denomination, would be the very same.

And by the Way (*Leutherius*) I am inclin'd upon this ground to Think, That the artificial resolution of compound bodies by Fire does not so much enrich mankind, as it divides them into their supposed Principles; as upon the score of its making new compounds by new combinations of the dissipated parts of the resolv'd Body. For by this means the Number of mixt Bodies is considerably increased; And many of those new productions are endow'd with useful qualities; divers of which they owe not to the body from which they were obtain'd, but to Their newly Acquired Texture.

But thirdly, that which is principally to be Noted is this, that as there are divers Concretes, whose Faculties reside in some one or other of those differing Substances, that Chymists call their Sulphurs, Salts, and Mercuries, and consequently may be best obtain'd, by ana-

lyzing the Concrete whereby the desir-ed Principles may be had sever'd or freed from the rest; So there are others where-in the noblest properties lodge not in the Salt, or Sulphur, or Mercury, but depend immediately upon the form, or (if you will) result from the determi-nate structure of the Whole Concrete; and consequently they that go about to extract the Vertues of such Bodies, by exposing them to the Violence of the Fire, do exceedingly mistake, and take the way to Destroy what they would obtain.

I remember that *Helmont* himself somewhere confesses, That as the Fire betters some things and improves their Vertues, so it spoyles others and makes them degenerate. And elsewhere he judiciously affirmes, that there may be sometimes greater vertue in a simple, such as Nature has made it, than in any thing that can by the fire be separated from it. And lest you should doubt whether he means by the vertues of things those that are Medical; he has in one place this ingenuous confession; *Credo* (saies he) *simplicia in sua simplicitate esse sufficientia pro sanatione omnium morborum*

Helmont. Pharm. & Dispens. Nov. pag. 498.

borum. Nay, Barthius, even in a comment upon *Beguinus*, scruples not to make this acknowledgment; *Valde absurdum est* (saies he) *ex omnibus rebus extracta facere, salia, quintas essentias; præsertim ex substantiis per se plane vel subtilibus vel homogeneis, quales sunt Uniones, Corallia, Moschus, Ambra &c.* Consonant'y where-unto he also tells Us, (and Vouches the famous *Paterus*, for having candidly given the same Advertisement to his Auditors,) that some things have greater vertues, and better suited to our humane nature, when unprepar'd, than when they have past the Chymists Fire; as we see, saies my Author, in Pepper; of which some grains swallowed perform more towards the relief of a Distemperd stomack, than a great quantity of the Oyle of the same spice.

Vide Jer. ad Begu. Lib. 1. Cap. 17.

It has been (pursues *Carneades*) by our Friend here present observ'd concerning Salt-petre, that none of the substances into which the Fire is wont to divide it, retaines either the Taste, the cooling ver-tue, or some other of the properties of the Concrete; and that each of those Substances acquires new qualities not to be found in Salt-Petre it self. The

ſhining property of the tayls of glow-worms does ſurvive but ſo ſhort a time the little animal made conſpicuous by it, that inquiſitive men have not ſcrupled publickly to deride *Baptiſta Porta* and others; who, deluded perhaps with ſome Chymical ſurmiſes, have ventur'd to preſcribe the diſtillation of a Water from the tayles of Glowwormes, as a ſure way to obtain a liquor ſhining in the Dark. To which I ſhall now add no other example than that afforded us by Amber; which, whilſt it remains an intire body, is endow'd with an Electrical faculty of drawing to it ſelf feathers, ſtrawes, and ſuch like Bodies; which I never could obſerve either in its Salt, its Spirit, its Oyle, or in the Body I remember I once made by the reunion of its divided Elements; none of theſe having ſuch a Texture as the intire Concrete. And however Chymiſts boldly deduce ſuch and ſuch properties from this or that proportion of their component Principles; yet in Concretes that abound with this or that Ingredient, 'tis not alwaies ſo much by vertue of its preſence, nor its plenty, that the Concrete is qualify'd to perform ſuch and ſuch Effects; as upon the account

account of the particular texture of that and the other Ingredients, aſſociated after a determinate Manner into one Concrete: though poſſibly ſuch a proportion of that ingredient may be more convenient than another for the conſtituting of ſuch a body. Thus in a clock the hand is mov'd upon the Dyal, the bell is ſtruck, and the other actions belonging to the engine are perform'd, not becauſe the Wheeles are of braſs or iron, or part of one metal and part of another, or becauſe the weights are of Lead, but by Vertue of the ſize, ſhape, bigneſs, and co-aptation of the ſeveral parts; which would performe the ſame things though the wheels were of Silver, or Lead, or Wood, and the Weights of Stone or Clay; provided the Fabrick or Contrivance of the engine were the ſame: though it be not to be deny'd, that Braſs and Steel are more convenient materials to make clock-wheels of than Lead, or Wood. And to let you ſee, *Eleutherius*, that 'tis ſometimes at leaſt, upon the Texture of the ſmall parts of a body, & not alwaies upon the preſence, or receſs, or increaſe, or Decrement of any one of its Principles, that it may looſe ſome ſuch

ſuch Qualities, and acquire ſome ſuch others as are thought very ſtrongly inherent to the bodies they Reſide in; I will add to what may from my paſt diſcourſe be referr'd to this purpoſe, this Notable Example, from my Own experience; That Lead may without any additament, and only by various applications of the Fire, loſe its colour; and acquire ſometimes a gray, ſometimes a yellowiſh, ſometimes a red, ſometimes an *amethyſtine* colour; and after having paſt through theſe, and perhaps divers others, again recover its leaden colour, and be made a bright Body. That alſo this Lead, which is ſo flexible a metal, may be made as brittle as Glaſſe, and preſently be brought to be again flexible and Malleable as before. And beſides, that the ſame lead, which I find by *Microſcopes* to be one of the moſt opacous bodies in the World, may be reduced to a fine tranſparent glaſs; whence yet it may return to an opacous Nature again; and all this, as I ſaid, without the addition of any extraneous body, and meerly by the manner and Method of expoſing it to the Fire.

But (ſaies *Carneades*) after having already

already put you to ſo prolix a trouble, it is time for me to relieve you with a promiſe of putting ſpeedily a period to it; And to make good that promiſe, I ſhall from all that I have hitherto diſcourſed with you, deduce but this one propoſition by way of Corollary. [*That it may as yet be doubted, whether or no there be any determinate Number of Elements*; Or, *if you pleaſe, whether or no all compound bodies, do conſiſt of the ſame number of Elementary ingredients or material Principles.*]

This being but an inference from the foregoing Diſcourſe, it will not be requiſite to inſiſt at large on the proofs of it; But only to point at the chief of Them, and Referr You for Particulars to what has been already Delivered.

In the Firſt place then, from what has been ſo largely diſcours'd, it may appear, that the Experiments wont to be brought, whether by the common Peripateticks, or by the vulgar Chymiſts, to demonſtrate, that all mixt bodies are made up preciſely either of the four Elements, or the three Hypoſtatical Principles, do not evince what they are alledg'd to prove. And as for the other common

common arguments, pretended to be drawn from Reason in favour of the *Aristotelian Hypothesis* (for the Chymists are wont to rely almost altogether upon Experiments) they are Commonly grounded upon such unreasonable or precarious Suppositions, that 'tis altogether as easie and as just for any man to reject them, as for those that take them for granted to assert them, being indeed all of them as indemonstrable as the conclusion to be inferr'd from them; and some of them so manifestly weak and proofless; that he must be a very courteous adversary, that can be willing to grant them; and as unskilful a one, that can be compelled to do so.

In the next place, it may be considered, if what these Patriarchs of the *Spagyrists*, *Paracelsus* and *Helmont*, do on divers occasions positively deliver, be true; namely that the *Alkahest* does Resolve all mixt Bodies into other Principles than the fire, it must be decided which of the two resolutions (that made by the *Alkahest*, or that made by the fire) shall determine the number of the Elements, before we can be certain how many there are.

And

And in the mean time, we may take notice in the last place, that as the distinct substances whereinto the *Alkahest* divides bodies, are affirm'd to be differing in nature from those whereunto they are wont to be reduc'd by fire, and to be obtain'd from some bodies more in Number than from some others; since he tells us, he could totally reduce all sorts of Stones into Salt only, whereas of a coal he had two distinct Liquors. So, although we should acquiesce in that resolution which is made by fire, we find not that all mixt bodies are thereby divided into the same number of Elements and Principles; some Concretes affording more of them than others do; Nay and sometimes this or that Body affording a greater number of Differing substances by one way of management, than the same yeelds by another. And they that out of Gold, or Mercury, or Muscovy-glass, will draw me as many distinct substances, as I can separate from Vitriol, or from the juice of Grapes variously order'd, may teach me that which I shall very

Novi saxum & lapides omnes in merum salem suo saxo aut lapidi & aequiponderantem reducere absque omni prorsus sulphure aut Mercurio. Helmont. pag. 490.

very Thankfully learn. Nor does it appear more congruous to that variety that so much conduceth to the perfection of the Universe, that all Elemented bodies be compounded of the same number of Elements, than it would be for a language, that all its words should consist of the same number of Letters.

THE

THE SCEPTICAL CHYMIST OR, *A Paradoxical Appendix to the Foregoing Treatise.*

The Sixth Part.

HEre *Carneades* having Dispach't what he Thought Requisite to oppose against what the Chymists are wont to alledge for Proof of their three Principles, Paus'd a while, and look'd about him, to discover whether it were Time for him and his Friend to Rejoyne the Rest of the Company. But *Eleutherius* perceiving nothing yet to forbid

forbid Them to Profecute their Diſcourſe a little further, ſaid to his Friend, (who had likewiſe taken Notice of the ſame thing) I halfe expected, *Carneades*, that after you had ſo freely declar'd Your doubting, whether there be any Determinate Number of Elements, You would have proceeded to queſtion whether there be any Elements at all. And I confeſs it will be a trouble to me if You defeat me of my Expectation; eſpecially ſince you ſee the leaſure we have allow'd us may probably ſuffice to examine that Paradox; becauſe you have ſo largely Deduc'd already many Things pertinent to it, that you need but intimate how you would have them Apply'd, and what you would inferr from them.

Carneades having in Vain repreſented that their leaſure could be but very ſhort, that he had already prated very long, that he was unprepar'd to maintain ſo great and ſo invidious a Paradox, was at length prevail'd with to tell his Friend; Since, *Eleutherius*, you will have me Diſcourſe *Ex Tempore* of the Paradox you mention, I am content, (though more perhaps to expreſs my Obedience, than my Opinion) to tell you that (ſuppoſing the Truth of *Helmonts* and *Paracelſus*'s Alkaheſtical Experiments, if I may ſo call them) though it may ſeem extravagant, yet it is not abſurd to doubt, whether, for ought has been prov'd, there be a neceſſity to admit any Elements, or Hypoſtatical Principles, at all.

And, as formerly, ſo now, to avoid the needleſs trouble of Diſputing ſeverally with the *Ariſtotelians* and the Chymiſts, I will addreſs my ſelf to oppoſe them I have laſt nam'd, Becauſe their Doctrine about the Elements is more applauded by the Moderns, as pretending highly to be grounded upon Experience. And, to deal not only fairly but favourably with them, I will allow them to take in Earth and Water to their other Principles. Which I conſent to the rather, that my Diſcourſe may the better reach the Tenents of the Peripateticks; who cannot plead for any ſo probably as for thoſe two Elements; that of fire above the Air being Generally by Judicious Men exploded as an Imaginary thing; And the Air not concurring to compoſe Mixt

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Bodies as one of their Elements, but only lodging in their pores, or rather repleniſhing, by reaſon of its Weight and Fluidity, all thoſe Cavities of bodies here below, whether compounded or not, that are big enough to admit it, and are not fill'd up with any groſſer ſubſtance.

And, to prevent miſtakes, I muſt advertize You, that I now mean by Elements, as thoſe Chymiſts that ſpeak plaineſt do by their Principles, certain Primitive and Simple, or perfectly unmingled bodies; which not being made of any other bodies, or of one another, are the Ingredients of which all thoſe call'd perfectly mixt Bodies are immediately compounded, and into which they are ultimately reſolved: now whether there be any one ſuch body to be conſtantly met with in all, and each, of thoſe that are ſaid to be Elemented bodies, is the thing I now queſtion.

By this State of the controverſie you will, I ſuppoſe, Gueſs, that I need not be ſo abſurd, as to deny that there are ſuch bodies as Earth, and Water, and Quickſilver, and Sulphur: But I look upon Earth and Water, as component parts of

of the Univerſe, or rather of the Terreſtrial Globe, not of all mixt bodies. And though I will not peremptorily deny that there may ſometimes either a running Mercury, or a Combuſtible Subſtance be obtain'd from a Mineral, or even a Metal; yet I need not Concede either of them to be an Element in the ſence above declar'd; as I ſhall have occaſion to ſhew you by and by.

To give you then a brief account of the grounds I intend to proceed upon, I muſt tell you, that in matters of Philoſophy, this ſeems to me a ſufficient reaſon to doubt of a known and important propoſition, that the Truth of it is not yet by any competent proof made to appear. And congruouſly hereunto, if I ſhew that the grounds, upon which men are perſwaded that there are Elements, are unable to ſatisfie a conſidering man, I ſuppoſe my doubts will appear rational.

Now the Conſiderations that induce men to think, that there are Elements, may be conveniently enough referr'd to two heads. Namely, the one, that it is neceſſary that Nature make uſe of Elements to conſtitute the bodies that

are reputed Mixt. And the other, That the Resolution of such bodies manifests that nature had compounded them of Elementary ones.

In reference to the former of these Considerations, there are two or three things that I have to Represent.

And I will begin with reminding you of the Experiments I not long since related to you concerning the growth of pompions, mint, and other vegetables out of fair water. For by those experiments it seems evident, that Water may be Transmuted into all the other Elements; from whence it may be inferr'd, both, That 'tis not every Thing Chymists will call Salt, Sulphur, or Spirit, that needs alwaies be a Primordiate and Ingenerable body, and, that Nature may contexa Plant (though that be a perfectly mixt Concrete) without having all the Elements previously presented to her to compound it of. And, if you will allow the relation I mention'd out of *Mounsieur De Rochas* to be True; then may not only plants, but Animals and Minerals too, be produced out of Water. And however there is little doubt to be made, but that the plants my tryals afforded me, as

as they were like in so many other respects to the rest of the plants of the same Denomination; so they would, in case I had reduc'd them to putrefaction, have likewise produc'd Wormes or other insects, as well as the resembling Vegetables are wont to do; so that Water may, by Various Seminal Principles, be successively Transmuted into both plants and Animals. And if we consider that not only Men, but even sucking Children are, but too often, Tormented with Solid Stones; and that divers sorts of Beasts themselves, (whatever *Helmont* against Experience think to the contrary) may be Troubled with great and Heavy stones in their Kidneys and Bladders, though they Feed but upon Grass and other Vegetables, that are perhaps but Disguised Water, it will not seem improbable that even some Concretes of a mineral Nature, may Likewise be form'd of Water.

We may further take notice, that as a Plant may be nourisht, and consequently may Consist of Common water; so may both plants and Animals, (perhaps even from their Seminal Rudiments) consist of compound Bodies,

without having any thing meerly Elementary brought them by nature to be compounded by them: This is evident in divers men, who whilst they were Infants were fed only with Milk, afterwards Live altogether upon Flesh, Fish, Wine, and other perfectly Mixt Bodies. It may be seen also in sheep, who on some of our English Downs or Plains, grow very fat by feeding upon the grass, without scarce drinking at all. And yet more manifestly in the magots that breed and grow up to their full bigness within the pulps of Apples, Pears, or the like Fruit. We see also, that Dungs that abound with a mixt Salt give a much more speedy increment to Corn and other Vegetables, than Water alone would do: And it hath been assur'd me, by a man experienc'd in such matters, that sometimes when to bring up roots very early, the Mould they were planted in was made over-rich, the very substance of the Plant has tasted of the Dung. And let us also consider a Graft of one kind of Fruit upon the upper bough of a Tree of another kind. As (for instance) the Scion of a Pear upon a White-thorne; for there the ascending Liquor

Liquor is already alter'd, either by the root, or in its ascent by the bark, or both wayes, and becomes a new mixt body: as may appear by the differing qualities to be met with in the saps of several trees; as particularly, the medicinal vertue of the Birch-Water, which I have sometimes drunk upon *Helmonts* great and not undeserved commendation. Now the graft, being fasten'd to the stock, must necessarily nourish its self, and produce its Fruit, only out of this compound Juice prepared for it by the stock, being unable to come at any other aliment. And if we consider, how much of the Vegetable he feeds upon may (as we noted above) remain in an Animal; we may easily suppose, That the blood of that Animal who Feeds upon this, though it be a Well constituted Liquor, and have all the differing Corpuscles, that make it up, kept in order by one presiding ferm, may be a strangly Decompounded Body, many of its parts being themselves Decompounded. So little is it Necessary that even in the mixtures which nature her self makes in Animal and Vegetable Bodies, she should have pure Elements at hand to make her compositions of.

Having ſaid thus much touching the conſtitution of Plants and Animals, I might perhaps be able to ſay as much touching that of Minerals, and even Metals, if it were as eaſy for us to make experiment in Order to the production of theſe, as of thoſe. But the growth or increment of Minerals being uſually a work of exceſſively long time, and for the moſt part perform'd in the bowels of the Earth, where we cannot ſee it, I muſt inſtead of Experiments make uſe, on this occaſion, of Obſervations.

That ſtones were not all made at once, but that ſome of them are now adayes generated, may (though it be deny'd by ſome) be fully prov'd by ſeveral examples, of which I ſhall now ſcarce alledg any other, than that famous place in *France* known by the name of *Les Caves Goutieres*, where the Water falling from the upper Parts of the cave to the ground does preſently there condenſe into little ſtones, of ſuch figures as the drops, falling either ſeverally or upon one another, and coagularing preſently into ſtone, chance to exhibit. Of theſe ſtones ſome Ingenious Friends of ours, that went a while ſince to viſit that place, did me the

the favour to preſent me with ſome that they brought thence. And I remember that both that ſober Relator of his Voyages, *Van Linſchoten*, and another good Author, inform us that in the Diamond Mines (as they call them) in the *East-Indies*, when having dig'd the Earth, though to no great depth, they find Diamonds and take them quite away; Yet in a very few years they find in the ſame place new Diamonds produc'd there ſince. From both which Relations, eſpecially the firſt, it ſeems probable that Nature does not alwaies ſtay for divers Elementary Bodies, when ſhe is to produce ſtones. And as for Metals themſelves, Authors of good note aſſure us, that even they were not in the beginning produc'd at once altogether, but have been obſerv'd to grow; ſo that what was not a Mineral or Metal before, became one afterwards. Of this it were eaſie to alledg many teſtimonies of profeſſed Chymiſts. But that they may have the greater authority, I ſhall rather preſent you with a few borrowed from more unſuſpected writers. *Sulphuris Mineram* (as the inquiſitive *P. Fallopius* notes) *quæ nutrix eſt caloris ſubterranei fabri*

fabri seu Archæi fontium & mineralium, Infra terram citissimè renasci testantur Historiæ Metallicæ. Sunt enim loca è quibus si hoc anno sulphur effossum fuerit; intermissa fossione per quadriennium redeunt fossores & omnia sulphure, ut antea, rursus inveniunt plena. Pliny Relates, *In Italiæ Insula Ilva, gigni ferri metallum.* Strabo *multo expressius; effossum ibi metallum semper regenerari. Nam si effossio spatio centum annorum intermittebatur, & iterum illuc revertebantur, fossores reperisse maximam copiam ferri regeneratam.* Which history not only is countenanced by *Fallopius*, from the Incom which the Iron of that Island yeelded the Duke of *Florence* in his time; but is mention'd more expressely to our purpose, by the Learned *Cesalpinus. Vena* (saies he) *ferri copiosissima est in Italia; ob eam nobilitata Ilva Tyrrheni maris Insula incredibili copia etiam nostris temporibus eam gignens: Nam terra quæ eruitur, dum vena effoditur tota, procedente tempore in venam convertitur.* Which last clause is therefore very notable, because from thence we may deduce, that earth, by a Metalline plastick principle latent in it, may be in processe of time chang'd into a metal. And even *Agricola*

gricola himself, though the Chymists complain of him as their adversary, acknowledges thus much and more; by telling us that at a Town called *Saga* in *Germany*, they dig up Iron in the Fields, by sinking ditches two foot deep;

In Lygiis, ad Sagam oppidum; in pratis eruitur ferrum, fossis ad altitudinem bipedaneam actis. Id decennio renatum denuo foditur non aliter ac Ilvæ ferrum.

And adding, that within the space of ten years the Ditches are digged again for Iron since produced, As the same Metal is wont to be obtain'd in *Ilva*. Also concerning Lead, not to mention what even *Galen* notes, that it will increase both in bulk and Weight if it be long kept in Vaults or Sellers, where the Air is gross and thick, as he collects from the swelling of those pieces of Lead that were imploy'd to fasten together the parts of old Statues. Not to mention this, I say, *Boccacius Certaldus*, as I find him Quoted by a Diligent Writer, has this Passage touching the Growth of Lead. *Fessularum mons* (saies he) *in Hetruria, Florentiæ civitati imminens, lapides plumbarios habet; qui si excidantur, brevi temporis spatio, novis incrementis instaurantur; ut* (annexes my Author) *tradit Boccacius Certaldus, qui id*

id compertissimum esse scribit. Nihil hoc novi est; sed de eodem Plinius, lib. 34. Hist. Natur. cap. 17. dudum prodidit, Inquiens, mirum in his solis plumbi metallis, quod derelicta fertilius reviviscunt. In plumbariis secundo Lapide ab Amberga dictis ad Asylum recrementa congesta in cumulos, exposita solibus pluviisque paucis annis, reddunt suum metallum cum fœnore. I might Add to these, (continues *Carneades*) many things that I have met with concerning the Generation of Gold and Silver. But for fear of wanting time, I shall mention but two or three Narratives. The First you may find Recorded by *Gerbardus* the Physick Professor, in these Words. *In valle* (saies he) *Joachimica argentum graminis modo & more è Lapidibus mineræ velut è radice excrevisse digiti Longitudine, testis est Dr. Schreterus, qui ejusmodi venas aspectu jucundas & admirabiles Domi suæ aliis sæpe monstravit & Donavit. Item Aqua cærulea Inventa est Anneberge, ubi argentum erat adhuc in primo ente, quæ coagulata redacta est in calcem fixi & boni argenti..*

The other two Relations I have not met with in Latine Authors, and yet they

they are both very memorable in themselves, and pertinent to our present purpose.

The first I meet with in the Commentary of *Johannes Valehius* upon the *Kleine Baur*, in which that industrious Chymist Relates, with many circumstances, that at a Mine-Town (If I may so English the German *Bergstat*) eight miles or Leagues distant from *Strasburg* call'd *Mariakirch*, a Workman came to the Overseer, and desired employment; but he telling him that there was not any of the best sort at present for him, added that till he could be preferr'd to some such, he might in the mean time, to avoid idleness, work in a Grove or Mine-pit thereabouts, which at that time was little esteem'd. This Workman after some weeks Labour, had by a Crack appearing in the Stone upon a Stroak given near the wall, an Invitation Given him to Work his Way through, which as soon as he had done, his Eyes were saluted by a mighty stone or Lump which stood in the middle of the Cleft (that had a hollow place behind it) upright, and in shew like an armed-man; but consisted of pure fine Silver

Silver having no Vein or Ore by it, or any other Additament, but ſtood there free, having only underfoot ſomething like a burnt matter; and yet this one Lump held in Weight above a 1000 marks, which, according to the Dutch Account, makes 500 pound weight of fine ſilver. From which and other Circumſtances my Author gathers; That by the warmth of the place, the Noble Metalline Spirits, (Sulphureous and Mercurial) were carri'd from the neighbouring Galleries or Vaults, through other ſmaller Cracks and Clefts into that Cavity, and there collected as in a cloſe Chamber or Cellar; whereinto when they were gotten, they did in proceſs of time ſettle into the forementioned precious maſs of Metal.

The other Germane Relation is of that great Traveller and Laborious Chymiſt *Johannes* (not *Georgius*) *Agricola*; who in his notes upon what *Poppius* has written of Antimony, Relates, that when he was among the *Hungarian* Mines in the deep Groves, he obſerv'd that there would often ariſe in them a warm Steam, (not of that malignant ſort which the Germans call *Shwadt*, which

which (ſaies he) is a meer poyſon, and often ſuffocates the Diggers) which faſten'd it ſelf to the Walls; and that coming again to review it after a couple of dayes, he diſcern'd that it was all very faſt, and gliſtering; whereupon having collected it and Diſtill'd it *per Retortam*, he obtain'd from it a fine Spirit: adding, that the Mine-Men inform'd him, that this Steam, or Damp (as the Engliſh Men alſo call it, retaining the Dutch Term) would at laſt have become a Metal, as Gold or Silver.

I referr (ſaies *Carneades*) to another Occaſion, the Uſe that may be made of theſe Narratives towards the explicating the Nature of Metalls; and that of Fixtneſs, Malleableneſs, and ſome other Qualities conſpicuous in them. And in the mean time, this I may at preſent deduce from theſe Obſervations; That 'tis not very probable, that, whenſoever a Mineral, or even a Metal, is to be Generated in the Bowels of the Earth, Nature needs to have at hand both Salt, and Sulphur, and Mercury to Compound it of; for, not to urge that the two laſt Relations ſeem leſs to favour the Chymiſts than *Ariſtotle*, who would

would have Metals Generated of certain *Halitus* or ſteams, the forementi-on'd Obſervations together, make it ſeem more Likely that the mineral Earths or thoſe Metalline ſteams(where-with probably ſuch Earths are plenti-fully imbu'd) do contain in them ſome ſeminal Rudiment, or ſome thing Equi-valent thereunto; by whoſe plaſtick power the reſt of the matter, though per-haps Terreſtrial and heavy, is in Tract of time faſhion'd into this or That me-talline Ore; almoſt(as I formerly noted) as that fair water was by the ſeminal Principle of Mint, Pompions, and other Vegetables, contriv'd into Bodies an-ſwerable to ſuch Seeds. And that ſuch Alterations of Terreſtrial matter are not impoſſible, ſeems evident from that notable Practice of the Boylers of Salt-Petre, who unanimouſly obſerve, as well here in *England* as in other Coun-tries, That if an Earth pregnant with Nitre be depriv'd, by the affuſion of wa-ter, of all its true and diſſoluble Salt, yet the Earth will after ſome years yeeld them Salt-Petre again; For which rea-ſon ſome of the eminent and skilfulleſt of them keep it in heaps as a perpetual Mine

Mine of Salt Petre; whence it may ap-pear, that the Seminal Principle of Ni-tre latent in the Earth does by degrees Transforme the neighbouring matter in-to a Nitrous Body; for though I deny that ſome Volatile Nitre may by ſuch Earths be attracted (as they ſpeak) out of the Air, yet that the inner-moſt parts of ſuch great heaps that lye ſo remote from the Air ſhould borrow from it all the Nitre they abound with, is not probable, for other reaſons be-ſides the remoteneſs of the Air, though I have not the Leaſure to mention them.

And I remember, that a perſon of Great Credit, and well acquainted with the wayes of making Vitriol, affirm'd to me, that he had obſerv'd, that a kind of mineral which abounds in that Salt, being kept within Doors and not ex-poſ'd (as is uſual) to the free Air and Rains, did of it ſelf in no very long time turn into Vitriol, not only in the out-ward or ſuperficial, but even in the in-ternal and moſt Central parts.

And I alſo remember, that I met with a certain kind of Marchaſite that lay together in great Quantities under

ground, which did, even in my chamber, in so few hours begin of it self to turne into Vitriol, that we need not distrust the newly recited narrative. But to return to what I was saying of Nitre; as Nature made this Salt-Petre out of the once almost an inodorous Earth it was bread in, and did not find a very stinking and corrosive Acid Liquor, and a sharp Alcalizate Salt to compound it of, though these be the Bodies into which the Fire dissolves it; so it were not necessary that Nature should make up all Metals and other Minerals of Pre-existent Salt, and Sulphur, and Mercury, though such Bodies might by Fire be obtained from it. Which one consideration duly weigh'd is very considerable in the present controversy: And to this agree well the Relations of our two German Chymists; for besides that it cannot be convincingly prov'd, it is not so much as likely that so languid and moderate a heat as that within the Mines, should carry up to so great a height, though in the forme of fumes, Salt, Sulphur, and Mercury; since we find in our Distillations, that it requires a considerable Degree of Fire to raise so much as to the height

height of one foot not only Salt, but even Mercury it self, in close Vessels. And if it be objected, that it seems by the stink that is sometimes observ'd when Lightning falls down here below, that sulphureous steams may ascend very high without any extraordinary Degree of heat; It may be answer'd, among other things, that the Sulphur of Silver is by Chymists said to be a fixt Sulphur, though not altogether so well Digested as that of Gold.

But, (proceeds *Carneades*) If it had not been to afford You some hints concerning the Origine of Metals, I need not have deduc'd any thing from these Observations; It not being necessary to the Validity of my Argument that my Deductions from them should be irrefragrable, because my Adversaries the *Aristotelians* and Vulgar Chymists do not, I presume, know any better than I, *a priori*, of what ingredients Nature compounds Metals and Minerals. For their Argument to prove that those Bodies are made up of such Principles, is drawn *a posteriori*; I mean from this, that upon the *Analysis* of Mineral bodies they are resolv'd into those differing substan-

ces. That we may therefore examine this Argument, Let us proceed to consider what can be alledg'd in behalf of the Elements from the Resolutions of Bodies by the fire; which you remember was the second Topick whence I told you the Arguments of my Adversaries were desum'd.

And that I may first dispatch what I have to say concerning Minerals, I will begin the remaining part of my discourse with considering how the fire divides them.

And first, I have partly noted above, that though Chymists pretend from some to draw salt, from others running Mercury, and from others a Sulphur; Yet they have not hitherto taught us by any way in use among them to separate any one principle, whether Salt, Sulphur, or Mercury, from all sorts of Minerals without exception. And thence I may be allow'd to conclude that there is not any of the Elements that is an Ingredient of all Bodies, since there are some of which it is not so.

In the next place, supposing that either Sulphur or Mercury were obtainable from all sorts of Minerals. Yet still this Sulphur

Sulphur or Mercury would be but a compounded, not an Elementary body, as I told you already on another occasion. And certainly he that takes notice of the wonderful Operations of Quicksilver, whether it be common, or drawn from Mineral Bodies, can scarce be so inconsiderate as to think it of the very same nature with that immature and fugitive substance which in Vegetables & Animals Chymists have been pleas'd to call their Mercury. So that when Mercury is got by the help of the fire out of a metal or other Mineral Body, if we will not suppose that it was not pre existent in it, but produc'd by the action of the fire upon the Concrete, we may at least suppose this Quicksilver to have been a perfect Body of its own kind (though perhaps less heterogeneous than more secundary mixts) which happen'd to be mingl'd *per minima*, and coagulated with the other substances, whereof the Metal or Mineral consisted. As may be exemplyfied partly by Native Vermilion wherein the Quicksilver and Sulphur being exquisitely blended both with one another, and that other course Mineral stuff (what ever it be) that harbours

them, make up a red body differing enough from both; and yet from which part of the Quickſilver, and of the Sulphur, may be eaſily enough obtain'd; Partly by thoſe Mines wherein nature has ſo curiouſly incorporated Silver with Lead, that 'tis extreamly difficult, and yet poſſible, to ſeparate the former out of the Latter; And partly too by native Vitriol, wherein the Metalline Corpuſcles are by skill and induſtry ſeparable from the ſaline ones, though they be ſo con-coagulated with them, that the whole Concrete is reckon'd among Salts.

And here I further obſerve, that I never could ſee any Earth or Water, properly ſo call'd, ſeparated from either Gold or Silver (to name now no other Metalline Bodies) and therefore to retort the argument upon my Adverſaries, I may conclude, that ſince there are ſome bodies in which, for ought appears, there is neither Earth nor Water; I may be allow'd to conclude, that neither of thoſe two is an Univerſal Ingredient of all thoſe Bodies that are counted perfectly mixt, which I deſire you would remember againſt Anon.

It

It may indeed be objected, that the reaſon why from Gold or Silver we cannot ſeparate any moiſture, is, becauſe that when it is melted out of the Oar, the vehement Fire requiſite to its Fuſion forc'd away all the aqueous and fugitive moiſture; and the like fire may do from the materials of Glaſs. To which I ſhall Anſwer, that I Remember I read not long ſince in the Learned *Joſephus Acoſta*, who relates it upon his own obſervation; that in *America* (where he long lived) there is a kind of Silver which the *Indians* call *Papas* and ſometimes (like ſhe) they find pieces very fine and pure like to ſmall round roots, the which is rare in that metal, but uſual in Gold; Concerning which metal he tells us, that beſides this they find ſome which they call Gold in grains, which he tells us are ſmall morſels of Gold that they find whole without mixture of any other metal, which hath no need of melting or Refining in the fire. *Acoſta* Natural and Moral hiſtory of the Indies, l. 3. c. 5. p. 212.

I remember that a very skilful and credible perſon affirmed to me, that being in the *Hungarian* mines he had the good fortune to ſee a mineral that was

there digg'd up, wherein pieces of Gold of the length, and alſo almoſt of the bigneſs of a humane Finger, grew in the Oar, as if they had been parts and Branches of Trees.

And I have my ſelf ſeen a Lump of whitiſh Mineral, that was brought as a Rarity to a Great and knowing Prince, wherein there grew here and there in the Stone, which looked like a kind of ſparr, divers little Lumps of fine Gold, (for ſuch I was aſſured that Tryal had manifeſted it to be) ſome of them Seeming to be about the Bigneſs of peaſe.

But that is nothing to what our *Acoſta* ſubjoynes, which is indeed very memorable, namely, that of the morſels of Native and pure Gold, which we lately heard him mentioning, he had now and then ſeen ſome that weighed many pounds; to which I ſhall add, that I my ſelf have ſeen a Lump of Oar not long ſince digged up, in whoſe ſtony part there grew, almoſt like Trees, divers parcels though not of Gold, yet of (what perhaps Mineraliſts will more wonder at) another Metal which ſeemed to be very pure or unmixt

See *Acoſta* in the forecited Place, and the paſſage of *Pliny* quoted by him.

mixt with any Heterogeneous Subſtances, and were ſome of them as big as my Finger, if not bigger. But upon Obſervations of this kind, though perhaps I could, yet I muſt not at preſent, dwell any longer.

To proceed Therefore now (ſaies *Carneades*) to the Conſideration of the *Analyſis* of Vegetables, although my Tryals give me no cauſe to doubt but that out of moſt of them five differing Subſtances may be obtain'd by the fire, yet I think it will not be ſo eaſily Demonſtrated that theſe deſerve to be call'd Elements in the Notion above explain'd.

And before I deſcend to particulars, I ſhall repeat and premiſe this General Conſideration, that theſe differing ſubſtances that are call'd Elements or Principles, differ not from each other as Metals, Plants and Animals, or as ſuch Creatures as are immediately produc'd each by its peculiar Seed, and Conſtitutes a diſtinct propagable ſort of Creatures in the Univerſe; but theſe are only Various Schemes of matter or Subſtances that differ from each other, but in conſiſtence (as Running Mercury and the

the ſame Metal congeal'd by the Vapor of Lead) and ſome very few other accidents, as Taſt, or Smel, or Inflamability, or the want of them. So that by a change of Texture not impoſſible to be wrought by the Fire and other Agents that have the Faculty, not only to diſſociate the ſmall parts of Bodies, but afterwards to connect them after a new manner, the ſame parcel of matter may acquire or loſe ſuch accidents as may ſuffice to Denominate it Salt, or Sulphur, or Earth. If I were fully to clear to you my apprehenſions concerning this matter, I ſhould perhaps be obliged to acquaint you with divers of the Conjectures (for I muſt yet call them no more) I have had Concerning the Principles of things purely Corporeal: For though becauſe I ſeem not ſatisfi'd with the Vulgar Doctrines, either of the Peripatetick or Paracelſian Schooles, many of thoſe that know me, (and perhaps, among Them, *Eleutherius* himſelf) have thought me wedded to the Epicurean *Hypotheſis*, (as others have miſtaken me for an *Helmontian*) yet if you knew how little Converſant I have been with *Epicurean* Authors,

Authors, and how great a part of *Lucretius* himſelf I never yet had the Curioſity to read, you would perchance be of another mind; eſpecially if I were to entertain you at large, I ſay not, with my preſent Notions; but wth my former thoughts concerning the Principles of things. But, as I ſaid above, fully to clear my Apprehenſions would require a Longer Diſcourſe than we can now have.

For, I ſhould tell you that I have ſometimes thought it not unfit, that to the Principles which may be aſſign'd to things, as the World is now Conſtituted, we ſhould, if we conſider the Great Maſs of matter as it was whilſt the Univerſe was in making, add another, which may Conveniently enough be call'd an Architectonick Principle or power; by which I mean thoſe Various Determinations, and that Skilfull Guidance of the motions of the ſmall parts of the Univerſal matter by the moſt wiſe Author of things, which were neceſſary at the beginning to turn that confus'd *Chaos* into this Orderly and beautiful World; and Eſpecially, to contrive the Bodies of Animals

nimals and Plants, and the Seeds of those things whose kinds were to be propagated. For I confess I cannot well Conceive, how from matter, Barely put into Motion, and then left to it self, there could Emerge such Curious Fabricks as the Bodies of men and perfect Animals, and such yet more admirably Contriv'd parcels of matter, as the seeds of living Creatures.

I should likewise tell you upon what grounds, and in what sence, I suspected the Principles of the World, as it now is, to be Three, *Matter*, *Motion* and *Rest*. I say, *as the World now is*, because the present Fabrick of the Universe, and especially the seeds of things, together with the establisht Course of Nature, is a Requisite or Condition, upon whose account divers things may be made out by our three Principles, which otherwise would be very hard, if possible, to explicate.

I should moreover declare in general (for I pretend not to be able to do it otherwise) not only why *I* Conceive that Colours, Odors, Tasts, Fluidness and Solidity, and those other qualities that Diversifie and Denominate Bodies may

may Intelligibly be Deduced from these three; *but how two of the three* Epicurean Principles (which, I need not tell you, are Magnitude, Figure, and Weight) are Themselves Deducible from Matter and Motion; since the Latter of these Variously Agitating, and, as it were, Distracting the Former, must needs disjoyne its parts; which being Actually separated must Each of them necessarily both be of some Size, and obtain some shape or other. Nor did I add to our Principles the *Aristotelian Privation*, partly for other Reasons, which I must not now stay to insist on; and partly because it seems to be rather an Antecedent, or a *Terminus à quo*, than a True Principle, as the starting-Post is none of the Horses Legs or Limbs.

I should also explain why and how I made Rest, to be, though not so considerable a Principle of things, as Motion; yet a Principle of them; partly because it is (for ought we know) as Ancient at least as it, and depends not upon Motion, nor any other quality of matter; and partly, because it may enable the Body in which it happens to be, both

both to continue in a State of Reſt till ſome external force put it out of that ſtate, and to concur to the production of divers Changes in the bodies that hit againſt it, by either quite ſtopping or leſſning their Motion (whilſt the body formerly at Reſt Receives all or part of it into it ſelf) or elſe by giving a new Byaſs, or ſome other Modification, to Motion, that is, To the Grand and Primary inſtrument whereby Nature produces all the Changes and other Qualities that are to be met with in the World.

I ſhould likewiſe, after all this explain to you how, although Matter, Motion and Reſt, ſeem'd to me to be the Catholick Principles of the Univerſe, I thought the Principles of Particular bodies might be Commodiouſly enough reduc'd to two, namely *Matter*, and (what Comprehends the two other, and their effects) the reſult, or Aggregate, or Complex of thoſe Accidents, which are the Motion or Reſt, (for in ſome Bodies both are not to be found) the Bigneſs, Figure, Texture, and the thence reſulting Qualities of the ſmall parts, which are neceſſary to intitle the Body where-

to

to they belong to this or that Peculiar Denomination; and diſcriminating it from others to appropriate it to a Determinate Kind of Things, (as Yellowneſs, Fixtneſs, ſuch a Degree of Weight, and of Ductility, do make the Portion of matter wherein they Concur, to be reckon'd among perfect metals, and obtain the name of Gold) This Aggregate or reſult of Accidents you may if You pleaſe, call either *Structure*, or Texture, (Though indeed, that do not ſo properly Comprehend the motion of the conſtituent parts eſpecially in caſe ſome of them be Fluid) or what other appellation ſhall appear moſt Expreſſive. Or if, retaining the Vulgar Terme, You will call it the *Forme* of the thing it denominates, I ſhall not much oppoſe it; Provided the word be interpreted to mean but what I have expreſs'd, and not a Scholaſtick *Subſtantial Forme*, which ſo many intelligent men profeſs to be to them altogether Un-intelligible.

But, (ſaies *Carneades*) if you remember that 'tis a Sceptick ſpeaks to you, and that 'tis not ſo much my preſent Talk to make aſſertions as to ſuggeſt

doubts

doubts, I hope you will look upon what I have propos'd, rather as a Narrative of my former conjectures touching the Principles of things, than as a Resolute Declaration of my present opinions of them; especially since although they cannot but appear Very much to their Disadvantage, if you Consider Them as they are propos'd without those Reasons and Explanations by which I could perhaps make them appear much less extravagant; yet I want time to offer you what may be alledg'd to clear and countenance these notions; my design in mentioning them unto you at present being, partly, to bring some Light and Confirmation to divers passages of my discourse to you; *partly* to shew you, that I do not (as you seem to have suspected) embrace all *Epicurus* his principles; but Dissent from him in some main things, as well as from *Aristotle* and the Chymists, in others; and *partly* also, or rather chiefly, to intimate to you the grounds upon which I likewise differ from *Helmont* in this, that whereas he ascribes almost all things, and even diseases themselves, to their determinate Seeds; I am of opinion, that besides

besides the peculiar Fabricks of the Bodies of Plants and Animals (and perhaps also of some Metals and Minerals) which I take to be Effects of seminal principles, there are many other bodies in nature which have and deserve distinct and Proper names, but yet do but result from such contextures of the matter they are made of, as may without determinate seeds be effected by heat, cold, artificial mixtures and compositions, and divers other causes which sometimes nature imployes of her own accord; and oftentimes man by his power and skill makes use of to fashion the matter according to his intentions. This may be exemplified both in the productions of Nature, and in those of Art; of the first sort I might name multitudes; but to shew how slight a variation of Textures without addition of new ingredients may procure a parcel of matter divers names, and make it be Lookt upon as Different Things;

I shall invite you to observe with me, That Clouds, Rain, Hail, Snow, Frost, and Ice, may be but water, having its parts varyed as to their size and distance in respect of each other, and as to motion

and reſt. And among Artificial Productions we may take notice (to skip the Chryſtals of Tartar) of Glaſs, Regulus Martis Stellatus, and particularly of the Sugar of Lead, which though made of that inſipid Metal and ſowre Salt of Vinegar, has in it a ſweetneſs ſurpaſſing that of common Sugar, and divers other qualities, which being not to be found in either of its two ingredients, muſt be confeſs'd to belong to the Concrete it ſelf, upon the account of its Texture.

This Conſideration premis'd, it will be, I hope, the more eaſie to perſwade you that the Fire may as well produce ſome new textures in a parcel of matter, as deſtroy the old.

Wherefore hoping that you have not forgot the Arguments formerly imploy'd againſt the Doctrine of the *Tria Prima*; namely that the Salt, Sulphur, and Mercury, into which the Fire ſeems to reſolve Vegetable and Animal Bodies, are yet compounded, not ſimple and Elementary Subſtances; And that (as appear'd by the Experiment of Pompions) the *Tria prima* may be made out of Water; hoping I ſay, that you remember Theſe and the other Things that I formerly repreſented

ſented to the ſame purpoſe, I ſhall now add only, that if we doubt not the Truth of ſome of *Helmonts* Relations, We may well doubt whether any of theſe Heterogeneities be (I ſay not pre-exiſtent, ſo as to convene together, when a plant or Animal is to be conſtituted, but) ſo much as in-exiſtent in the Concrete whence they are obtain'd, when the Chymiſt firſt goes about to reſolve it; For, not to inſiſt upon the un-inflamable Spirit of ſuch Concretes, becauſe that may be pretended to be but a mixture of Phlegme and Salt; the Oyle or Sulphur of Vegetables or Animals is, according to him, reducible by the help of Lixiviate Salts into Sope; as that Sope is by the help of repeated Diſtillations from a *Caput Mortuum* of Chalk into inſipid Water. And as for the ſaline ſubſtance that ſeems ſeparable from mixt bodies; the ſame *Helmonts* tryals give us cauſe to think, That it may be a production of the Fire which by tranſporting and otherwiſe altering the particles of the matter, does bring it to a Saline nature.

Omne autem Alcali additâ pinguedine in aqueum liquorem, qui tandem mera & ſimplex aqua ſit, reducitur, (ut videre eſt in Sapone, Lazurio lapide, &c.) quoties per adjuncta fixa ſemen Pinguedinis deponit. Helmont.

For I know (saies he, in the place formerly alledg'd to another purpose) a way to reduce all stones into a meer Salt of equal weight with the stone whence it was produc'd, and that without any of the least either Sulphur or Mercury; which asseveration of my Author would perhaps seem less incredible to You, if I durst acquaint You with all I could say upon that subject. And hence by the way you may also conclude that the Sulphur and Mercury, as they call them, that Chymists are wont to obtain from compound Bodies by the Fire, may possibly in many Cases be the productions of it; since if the same bodies had been wrought upon by the Agents employ'd by *Helmont*, they would have yeelded neither Sulphur nor Mercury; & those portions of them, which the Fire would have presented Us in the forme of Sulphureous and Mercurial Bodies, would have, by *Helmonts* method, been exhibited to us in the form of Salt.

But though (saies *Eleutherius*) You have alledg'd very plausible Arguments against the *tria Prima*, yet I see not how it will be possible for you to avoid acknowledging that Earth and Water are Ele-

Elementary Ingredients, though not of Mineral Concretes, yet of all Animal and Vegetable Bodies; Since if any of these of what sort soever be committed to Distillation, there is regularly and constantly separated from it a phlegme or aqueous part, and a *Caput Mortuum* or Earth.

I readily acknowledge (answers *Carneades*) it is not so easy to reject Water and Earth (and especially the former) as 'tis to reject the *Tria Prima*, from being the Elements of mixt Bodies; but 'tis not every difficult thing that is impossible.

I consider then, as to Water, that the chief Qualities which make men give that name to any visible Substance, are that it is Fluid or Liquid, and that it is insipid and inodorous. Now as for the taste of these qualities, I think you have never seen any of those separated substances that the Chymists call Phlegme which was perfectly devoid both of Taste and Smell: and if you object, that yet it may be reasonably suppos'd, that since the whole Body is Liquid, the mass is nothing but Elementary Water faintly imbu'd with some of the Saline or

Sulphureous parts of the ſame Concrete, which it retain'd with it upon its Separation from the Other Ingredients. To this I anſwer, That this Objection would not appear ſo ſtrong as it is plauſible, if Chymiſts underſtood the Nature of Fluidity and Compactneſs; and that, as I formerly obſerv'd, to a Bodies being Fluid there is nothing neceſſary, but that it be divided into parts ſmall enough; and that theſe parts be put into ſuch a motion among themſelves as to glide ſome this way and ſome that way, along each others Surfaces. So that although a Concrete were never ſo dry, and had not any Water or other Liquor in-exiſtent in it, yet ſuch a Comminution of its parts may be made, by the fire or other Agents, as to turn a great portion of them into Liquor. Of this Truth I will give an inſtance, employ'd by our friend here preſent as one of the moſt conducive of his experiments to Illuſtrate the nature of Salts. If you Take then ſea ſalt, and melt it in the Fire to free it from the aqueous parts, and afterwards diſtill it with a vehement Fire from burnt Clay, or any other, as dry a *Caput Mortuum* as you pleaſe, you will, as Chymiſts confeſs by

by teaching it, drive over a good part of the Salt in the form of a Liquor. And to ſatisfy ſome ingenious men, That a great part of this Liquor was ſtill true ſea ſalt brought by the Operation of the Fire into Corpuſcles ſo ſmall, and perhaps ſo advantageouſly ſhap'd, as to be capable of the forme of a Fluid Body, He did in my preſence poure to ſuch ſpiritual ſalts a due proportion of the ſpirit (or ſalt and Phlegme) of Urine; whereby having evaporated the ſuperfluous moiſture, he ſoon obtain'd ſuch another Concrete, both as to taſt and ſmell, and eaſie ſublimableneſs as common Salt *Armoniack*, which you know is made up of groſs and undiſtill'd ſea ſalt united with the ſalts of Urine and of Soot, which two are very neer of kin to each other. And further, to manifeſt that the Corpuſcles of ſea ſalt and the Saline ones of Urine retain their ſeveral Natures in this Concrete, He mixt it with a convenient quantity of Salt of Tartar, and committing it to Diſtillation ſoon regain'd his ſpirit of Urine in a liquid form by its ſelf, the ſea ſalt ſtaying behind with the Salt of Tartar. Wherefore it is very poſſible that dry Bodies may by

the Fire be reduc'd to Liquors without any ſeparation of Elements, but barely by a certain kind of Diſſipation and Comminution of the matter, whereby its parts are brought into a new ſtate. And if it be ſtill objected, that the Phlegme of mixt Bodies muſt be reputed water, becauſe ſo weak a taſt needs but a very ſmall proportion of Salt to impart it; It may be reply'd, that for ought appears, common Salt and divers other bodies, though they be diſtill'd never ſo dry, and in never ſo cloſe Veſſels, will yeeld each of them pretty ſtore of a Liquor, wherein though (as I lately noted) Saline Corpuſcles abound, Yet there is beſides a large proportion of Phlegme, as may eaſily be diſcovered by coagulating the Saline Corpuſcles with any convenient Body; as I lately told you, our Friend coagulated part of the Spirit of Salt with Spirit of Urine: and as I have divers times ſeparated a ſalt from Oyle of Vitriol it ſelf (though a very ponderous Liquor and drawn from a ſaline body) by boyling it with a juſt quantity of Mercury, and then waſhing the newly coagulated ſalt from the Precipitate with fair Water. Now to what can we more probably

probably aſcribe this plenty of aqueous Subſtance afforded us by the Diſtillation of ſuch bodies, than unto this, That among the various operations of the Fire upon the matter of a Concrete divers particles of that matter are reduc'd to ſuch a ſhape and bigneſs, as is requiſite to compoſe ſuch a Liquor as Chymiſts are wont to call Phlegme or Water. How I conjecture this change may be effected, 'tis neither neceſſary for me to tell you, nor poſſible to do ſo without a much longer diſcourſe than were now ſeaſonable. But I deſire you would with me reflect upon what I formerly told you concerning the change of Quickſilver into Water; For that water having but a very faint taſt, if any whit more than divers of thoſe liquors that Chymiſts referr to Phlegme, By that experiment it ſeems evident, that even a metalline body, and therefore much more ſuch as are but Vegetable or Animal, may by a ſimple operation of the Fire be turn'd in great part into Water. And ſince thoſe I diſpute with are not yet able out of Gold, or Silver, or divers other Concretes to ſeparate any thing like Water; I hope I may be allow'd to conclude againſt Them,

Them, that water it ſelf is not an Univerſal and pre-exiſtent Ingredient of Mixt Bodies.

But as for thoſe Chymiſts that, Suppoſing with me the Truth of what *Helmont* relates of the *Alkaheſt's* wonderful Effects, have a right to preſs me with his Authority concerning them, and to alledge that he could Tranſmute all reputed mixt Bodies into inſipid and meer Water; To thoſe I ſhall repreſent, That though his affirmations conclude ſtrongly againſt the Vulgar Chymiſts (againſt whom I have not therefore ſcrupl'd to Employ Them) ſince they Evince that the Commonly reputed Principles or ingredients of Things are not Permanent and indeſtructible, ſince they may be further reduc'd into Inſipid Phlegme differing frõ them all; Yet till we can be allow'd to examine this Liquor, I think it not unreaſonable to doubt whether it be not ſomething elſe than meer Water. For I find not any other reaſon given by *Helmont* of his Pronouncing it ſo, than that it is inſipid. Now Sapour being an Accident or an Affection of matter that relates to our Tongue, Palate, and other Organs of Taſt, it may very poſſibly be, that

that the ſmall Parts of a Body may be of ſuch a Size and Shape, as either by their extream littleneſs, or by their ſlenderneſs, or by their Figure, to be unable to pierce into and make perceptible Impreſſion upon the Nerves or Membranous parts of the Organs of Taſt, and yet may be fit to work otherwiſe upon divers other Bodies than meer Water can, and conſequently to Diſcloſe it ſelf to be of a Nature farr enough from Elementary. In Silke dyed Red or of any other Colour, whilſt many Contiguous Threads make up a skein, the Colour of the Silke is conſpicuous; but if only a very few of them be look't upon, the Colour will appear much fainter than before. But if You take out one ſimple Thread, you ſhall not eaſily be able to diſcern any Colour at all; So ſubtile an Object having not the Force to make upon the Optick Nerve an Impreſſion great enough to be taken Notice of. It is alſo obſerv'd, that the beſt ſort of Oyl-Olive is almoſt taſtleſs, and yet I need not tell you how exceedingly diſtant in Nature Oyle is from Water. The Liquor into which I told you, upon the Relation of *Lully* an

an Eye-witneſs, that Mercury might be Tranſmuted, has ſometimes but a very Languid, if any Taſt; and yet its Operations even upon ſome Mineral Bodies are very peculiar. Quickſilver it ſelf alſo, though the Corpuſcles it conſiſts of be ſo very ſmall, as to get into the Pores of that Cloſeſt and compacteſt of Bodies, Gold, is yet (you know) altogether Taſtleſs. And our *Helmont* ſeveral times tells us, that fair Water, wherein a little Quantity of Quickſilver has lain for ſome time, though it acquire no certain Taſt or other ſenſible Quality from the Quickſilver; Yet it has a power to deſtroy wormes in human Bodies; which he does much, but not cauſeleſsly extoll. And I remember, a great Lady, that had been Eminent for her Beauty in Divers Courts, confeſs'd to me, that this inſipid Liquor was of all innocent waſhes for the Face the beſt that ſhe ever met with.

And here let me conclude my Diſcourſe, concerning ſuch waters or Liquors as I have hitherto been examining, with theſe two Conſiderations. Whereof the firſt is, That by reaſon of our being wont to drink nothing but Wine,

Wine, Bear, Cider, or other ſtrongly taſted Liquors, there may be in ſeveral of thoſe Liquors, that are wont to paſs for inſipid Phlegme, very peculiar and Diſtinct Taſts, though unheeded (and perhaps not to be perceiv'd) by Us. For to omit what Naturaliſts affirm of Apes, (and which probably may be true of divers other Animals) that they have a more exquiſite palate than Men: among Men themſelves, thoſe that are wont to drink nothing but water, may (as I have try'd in my ſelf) Diſcern very ſenſibly a great Difference of Taſts in ſeveral waters, which one unaccuſtomed to drink water would take to be all alike inſipid. And this is the *firſt* of my two Conſiderations. The Other is, That it is not impoſſible that the Corpuſcles, into which a body is diſſipated by the Fire, may by the Operation of the ſame fire have their figures ſo altered, or may be by aſſociations with one another brought into little Maſſes of ſuch a Size and Shape, as not to be fit to make ſenſible Impreſſions on the Tongue. And that you may not think ſuch alterations impoſſible, be pleaſed to conſider with me, that not only

only the ſharpeſt Spirit of Vinegar having diſſolved as much Corall as it can, will Coagulate with it into a Subſtance, which, though ſoluble in water like ſalt, is incomparably leſs ſtrongly Taſted than the Vinegar was before; but (what is more conſiderable) though the Acid ſalts that are carried up with Quick-ſilver in the preparation of common ſublimate are ſo ſharp, that being moiſtened with water it will Corrode ſome of the Merals themſelves; yet this Corroſive Sublimate being twice or thrice re-ſublim'd with a full proportion of inſipid Quickſilver, Conſtitutes (as you know) that Factitious Concrete which the Chymiſts call *Mercurius dulcis*; not becauſe it is ſweet, but becauſe the ſharpneſs of the Corroſive Salts is ſo taken away by their Combination with the Mercurial Corpuſcles, that the whole mixture when it is prepar'd is judg'd to be inſipid.

And thus (continues *Carneades*) having given you ſome Reaſons why I refuſe to admit Elementary water for a conſtant Ingredient of Mixt Bodies, it will be eaſie for me to give you an Account why I alſo reject Earth.

For

For firſt, it may well be ſuſpected that many Subſtances paſs among Chymiſts under the name of Earth, becauſe, like it, they are Dry, and Heavy, and Fixt, which yet are very farr from an Elementary Nature. This you will not think improbable, If you recall to mind what I formerly told you concerning what Chymiſts call the Dead Earth of things, and eſpecially touching the copper to be drawn from the *Caput Mortuum* of Vitriol; And if alſo you allow me to ſubjoyne a caſual but memorable Experiment made by *Johannes Agricola* upon the *Terra Damnata* of Brimſtone. Our Author then tells us (in his notes upon *Popius*) that in the year 1621 he made an Oyle of Sulphur; the remaining *Fæces* he reverberated in a moderate Fire fourteen dayes; afterwards he put them well lured up in a Wind Oven, and gave them a ſtrong Fire for ſix hours, purpoſing to calcine the *Fæces* to a perfect Whiteneſs, that he might make ſomething elſe out of them. But coming to break the pot, he found above but very little *Fæces*, and thoſe Grey and not White; but beneath there lay a fine Red *Regulus* which

which he first marvell'd at and knew not what to make of, being well assured that not the least thing, besides the *Fæces* of the Sulphur, came into the pot; and that the Sulphur it self had only been dissolv'd in Linseed Oyle; this *Regulus* he found heavy and malleable almost as Lead; having caus'd a Goldsmith to draw him a Wire of it, he found it to be of the Fairest copper, and so rightly colour'd, that a Jew of *Prague* offer'd him a great price for it. And of this Metal he saies he had 12 *loth* (or six ounces) out of one pound of Ashes or *Fæces*. And this story may well incline us to suspect that since the *Caput Mortuum* of the Sulphur was kept so long in the fire before it was found to be any thing else than a *Terra damnata*, there may be divers other Residences of Bodies which are wont to pass only for the Terrestrial *Fæces* of things, and therefore to be thrown away as soon as the Distillation or Calcination of the Body that yeelded them is ended; which yet, if they were long and Skilfully examin'd by the fire, would appear to be differing from Elementary Earth. And I have taken notice of the un-

unwarrantable forwardness of common Chymists to pronounce things useless *Fæces*, by observing how often they reject the *Caput Mortuum* of Verdegrease; which is yet so farr from deserving that Name, that not only by strong fires and convenient Additaments it may in some hours be reduc'd into copper, but with a certain Flux Powder I sometimes make for Recreation, I have in two or three minutes obtain'd that Metal from it. To which I may add, that having for tryall sake kept Venetian Talck in no less a heat than that of a glass Furnace, I found after all the Brunt of the fire it had indur'd, the remaining Body, though brittle and discolour'd, had not lost very much of its former Bulke, and seem'd still to be nearer of kin to Talck than to meer Earth. And I remember too, that a candid Mineralist, famous for his skill in trying of Oars, requesting me one day to procure him a certain *American* Mineral Earth of a *Virtuoso*, who he thought would not refuse me; I enquir'd of him why he seem'd so greedy of it: he confess'd to me that this Gentleman having brought that Earth to the publick Say-Masters;

and they upon their being unable by any means to bring it to fusion or make it fly away, he (the Relator) had procur'd a little of it; and having try'd it with a peculiar Flux, separated from it neer a third part of pure Gold; so great mistakes may be committed in hastily concluding things to be Useless Earth.

Next, it may be suppos'd, That as in the Resolution of Bodies by the Fire some of the dissipated Parts may, by their various occursion occasion'd by the heat, be brought to stick together so closely as to constitute Corpuscles too heavy for the Fire to carry away; the aggregate of which Corpuscles is wont to be call'd Ashes or Earth; So other Agents may resolve the Concrete into Minute Parts after so differing a manner, as not to produce any *Caput Mortuum*, or dry and heavy Body. As you may remember *Helmont* above inform'd us, that with his great Dissolvent he divided a Coal into two liquid and volatile Bodies, æquiponderant to the Coal, without any dry or fixt Residence at all.

And indeed, I see not why it should be necessary that all Agents that resolve Bodies

Bodies into portions of differing qualifi'd matter must work on them the same way, and divide them into just such parts, both for nature and Number, as the Fire dissipates them into. For since, (as I noted before) the Bulk and shape of the small Parts of bodies, together with their Fitness and unfitness to be easily put into Motion, may make the liquors or other substances such Corpuscles compose, as much to differ from each other as do some of the Chymical principles: Why may not something happen in this case, not unlike what is usuall in the grosser divisions of bodies by Mechanical Instruments? Where we see that some Tools reduce Wood, for Instance, into parts of several shapes, bigness, and other qualities, as Hatchets and Wedges divide it into grosser parts; some more long and slender, as splinters; and some more thick and irregular, as chips; but all of considerable bulk; but Files and Saws make a Comminution of it into Dust; which, as all the others, is of the more solid sort of parts; whereas others divide it into long and broad, but thin and flexible parts, as do *Planes*: And of this kind of parts it self there is also a

variety according to the Difference of the Tools employ'd to work on the Wood; the ſhavings made by the *plane* being in ſome things differing from thoſe ſhives or thin and flexible pieces of wood that are obtain'd by *Borers*, and theſe from ſome others obtainable by other Tools. Some Chymical Examples applicable to this purpoſe I have elſewhere given you. To which I may add, that whereas, in a mixture of Sulphur & Salt of Tartar well melted and incorporated together, the action of pure ſpirit of Wine digeſted on it is to ſeparate the ſulphureous from the Alcalizate Parts, by diſſolving the former and leaving the latter: the action of Wine (probably upon the ſcore of its copious Phlegme) upon the ſame mixture is to divide it into Corpuſcles conſiſting of both Alcalizate and Sulphureous Parts united. And if it be objected, that this is but a Factitious Concrete; I anſwer, that however the inſtance may ſerve to illuſtrate what I propos'd, if not to prove it; and that Nature her ſelf doth in the bowels of the Earth make Decompounded Bodies, as we ſee in Vitriol, Cinnaber, and even in Sulphur it ſelf; I will not urge that the

the Fire divides new Milk into five differing Subſtances; but Runnet and Acid Liquors divide it into a Coagulated matter and a thin Whey: And on the other ſide churning divides it into Butter and Butter-milk, which may either of them yet be reduc'd to other ſubſtances differing from the former. I will not preſs this, I ſay, nor other inſtances of this Nature, becauſe I cannot in few words anſwer what may be objected, that theſe Concretes ſequeſtred without the help of the Fire may by it be further divided into Hypoſtatical Principles. But I will rather repreſent, That whereas the ſame ſpirit of Wine will diſſociate the Parts of Camphire, and make them one Liquor with it ſelf; *Aqua Fortis* will alſo disjoyne them, and put them into motion; but ſo as to keep them together, and yet alter their Texture into the form of an Oyle. I know alſo an uncompounded Liquor, that an extraordinary Chymiſt would not allow to be ſo much as Saline, which doth (as I have try'd) from Coral it ſelf (as fixt as divers judicious writers aſſert that Concrete to be) not only obtain a noble Tincture without the Intervention of Nitre or o-

ther Salts; but will carry over the Tincture in Distillation. And if some reasons did not forbid me, I could now tell you of a *Menstruum* I make my self, that doth more odly dissociate the parts of Minerals very fixt in the fire. So that it seems not incredible, that there may be some Agent or way of Operation found, whereby this or that Concrete, if not all Firme Bodies, may be resolv'd into parts so very minute and so apt to stick close to one another, that none of them may be fixt enough to stay behind in a strong Fire, and to be incapable of Distillation; nor consequently to be look'd upon as Earth. But to return to *Helmont*; the same Author somewhere supply's me with another Argument against the Earth's being such an Element as my Adversaries would have it. For he somewhere affirmes, that he can reduce all the Terrestrial parts of mixt bodies into insipid water; whence we may argue against the Earths being one of their Elements, even from that Notion of Elements, which you may remember *Philoponus* recited out of *Aristotle* himself, when he lately disputed for his Chymists against *Themistius*. And here we may on

on this occasion consider, that since a Body, from which the Fire hath driven away its looser parts, is wont to be look'd upon as Earth, upon the Account of its being endow'd with both these qualities, Tastlesnesse and Fixtnesse, (for Salt of Tartar, though Fixt, passes not among the Chymists for Earth, because 'tis strongly Tasted) if it be in the power of Natural Agents to deprive the *Caput Mortuum* of a body of either of those two Qualities, or to give them both to a portion of matter that had them not both before, the Chymists will not easily define what part of a resolv'd Concrete is Earth, and make out, that that Earth is a primary, simple, and indestructible Body. Now there are some cases wherein the more skilful of the Vulgar Chymists themselves pretend to be able, by repeated Cohobations and other fit Operations, to make the Distilled parts of a Concrete bring its own *Caput Mortuum* over the Helme, in the forme of a Liquor, in which state being both Fluid and Volatile, you will easily beleeve it would not be taken for Earth. And indeed by a skilful, but not Vulgar, way of managing some Concretes, there may be more ef-

fected in this kind, than you perhaps would easily think. And on the other side, that either Earth may be Generated, or at least Bodies that did not before appear to be neer Totally Earth, may be so alter'd as to pass for it, seems very possible, if *Helmont* have done that by Art which he mentions in several places; especially where he saies that he knowes waies whereby Sulphur once dissolv'd is all of it fix'd into a Terrestrial Powder, and the whole Body of Salt-Petre may be turn'd into Earth: Which last he elsewhere saies is Done by the Odour only of a certain Sulphureous Fire. And in another place He mentions one way of doing this, which I cannot give you an Account of; because the Materials I had prepar'd for Trying it, were by a Servants mistake unhappily thrown away.

Novi item modos quibus totum Sal-petræ in terram convertitur, totumque Sulphur semel dissolutum fixetur in Pulverem terreum. Helmont in Compl. atque Mist. Elementor. Sect. 24.

And these Last Arguments may be confirm'd by the Experiment I have often had occasion to mention concerning the Mint I produc'd out of Water. And partly by an Observation of *Rondeletius*

deletius concerning the Growth of Animals also, Nourish'd but by Water, which I remember'd not to mention, when I discours'd to you about the Production of things out of Water. This Diligent Writer then in his instructive book of fishes, affirmes That his Wife kept a fish in a Glass of water without any other Food for three years; in which space it was constantly augmented, till at last it could not come out of the Place at which it was put in, and at length was too big for the glass it self, though that were of a large capacity. And because there is no just reason to doubt, that this Fish, if Distill'd would have yeelded the like differing substances with other Animals; And However, because the Mint, which I had out of water, afforded me upon Distillation a good quantity of Charcoal; I think I may from thence inferr, that Earth it self may be produc'd out of Water; or if you please, that water may be transmuted into Earth; and consequently, that though it could be prov'd, that Earth is an Ingredient actually in-existent in the Vegetable and Animal Bodies whence it may be obtain'd by Fire: yet it would not

Lib. 1. cap. 2.

not neceſſarily follow, that Earth, as a pre-exiſtent Element does with other Principles convene to make up thoſe Bodies whence it ſeems to have been ſeparated.

After all is ſaid (ſaies *Eleutherius*) I have yet ſomething to Object, that I cannot but think conſiderable, ſince *Carneades* himſelf alledg'd it as ſuch; for, (continues *Eleutherius* ſmiling) I muſt make bold to try whether you can as luckily anſwer your own Arguments, as thoſe of your Antagoniſts, I mean (purſues he) that part of your Conceſſions, wherein you cannot but remember, that you ſupply'd your Adverſaries with an Example to prove that there may be Elementary Bodies, by taking Notice that Gold may be an Ingredient in a multitude of differing Mixtures, and yet retain its Nature, notwithſtanding all that the Chymiſts by their Fires and Corroſive Waters are able to do to Deſtroy it.

I ſufficiently intimated to you at that time (replies *Carneades*) that I propos'd this Example, chiefly to ſhew you how Nature may be Conceived to have made Elements, not to prove that ſhe actually

actually has made any; And you know, that *a poſſe ad eſſe* the Inference will not hold. But (continues *Carneades*) to anſwer more directly to the Objection drawn from Gold, I muſt tell You, that though I know very well that divers of the more ſober Chymiſts have complain'd of the Vulgar Chymiſts, as of Mountebanks or Cheats, for pretending ſo vainly, as hitherto they have done, to Deſtroy Gold; Yet I know a certain *Menſtruum* (which our Friend has made, and intends ſhortly to communicate to the Ingenious) of ſo piercing and powerful a Quality, That if notwithſtanding much care, and ſome skill, I did not much deceive my ſelf, I have with it really deſtroy'd even refin'd Gold, and brought it into a Metalline Body of another colour and Nature, as I found by Tryals purpoſely made. And if ſome juſt Conſiderations did not for the preſent Forbid it, I could Perchance here ſhew you by another Experiment or Two of my own Trying, that ſuch *Menſtruums* may be made as to entice away and retain divers parts from Bodies, which even the more Judicious and Experienc'd *Spagyriſts* have pronounc'd

nounc'd irresoluble by the Fire. Thoug (which I Desire you would mark) i neither of these Instances, the Gold o Precious Stones be Analyz'd into any o the *Tria Prima*, but only Reduc'd t new Concretes. And indeed there i a great Disparity betwixt the Operati ons of the several Agents whereby the Parts of a Body come to be Dissipated. As if (for Instance) you dissolve the pu rer sort of Vitriol in common Water, the Liquor will swallow up the Mineral, and so Dissociate its Corpuscles, that they will seem to make up but one Li quor with those of the water; and yet each of these Corpuscles retains its Na ture and Texture, and remains a Vitri olate and Compounded Body. But if the same Vitriol be exposed to a strong Fire, it will then be divided not only, as before, into smaller parts, but into He terogeneous Substances, each of the Vi triolate Corpuscles that remain'd en tire in the water, being it self upon the Destruction of its former Texture Dissi pated or divided into new Particles of differing Qualities. But Instances more fitly applicable to this purpose I have already given you. Wherefore to re turn

urn to what I told you about the De truction of Gold; that Experiment nvites me to Represent to you, that Though there were either Saline, or Sulphureous, or Terrestrial Portions of Matter, whose parts were so small, so irmly united together, or of a figure so it to make them cohere to one another, (as we see that in quicksilver broken in o little Globes, the Parts brought to ouch one another do immediately re mbody) that neither the Fire, nor the u ual Agents, employ'd by Chymists, are piercing enough to divide their Parts, so as to destroy the Texture of the single Corpuscles; yet it would not necessarily follow, That such Permanent Bodies were Elementary; since 'tis possible there may be Agents found in Nature, some of whose parts may be of such a Size and Figure as to take better Hold of some parts of these seemingly Elemen tary Corpuscles than these parts do of the rest, and Consequently may carry away such parts with them, and so dis solve the Texture of the Corpuscle by pulling its parts asunder. And if it be said, that at least we may this way dis cover the Elementary Ingredients of

things

things, by obſerving into what Subſtances theſe Corpuſcles, that were reputed pure are divided; I anſwer, that 'tis not neceſſary that ſuch a Diſcovery ſhould be practicable. For if the Particles of the Diſſolvent do take ſuch firm hold of thoſe of the Diſſolved Body, they muſt conſtitute together new Bodies, as well as Deſtroy the Old; and the ſtrict Union, which according to this *Hypotheſis* may well be ſuppos'd betwixt the Parts of the Emergent Body, will make it as Little to be Expected that they ſhould be pull'd aſunder, but by little Parts of matter, that to Divide them Aſſociate Themſelves and ſtick extreamly cloſe to thoſe of them which they ſever from their Former Adherents. Beſides that it is not impoſſible, that a Corpuſcle ſuppos'd to be Elementary may have its Nature changed, without ſuffering a Divorce of its parts, barely by a new Texture Effected by ſome powerful Agent; as I formerly told you, the ſame portion of matter may eaſily by the Operation of the Fire be turn'd at pleaſure into the form of a Brittle and Tranſparent, or an Opacous and Malleable Body.

And

And indeed, if you conſider how farr the bare Change of Texture, whether made by Art or Nature (or rather by Nature with or without the aſſiſtance of man) can go in producing ſuch New Qualities in the ſame parcel of matter, and how many inanimate Bodies (ſuch as are all the Chymical productions of the Fire) we know are Denominated and Diſtinguiſh'd not ſo much by any Imaginary Subſtantial Form, as by the aggregate of theſe Qualities; If you conſider theſe Things, I ſay, and that the varying of either figure, or the Size, or the Motion, or the Situation, or Connexion of the Corpuſcles whereof any of theſe Bodies is compos'd, may alter the Fabrick of it, you will poſſibly be invited to ſuſpect with me, that there is no great need that Nature ſhould alwaies have Elements before hand, whereof to make ſuch Bodies as we call mixts. And that it is not ſo eaſie as Chymiſts and others have hitherto Imagin'd, to diſcern, among the many differing Subſtances that may without any extraordinary skill be obtain'd from the ſame portion of matter, Which ought to be eſteemed excluſively to all the reſt,

its

its in-existent Elementary Ingredients; much less to determine what Primogeneal and Simple Bodies convened together to compose it. To exemplify this, I shall add to what I have already on several occasions Represented, but this single instance.

You may remember (*Eleutherius*) that I formerly intimated to you, that besides Mint and Pompions, I produced divers other Vegetables of very differing Natures out of Water. Wherefore you will not, I presume, think it incongruous to suppose, that when a slender Vine-slip is set into the ground, and takes root there, it may likewise receive its Nutriment from the water attracted out of the earth by its roots, or impell'd by the warm'th of the Sun, or pressure of the ambient air into the pores of them. And this you will the more easily beleeve, if you ever observ'd what a strange quantity of Water will Drop out of a wound given to the Vine, in a convenient place, at a seasonable time in the Spring; and how little of Tast or Smell this *Aqua Vitis*, as Physitians call it, is endow'd with, notwithstanding what concoction or alteration it may receive in its passage through

through the Vine, to discriminate it from common Water. Supposing then this Liquor, at its first entrance into the roots of the Vine, to be common Water; Let us a little consider how many various Substances may be obtain'd from it; though to do so, I must repeat somewhat that I had a former occasion to touch upon. And first, this Liquor being Digested in the plant, and assimilated by the several parts of it, is turn'd into the Wood, Bark, Pith, Leaves, &c. of the Vine; The same Liquor may be further dry'd, and fashion'd into Vine-buds, and these a while after are advanced unto sowre Grapes, which express'd yeeld Verjüice, a Liquor very differing in several qualities both from Wine and other Liquors obtainable from the Vine: These sowre Grapes, being by the heat of the Sun concocted and ripened, turne to well tasted Grapes; These, if dry'd in the Sun and Distill'd, afford a fætid Oyle and a piercing *Empyreumatical* Spirit, but not a Vinous Spirit; These dry'd Grapes or Raisins, boyl'd in a convenient proportion of Water, make a sweet Liquor, which, being betimes distill'd, afford an Oyle & Spirit much like

those of the Raisins themselves; If the juice of the Grapes be squeez'd out and put to Ferment, it first becomes a sweet and turbid Liquor, then grows lesse sweet and more clear, and then affords in common Distillations not an Oyle but a Spirit, which, though inflamable like Oyle, differs much from it, in that it is not fat, and that it will readily mingle with Water. I have likewise without Addition obtain'd in processe of time (and by an easie way which I am ready to teach you) from one of the noblest sorts of Wine, pretty store of pure and curiously figured Chrystals of Salt, together with a great proportion of a Liquor as sweet almost as Hony; and these I obtained not from Must, but True and sprightly Wine; besides the Vinous Liquor, the fermented Juice of Grapes is partly turned into liquid Dregs or Leeze, and partly into that crust or dry feculancy that is commonly called Tartar; and this Tartar may by the Fire be easily divided into five differing substances; four of which are not Acid, and the other not so manifestly Acid as the Tartar it self; The same Vinous Juice after some time, especially if it be not carefully kept

kept, Degenerates into that very sowre Liquor called Vinegar; from which you may obtain by the Fire a Spirit and a Chrystalline Salt differing enough from the Spirit and Lixiviate Salt of Tartar. And if you poure the Dephlegm'd Spirit of the Vinegar upon the Salt of Tartar, there will be produc'd such a Conflict or Ebullition, as if there were scarce two more contrary Bodies in Nature; and oftentimes in this Vinegar you may observe part of the matter to be turned into an innumerable company of swimming Animals, which our Friend having divers years ago observed, hath in one of his Papers taught us how to discover clearly without the help of a *Microscope*.

Into all these various Schemes of matter, or differingly Qualifyed Bodies, besides divers others that I purposely forbear to mention, may the Water, that is imbib'd by the roots of the Vine, be brought, partly by the formative power of the plant, and partly by supervenient Agents or Causes, without the visible concurrence of any extraneous Ingredient; but if we be allow'd to add to the Productions of this transmuted Water a few other substances, we may much

encreaſe the Variety of ſuch Bodies; although in this ſecond ſort of Productions, the Vinous parts ſeem ſcarce to retain any thing of the much more fix'd Bodies wherewith they were mingl'd, but only to have by their Mixture with them acquir'd ſuch a Diſpoſition, that in their receſs occaſion'd by the Fire they came to be alter'd as to ſhape, or Bigneſs, or both, and aſſociated after a New manner. Thus, as I formerly told you, I did by the Addition of a *Caput Mortuum* of Antimony, and ſome other Bodies unfit for Diſtillation, obtain from crude Tartar, ſtore of a very Volatile and Chryſtalline Salt, differing very much in ſmell and other Qualities from the uſuall ſalts of Tartar.

But (ſaies *Lleutherius*, interrupting him at theſe Words) if you have no reſtraint upon you, I would very gladly before you go any further, be more particularly inform'd, how you make this Volatile Salt, becauſe (you know) that ſuch Multitudes of Chymiſts have by a ſcarce imaginable variety of waies, attempted in Vain the Volatilization of the Salt of Tartar, that divers learned *Spagyriſts* ſpeak as if it were impoſſible to

to make any thing out of Tartar, that ſhall be Volatile in a Saline Forme, or, as ſome of them expreſs it, *in forma ſiccа*. I am very farr from thinking (anſwers *Carneades*) that the Salt I have mention'd is that which *Paracelſus* and *Helmont* mean, when they ſpeak of *Sal Tartari Volatile*, and aſcribe ſuch great things to it. For the Salt I ſpeak of falls extreamly ſhort of thoſe Vertues, not ſeeming in its Taſt, Smel, and other Obvious Qualities, to differ very much (though ſomething it does differ) from Salt of Harts-horn, and other Volatile Salts drawn from the Diſtill'd Parts of Animals. Nor have I yet made Tryals enough to be ſure, that it is a pure Salt of Tartar without participating any thing at all of the Nitre, or Antimony. But becauſe it ſeems more likely to proceed from the Tartar, than from any of the other Ingredients, and becauſe the Experiment is in it ſelf not Ignoble, and Luciferous enough (as ſhewing a new way to produce a Volatile Salt, contrary to Acid Salts, from Bodies that otherwiſe are Obſerv'd to yeeld no ſuch Liquor, but either only, or chiefly, Acid ones,) I

ſhall, to ſatisfie you, acquaint you before any of my other Friends with the way I now uſe (for I have formerly us'd ſome others) to make it.

Take then of good Antimony, Salt-Petre and Tartar, of each an equal Weight, and of Quicklime Halfe the Weight of any one of them; let theſe be powder'd and well mingl'd; this done, you muſt have in readineſs a long neck or Retort of Earth, which muſt be plac'd in a Furnace for a naked Fire, and have at the top of it a hole of a convenient Bigneſs, at which you may caſt in the Mixture, and preſently ſtop it up again; this Veſſel being fitted with a large Receiver muſt have Fire made under it, till the bottom of the ſides be red hot, and then you muſt caſt in the above prepar'd Mixture, by aboute halfe a ſpoonful (more or leſs) at a time, at the hole made for that purpoſe; which being nimbly ſtopt, the Fumes will paſs into the Receiver and condenſe there into a Liquor, that being rectifi'd will be of a pure Golden Colour, and carry up that colour to a great height; this Spirit abounds in the Salt I told you of, part of which may eaſily enough be ſeparated by

by the way I uſe in ſuch caſes, which is, to put the Liquor into a glaſs Egg, or bolthead with a long and narrow Neck. For if this be plac'd a little inclining in hot ſand, there will ſublime up a fine Salt, which, as I told you, I find to be much of kin to the Volatile Salts of Animals: For like them it has a Saltiſh, not an Acid Salt; it hiſſes upon the Affuſion of Spirit of Nitre, or Oyle of Vitriol; it precipitates Corals Diſſolv'd in Spirit of Vinegar; it turnes the blew Syrup of Violets immediately green; it preſently turnes the Solution of Sublimate into a Milkie whiteneſs; and in ſumm, has divers Operations like thoſe that I have obſerv'd in that ſort of Salts to which I have reſembled it: and is ſo Volatile, that for Diſtinction ſake, I call it *Sal Tartari Fugitivus.* What vertues it may have in Phyſick I have not yet had the opportunity to try; but I am apt to think they will not be deſpicable. And beſides that, a very Ingenious Friend of mine tells me he hath done great matters againſt the ſtone with a Preparation not very much Differing from ours: a very Experienc'd Germane Chymiſt finding that I was

unacquainted with the waies of making this ſalt, told me that in a great City in his Country, a noted Chymiſt prizes it ſo highly, that he had a while ſince procur'd a Priviledge from the Magiſtrates, that none but He, or by his Licence, ſhould vent a Spirit made almoſt after the ſame Way with mine, ſave that he leaves out one of the Ingredients, namely the Quick-lime. But, (continues *Carneades*) to reſume my Former Diſcourſe where your Curioſity interrupted it;

Tis alſo a common practice in *France* to bury thin Plates of Copper in the Marc (as the French call it) or Husks of Grapes, whence the Juice has been ſqueez'd out in the Wine-preſs; and by this means the more ſaline parts of thoſe Husks, working by little and little upon the Copper, Coagulate Themſelves with it into that Blewiſh Green Subſtance we in Engliſh call Verdigreaſe. Of which I therefore take Notice, becauſe having Diſtill'd it in a Naked Fire, I found, as I expected, that by the Aſſociation of the Saline with the Metalline parts, the former were ſo alter'd, that the Diſtill'd Liquor, even without Rectification, ſeem'd by ſmell and

and Taſt, ſtrong almoſt like *Aqua Fortis*, and very much ſurpaſſed the pureſt and moſt Rectifi'd Spirit of Vinegar that ever I made. And this Spirit I therefore aſcribe to the ſalt of the Husks alter'd by their Co-Mixture with the Copper (though the Fire afterwards Divorce and Tranſmute them) becauſe I found this latter in the bottom of the Retort in the Forme of a *Crocus* or reddiſh powder: And becauſe Copper is of too ſluggiſh a Nature to be forc'd over in cloſe Veſſels by no ſtronger a heat. And that which is alſo ſomewhat Remarkable in the Diſtillation of good Verdigreaſe, (or at leaſt of that ſort that I us'd) is this, that I Never could obſerve that it yeelded me any oyl, (unleſs a little black ſlime which was ſeparated in Rectification may paſs for Oyle) though both Tartar and Vinegar, (eſpecially the former) will by Diſtillation yeeld a Moderate proportion of it. If likewiſe you poure Spirit of Vinegar upon Calcin'd Lead, the Acid Salt of the Liquor will by its Commixture with the Metalline parts, though inſipid, acquire in few hours a more than Saccharine ſweetneſs; and theſe Saline

parts

parts being by a ſtrong Fire Diſtill'd from the Lead wherewith they were imbody'd, will, as I formerly alſo noted to a Different purpoſe, leave the Metal behind them alter'd in ſome qualities from what it was, and will themſelves aſcend, partly in the Form of an unctuous Body or Oyle, partly in that of Phlegme, but for the greateſt part in the Forme of a ſubtile Spirit, indow'd, beſides divers new Qualities which I am not now willing to take notice of, with a ſtrong ſmell very much other than that of Vinegar, and a piercing taſt quite differing both from the Sowreneſs of the Spirit of Vinegar, and the Sweetneſs of the Sugar of Lead.

To be ſhort, as the difference of Bodies may depend meerly upon that of the ſchemes whereinto their Common matter is put; So the ſeeds of Things, the Fire and the other Agents are able to alter the minute parts of a Body (either by breaking them into ſmaller ones of differing ſhapes, or by Uniting together theſe Fragments with the unbroken Corpuſcles, or ſuch Corpuſcles among Themſelves) and the ſame Agents partly by Altering the ſhape or bigneſs

bigneſs of the Conſtituent Corpuſcles of a Body, partly by driving away ſome of them, partly by blending others with them, and partly by ſome new manner of connecting them, may give the whole portion of matter a new Texture of its minute parts, and thereby make it deſerve a new and Diſtinct name. So that according as the ſmall parts of matter recede from each other, or work upon each other, or are connected together after this or that determinate manner, a Body of this or that denomination is produced, as ſome other Body happens thereby to be alter'd or deſtroy'd.

Since then thoſe things which Chymiſts produce by the help of the Fire are but inanimate Bodies; ſince ſuch fruits of the Chymiſts skill differ from one another but in ſo few qualities that we ſee plainly that by fire, and other Agents we can employ, we can eaſily enough work as great alterations upon matter, as thoſe that are requiſite to change one of theſe Chymical Productions into another; Since the ſame portion of matter may without being Compounded with any extraneous Body, or at leaſt Element, be made to put on ſuch a variety

riety of formes, and consequently to be (successively) turn'd into so many differing Bodies; And since the matter, cloath'd with so many differing formes, was originally but water, and that in its passage through so many transformations, it was never reduc'd into any of those substances which are reputed to be the Principles or Elements of mixt Bodies, except the violence of the fire, which it self divides not Bodies into perfectly simple or Elementary substances, but into new Compounds; Since, I say, these things are so, I see not why we must needs beleeve that there are any Primogeneal & simple Bodies, of which, as of Pre-existent Elements, Nature is obliged to compound all others. Nor do I see why we may not conceive that she may produce the Bodies accounted mixt out of one another by Variously altering and contriving their minute parts, without resolving the matter into any such simple or Homogeneous substances as are pretended. Neither, to dispatch, do I see why it should be counted absurd to think, that when a Body is resolv'd by the Fire into its suppos'd simple Ingredients, those substances are not true and proper

proper Elements, but rather were, as it were, Accidentally produc'd by the fire, which by Dissipating a Body into minute Parts does, if those parts be shut up in Close Vessels, for the most part necessarily bring them to Associate Themselves after another manner than before, and so bring Them into Bodies of such Different Consistences, as the Former Texture of the Body and Concurrent Circumstances make such disbanded particles apt to Constitute; as experience shews us (and I have both noted it, and prov'd it already) that as there are some Concretes whose parts, when dissipated by fire, are fitted to be put into such Schemes of matter as we call Oyle, and Salt, and Spirit; So there are others, such as are especially the greatest part of Minerals, whose Corpuscles being of another Size or figure, or perhaps contriv'd another Way, will not in the Fire yeeld Bodies of the like Consistences, but rather others of differing Textures; Not to mention, that from Gold and some other Bodies, we see not that the Fire separates any Distinct Substances at all; or that even those Similar Parts of Bodies

Bodies, which the Chymists Obtain by the Fire, are the Elements whose names they bear, but Compound Bodies, upon which, for their resemblance to them in consistence, or some other obvious Quality, Chymists have been pleas'd to bestow such Appellations.

THE

THE CONCLUSION.

THese last Words of *Carneades* being soon after follow'd by a noise which seem'd to come from the place where the rest of the Company was, he took it for a warning, that it was time for him to conclude or break off his Discourse; and told his Friend; By this time I hope you see, *Eleutherius*, that if *Helmonts* Experiments be true, it is no absurdity to question whether that Doctrine be one, that doth not Assert Any Elements in the sence before explain'd. But because that, as divers of my Arguments suppose the marvellous power of the *Alkahest* in the Analyzing of Bodies, so the Effects ascrib'd to that power are so unparallell'd and stupendous,

dous, that though I am not sure but that there may be such an Agent, yet little less than ἀνοφία seems requisite to make a man sure there is. And consequently I leave it to you to judge, how farr those of my Arguments that are built upon *Alkahestical* Operations are weakned by that Liquors being Matchless; and shall therefore desire you not to think that I propose this Paradox that rejects all Elements, as an Opinion equally probable with the former part of my discourse. For by that, I hope, you are satisfied, that the Arguments, wont to be brought by Chymists to prove That all Bodies consist of either Three Principles, or Five, are far from being so strong as those that I have employ'd to prove, that there is not any certain and Determinate number of such Principles or Elements to be met with Universally in all mixt Bodies. And I suppose I need not tell you, that these *Anti-Chymical* Paradoxes might have been manag'd more to their Advantage; but that having not confin'd my Curiosity to Chymical Experiments, I, who am but a young Man, and younger Chymist, can yet be but slenderly furnished with them,

them, in reference to so great and difficult a Task as you impos'd upon me: Besides that, to tell you the Truth, I durst not employ some even of the best Experiments I am acquainted with, because I must not yet disclose them; but however, I think I may presume that what I have hitherto Discoursed will induce you to think, that Chymists have been much more happy in finding Experiments than the Causes of them; or in assigning the Principles by which they may best be explain'd. And indeed, when in the writing of *Paracelsus* I meet with such Phantastick and Un-intelligible Discourses as that Writer often puzzels & tires his Reader w^th^, father'd upon such excellent Experiments, as though he seldom clearly teaches, I often find he knew; methinks the Chymists, in their searches after truth, are not unlike the Navigators of *Solomons Tarshish* Fleet, who brought home from their long and tedious Voyages, not only Gold, and Silver, and Ivory, but Apes and Peacocks too; For so the Writings of several (for I say not, all) of your Hermetick Philosophers present us, together with divers Substantial and

noble Experiments, Theories, which either like Peacocks feathers make a great ſhew, but are neither ſolid nor uſeful; or elſe like Apes, if they have ſome appearance of being rational, are blemiſh'd with ſome abſurdity or other, that when they are *Attentively* conſider'd, make them appear Ridiculous.

Carneades having thus finiſh'd his Diſcourſe againſt the received Doctrines of the *Elements*. *Eleutherius* judging he ſhould not have time to ſay much to him before their ſeparation, made ſome haſte to tell him; I confeſs, *Carneades*, that you have ſaid more in favour of your Paradoxes than I expected. For though divers of the Experiments you have mention'd are no ſecrets, and were not unknown to me, yet beſides that you have added many of your own unto them, you have laid them together in ſuch a way, and apply'd them to ſuch purpoſes, and made ſuch Deductions From them, as I have not Hitherto met with.

But though I be therefore inclin'd to think, that *Philoponus*, had he heard you, would ſcarce have been able in all points

points to defend the Chymical *Hypotheſis* againſt the arguments wherewith you have oppos'd it; yet methinks that however your Objections ſeem to evince a great part of what they pretend to, yet they evince it not all; and the numerous tryals of thoſe you call the vulgar Chymiſts, may be allow'd to prove ſomething too.

Wherefore, if it be granted you that you have made it probable,

Firſt, that the differing ſubſtances into which mixt Bodies are wont to be reſolved by the Fire are not of a pure and an Elementary nature, eſpecially for this Reaſon, that they yet retain ſo much of the nature of the Concrete that afforded them, as to appear to be yet ſomewhat compounded, and oftentimes to differ in one Concrete from Principles of the ſame denomination in another:

Next, that as to the number of theſe differing ſubſtances, neither is it preciſely three, becauſe in moſt Vegetable and Animal bodies Earth and Phlegme are alſo to be found among their Ingredients; nor is there any one determinate number into which the Fire (as it is

wont to be employ'd) does precisely and universally resolve all compound Bodies whatsoever; as well Minerals as others that are reputed perfectly mixt:

Lastly, that there are divers Qualities which cannot well be refer'd to any of these Substances, as if they primarily resided in it and belong'd to it; and some other qualities, which though they seem to have their chief and most ordinary residence in some one of these Principles or Elements of mixt Bodies, are not yet so deducible from it, but that also some more general Principles must be taken in to explicate them:

If, I say, the Chymists (continues *Eleutherius*) be so Liberall as to make you these three Concessions, I hope you will, on your part, be so civil and Equitable as to grant them these three other propositions, namely;

First, that divers Mineral Bodies, and therefore probably all the rest, may be resolv'd into a Saline, a Sulphureous, and a Mercurial part; And that almost all Vegetable and Animal Concretes may, if not by the Fire alone, yet by a skilfull Artist Employing the Fire as his

his chief Instrument, be divided into five differing Substances, Salt, Spirit, Oyle, Phlegme and Earth; of which the three former by reason of their being so much more Operative than the Two Latter, deserve to be Lookt upon as the Three active Principles, and by way of Eminence to be call'd the three principles of mixt bodies.

Next, that these Principles, Though they be not perfectly Devoid of all Mixture, yet may without inconvenience be stil'd the Elements of Compounded bodies, and bear the Names of those Substances which they most Resemble, and which are manifestly predominant in them; and that especially for this reason, that none of these Elements is Divisible by the Fire into Four or Five differing substances, like the Concrete whence it was seperated.

Lastly, That Divers of the Qualities of a mixt Body, and especially the Medical Virtues, do for the most part lodge in some One or Other of its principles, and may Therefore usefully be sought for in That Principle sever'd from the others.

And in this also (pursues *Eleutherius*) methinks

methinks both you and the Chymists may easily agree, that the surest way is to Learn by particular Experiments, what differing parts particular Bodies do consist of, and by what wayes (either Actual or potential fire) they may best and most Conveniently be Separated, as without relying too much upon the Fire alone, for the resolving of Bodies, so without fruitlessly contending to force them into more Elements than Nature made Them up of, or strip the sever'd Principles so naked, as by making Them Exquisitely Elementary to make them almost useless.'

These things (subjoynes *Ileu.*) I propose, without despairing to see them granted by you; not only because I know that you so much preferr the Reputation of *Candour* before that of subtility, that your having once suppos'd a truth would not hinder you from imbracing it when clearly made out to you; but because, upon the present occasion, it will be no disparagement to you to recede from some of your Paradoxes, since the nature and occasion of your past Discourse did not oblige you to declare your own opinions, but only to

to personate an Antagonist of the Chymists. So that (concludes he, with a smile) you may now by granting what I propose, add the Reputation of Loving the truth sincerely to that of having been able to oppose it subtilly.

Carneades's haste forbidding him to answer this crafty piece of flattery; Till I shall (saies he) have an opportunity to acquaint you with my own Opinions about the controversies I have been discoursing of, you will not I hope, expect I should declare my own sence of the Argument I have employ'd. Wherefore I shall only tell you thus much at present; that though not only an acute Naturalist, but even I my self could take plausible Exceptions at some of them; yet divers of them too are such as will not perhaps be readily answer'd, and will Reduce my Adversaries, at least, to alter and Reform their *Hypotheses*. I perceive I need not mind you that the Objections I made against the Quaternary of Elements and Ternary of Principles needed not to be oppos'd so much against the Doctrines Themselves, either of which, especially the latter, may be much more probably

bably maintain'd than hitherto it seems to have been, by those Writers for it I have met with) as against the unaccurateness and the unconcludingness of the *Analytical* Experiments vulgarly Relyed On to Demonstrate them.

And therefore, if either of the two examin'd Opinions, or any other Theory of Elements, shall upon rational and Experimental grounds be clearly made out to me; 'Tis Obliging, but not irrational, in you to Expect, that I shall not be so farr in Love with my Disquieting Doubts, as not to be content to change them for undoubted truths. And (concludes *Carneades* smiling) it were no great disparagement for a Sceptick to confesse to you, that as unsatisfy'd as the past discourse may have made you think me with the Doctrines of the Peripateticks, and the Chymists, about the Elements and Principles, I can yet so little discover what to acquiesce in, that perchance the Enquiries of others have scarce been more unsatisfactory to me, than my own have been to my self.

FINIS.

Experiments

AND

NOTES

About the

PRODVCIBLENESS

OF

Chymicall Principles;

Being Parts of an Appendix, design'd to be added to the SCEPTICAL CHYMIST.

By the Authour of that Booke.

OXFORD,
Printed by *H. Hall* for *Ric. Davis*, 1680.

The Authors Preface.

Having long since observ'd, that a great part of the erroneous Reasonings and Conclusions of Learned Men, as well about Physicall, as other Subjects, proceeds not so much from their making bad illations, as from their assuming false or uncertaine Principles, to draw their consequences from: I thought, I could scarce misspend the time I allow'd my leisure for Chymicall Studies, if I employ'd some part of it, in examining the Doctrine about the Principles of Natural Bodies. Upon this account I did, in the year 1661. venture abroad my Sceptical Chymist, *to acquaint the inquisitive with my doubts, and excite them, to a more thorow disquisition of a Subject, so considerable, as well to Natural Philosophy, as to Physick. That discourse being once published in* English, *and soone after in* Latine: *I thought fit*

fit to wait a while, that I might learn what Judgement would be made of it, and whether any of the Chymists *would return an answer to it, and in the mean while, to gratifie those that appear'd desirous of having it soon reprinted, I gathered divers Notes, (some of them considerable for bulk) to be inserted here and there, as inlargements in the next Edition, whose volume I was not unwilling somewhat to encrease, not only because I thought Truth in general, a thing worthy that the lovers of it should take pains to discover, and establish it, but because, I look'd upon the truth enquired after, in the* Sceptical Chymist, *as of no mean importance, especially since the mistakes that very many have made about it, have I fear, not only been prejudicial to Natural Philosophy, but have, by severall Men, as well Learned as Ignorant, been adopted both into the Speculations, and practise of Physitians; whose Art being conversant about the Health and Life of Man, Doctrinal errours in it, cannot but be dangerous, and therefore fit, as much as is possible, to be solicitously avoided, or remov'd. These inconveniencies I hop'd might*

wight in some measure be obviated; if it were further made appear by Experiments as well as Reasonings, that the vulgar doctrine of the Tria Prima *is at least very* questionable, *or uncertaine and very* narrow. *For the contrary persuasions, about these Principles, has misled divers Learned Men to give, and take up with precarious and superficial accounts of divers* Phænomena *of Nature, by which meanes they have been diverted from employing their Witts (wherein divers of them are happy) in the investigation of the true and fundamentall causes, the discovery whereof, would have enabled them, instead of dark and superficial, to give intelligible and particular explications of those* Phænomena, *and many others. The difference between the accounts given of the same* Phænomena, *by the Hypostatical, and by the Mechanical Principles, may be seen exemplyfied, by particular instances in other Papers; Wherefore I shall proceed to observe as to* Physick, *that besides the mistakes which I doubt, divers Learned Men have by another valuation of the Doctrine of the* Tria prima, *been led into, in relation to the causes of divers things that occur to humane Bodies, and even in Chymical*

Chymical operations; besides this I say, I fear that the too confident opinion of the Doctrine I question has made divers practitioners of Physick, *make wrong estimates of Medicines. But after I had waited a competent time, I perceiv'd no Author vouchsaf'd the* Sceptical Chymist *an answer; but a very Ingenious Man, from whom I chiefly expected it, told me, that he had indeed design'd to write one, but was hindered by considering, that I had so stated the case, that an answer could not confute that Book, by any meer Justification of the Chymists Principles, since he would be obliged also to defend the Chymical Doctrine as 'tis generally taught by the vulgar Chymists; and make good the Arguments by which they are wont to maintaine it. Since 'tis only that* Doctrine *and these Arguments, that I declare my self in that discourse to question; and he himself did not think them sound and valid. By these encouragements, I was induced to comply with the earnest solicitations of the Printer, for another Edition, but he dying soon after, and the Person to whom the right to dispose of the* English *Copy, legally came, having*

left England, and continued out of it, for divers Years, the dispute between the Stationers that pretended to it, and treated about it, lasted so long, that a Traveller who passed this way told an acquantance of mine, that he had then (which was two or three years agoe) seen nine severall Latine impressions of it, since when, another has been brought me made at Geneva. This number of Editions (in none of which I have added or altered a Word) and the numerous citations I have mett with of it, in favourable Writers, made me unwilling to confound, or trouble, Readers by interweaving Additional Notes, with the Body of the Discourse; and so by obliging those that should hereafter Vouchsafe to mention any of the inserted passages of it, to cite the Edition as well as the Book. And therefore I was easily inclin'd, by want of Health and Leasure, to peruse againe deliberately the whole Treatise, to suppress all those Notes, that I could not readily and conveniently refer to three or four of the chief heads, I intended to enlarge upon, and without altering the forme of the Book wherein it has prov'd so fortunate to leave it intire, and

and publish my Additions also by themselves by way of Appendix. This in my Intention was to consist of four heads, The Producibleness of Chymicall Principles, The uncertainty of the vulgar Analyses made by distillation. The various effects of the fire according to the differing waies of employing it. And doubts whether there be any Elements, or material Principles of mixt Bodies, one or more in the sense vulgarly received. But finding by the Stationers estimate, that the notes refer'd to the three last Titles, are not near so large as those that belong to the first; yet they would make the book to which they should be added, and which is already printed, of too great a thickness in proportion to its other dimensions, I thought fitt to reserve the other papers for another opportunity, and at this time annex nothing, but what concerns the Producibleness of Chymical Principles.

But yet because there are some generall Advertisements that do somewhat more belong to this part of our design'd Appendix that now comes forth, than to any of the rest, I must not deny them

a roome in this Preface, which I shall conclude with them.

I might justly enough alledg, in excuse of incoherence of some of the particulars that follow next after one another in the subsequent discourse, that this being confusedly but a Collection *(or if you please a* Rhapsody*) of loose* Notes, *'tis more pardonable, than strange, that some of them should want apt connections, and the stile of the discourse they compose should want uniformity. But 'tis not so much my present Work to make Apologies, as to give Advertisements, and therefore I shall proceed to tell you in the first place, that though the following discourse have in some places a somewhat Dogmaticall dress, yet it is cheifely meant (as becomes an Appendix to a* Sceptical *Book.) to excite and assist a further inquiry, and accordingly the reader may perceive it to have been my care, not so much to play the part of a Logical Opponent, as to take occasion to sett down variety of experiments and observations, that whatever* Hypothesis *about the Material principles of mixt Body's shall prove fitt to be pitch'd upon, it may be founded on*

on a less insufficient History of matters of fact (relating to that subject) that Chymists have been wont to take in; and may be so framed, as not to be lyable to those objections and difficulties, that will be here mett with, and yet perhaps were not thought of, or at least were not duely taken into consideration, when the vulgar Hypothesis *of the* Tria prima *was establish'd. Upon this account I am not without hope, that the following experiments and considerations, though propos'd by way of objections, may do some service to the inquirers into the material Principles of things; by obliging the Chymists, at least, to reforme their doctrine about them, and build it more cautiously, and that upon a larger, as well as more solid foundation of Natural History.*

The second *thing whereof I am to advertise the Reader, is that I would not have him infer from any thing that (prompted by the exegencies of my design) I have said in the following papers, that I either do undervalue, or would decry Chymistry, or Chymists themselves indiscriminately. For I have a very differing*

differing esteem of the Notionall *and of the* Practicall *part of Chymistry. For divers of the opinions maintain'd by* Spagirists, *without excepting their grand* Hypothesis *of the* three Principles, *I have been inclin'd to question not only as a* Naturalist, *but as a* Chymist; *as seeing great cause to doubt whether they be agreeable, either to the true grounds of* Philosophy, *or the exploring Experiments of the fire. But as for* Chymical *operations, such as Destillation, Solution, Sublimation, Precipitation, and the rest; especially those seldome sufficiently valued ones, Digestion and Cohobation, I take them to be excellent tooles in the Hands of a Naturall* Philosopher, *and to be by him applicable to many other, and perhaps some nobler uses than they are wont to be put to, in* Laboratories; *since if they be skilfully employ'd they may be successfully so, as well to discover Nature, as to* correct, *to* imitate, *and in some cases to* outdo *her. Nor do I only thus distinguish between the speculative and operative part of* Chymistry, *but I make a great difference between the avow'd Cultivators of that Art; and look not with the same eyes on the opinions and*

and performances of vulgar Chymists, *and Chymical Philosophers. For we are told that there lives conceal'd in the world, a sett of* Spagyrists *of a much higher order than those that are wont to Write courses of* Chymistry *or other Bookes of that nature; being able to transmute baser Metalls into perfect ones, and do some other things, that the generality of* Chymists *confess to be extreamly difficult; and divers of the more judicious even among the* Spagyrists *themselves have judg'd impossible. The declaration of what I thinke of these latent* Philosophers *belongs to another paper. Yet in this I shall not deny but that what I have heard from divers very credible eye-witnesses, and perhaps some more immediate arguments, strongly incline me to thinke that there may have been, and may yet be, some such men, and whatever be to be thought of what they call the* Philosophers Stone, *I confess my self convinc'd by what I have seen, that there are in the World as difficult* Arcana *as divers of those which have been (perhaps not all of them justly) derided under the name of Chymicall* non-entia. *Now if there be really such adept Philosophers*

as

as we are told of; I am apt to thinke that among their other Arcana *they are Masters of extreemly potent Menstruums (which may, as far as I can guess, be some of their cheifest Tooles) and may by the help of these and other means peculiar to themselves, of working upon bodys, be able to produce in them, such alterations, as we have no examples of, and so obtain from them such similar substances, as either for number, or quality, or both, may be very different from the vulgar* Tria Prima, *or those substances Chymists are wont to* obtaine, (*for that word I chuse to employ rather than the word* separate *or* Extract) *by the common ways of what they call* Analysis. *For if a Man have an instrument which other men have not, and much more, if it be an excellent one, he may be able with it to performe other things, than they can without it. The* Europeans *by the helpe of so slight an Engine as a Mill assisted by a far slighter instrument a* sive *can easily divide Corne into Bran and Meal and Floure, which even those* Americans, *for want of those helpes, were not able to do, who could do other things that are thought far more difficult. And he that has a file and a good turning lath with*

with its appurtenances, may obtain from a piece of iron both filings and shavings and concave Hemispheres and ellypses and Globes and Cylinders and other sorts of bodies, which could not be obtain'd from that Iron even by good artificers that were not furnish'd (as till of late very few were) with those instruments. And he that first found the use of Aqua Fortis *in dissolving Silver, and that though it were mixt with Gold, had by his* Menstruum *an easy way of separating those two Metalls, though ancienter Mineralists, Nor* Chymists *themselves had no liquor that would performe that worke. But* Helmonts *writings will supply me with a far nobler instance to my present purpose, if the truth of all that he delivers concerning the effects of his* Alkahest *be admitted, About the possibility of which strange Solvent having elsewhere written a short enquiry, I shall forbear to say any thing of it here, but rather intimate that if there be such adept* Philosophers *as some speak of (which I thinke not Incredible) and if they have (which supposing there be such I think not unlikely) among other rare things some* Alkahestical *or other extraordinarily potent* Menstruum, *or way of penetrating and working upon mixt bodies; they may for ought I know be able to obtaine such substances from them, as may induce me, and perhaps the Chymists too, to entertaine other thoughts about the constitution of compounded bodies (as they are wont to be call'd) than either I or they now have. And therefore though as to Naturall* Philosophy *in generall I do not expect to see any Principles propos'd more comprehensive and intelligible than the* Corpuscularian *or Mechanical;*

cal; yet as to the subordinate Theory of mixt bo-
dies in particular, I that have disputed only a-
gainst the vulgar Hypothesis of the Chymists
can easily retain a disposition to receive further
light in this matter, when those that are the bet-
able to afford it us, and from whom it will be no
disparagement for much greater proficients than
I, to learn, shall think fit to oblige us by doing so.
the mean time, to end this advertisement as I
begun it; I should not need to say much to satisfie
Chymists *that I neither hate nor dispise their*
Art, even in its present state, if some things sure-
chiefly want of leasure, would permit me to pub-
lish an essay that I wrote many Years since, Of
the usefulness of Chymistry to the Empire of
Man. *Nor is it only to the practical part of Natu-*
ral Philosophy that I take Chymistry as it may
be manag'd, to be highly usefull, but I confess I
thinke also that being ordered by a skilfull Na-
turalist, it may far more conduce, than those that
are strangers to it are wont to think, to the Spe-
culative part of Physicks; *and that as the Bo-*
lonian Stone *without being Chymically pre-*
par'd would never be made Luminous, but being
so prepar'd is brought to shine, so many other Na-
turall body's never afford much light to Philo-
sophy, till Chymicall operations have qualified
them to do so.

The Last *advertisement I desire to give*
the Reader concernes the intention with which I
I call in question the Hypothesis *of the* Tria Pri-
ma *and some other of the Chymists* Doctrines.
For though sometimes I have had occasion to
discourse like a Scepticke, yet I am far from being
one of that sect; which I take to have been little
less

less prejudiciall to naturall Philosophy *than to*
Divinity it selfe. I do not with the true Scepticks
propose doubts to perswade Men that all things are
doubtfull and will ever remaine so, (at least) to
humane understandings, but I propose doubts not on-
ly with designe, *but with* hope, *of being at length*
freed from them by the attainement of undoubt-
ed truth; which I seek that I may find it; though
if I miss of it in one opinion I proceed to search
after it in the opposite *or in any other where it*
seems more likely I should meet with it. And to
declare my mind to the disciples of the fire, by a
similitude not alien from their profession: Suppose
a Man more rich than skillfull should Bequeath
me a purse of Guinneys, and that I should have
strong presumptions that some of them are counter-
feit, what in this case would a Chymist have me do?
To take them all for good in spite of contrary pre-
sumptions against some of them, were very impru-
dent. On the other side to throw them all away
because tis probable some may prove counterfeit,
were downright folly. That then which common
prudence would direct me would be to take them
all out and examine them one by one, first with the
touch-stone, and then, if need be, by the Cupell
and by Aqua Fortis *too: and this I should do with*
desire to find all the pieces true, having also care
not only to preserve and put back into the Purse,
those that prove right; but if any be but partly
adulterated, to preserve the good portion by purify-
ing it, (by the Cupel or some other fit way) from
the falsifying alloy by whose admixture it had
been imbas'd. The application of this I leave to
be made by Chymists. And having in another
paper purposely discours'd of the cautions and li-
mitations

mitations without which I disallow Scepticisme, I shall only in generall professe that I more willingly embrace the truths taught by the Chymists, *than I endeavour to disprove their errors. For I looke upon* truth *as one of the cheife of those goods that* God *has of all others laid the most in common; since truth does not only, like desert Islands in* America, *belong to him that first finds it and seises on it; but even when another has lighted on it and is in possession of it, any Man may without trespass or injury, make himselfe a sharer in it. To conclude; I am glad to find truth in the Doctrines of the chymists: but when I cannot discern it there, I chuse rather to seek it elsewhere than sit down without it. And if I any where seem to be somewhat too indulgent to suspitions against their* Hypothesis, *or arguments, I hope the usuall confidence to be mett with among most of them, consider'd; twill be look'd upon but as a compliance with the advise of* Aristotle *of bending a crooked stick the contrary way to reduce it at length to straitness. And I did with the less scruple allow my selfe this way of writing, because experience having taught me that* some *spagirists (for I speak not of all) that keep their best things close, will do more to Vindicate their art, or oppose their antagonists, than to gratifie the curious or benefit Mankinde, I thought the rousing stile I sometimes wrote in, might prove no unhopefull way to procure somewhat considerable from those great Masters, and orders of Chymicall* Arcana, *that must be provok'd before they will come out with them; as the sea is observ'd not to give us one of its preciousest treasures,* Amber-greece; *till it have been agitated by winds and Stormes.*

The Publisher's Advertisement to the READER.

I Shall not entertaine the Reader with any thoughts of my own, about the following Appendix, which, without desiring to prepossess him, I shall willingly (and I thinke may safely) leave to speak for it selfe. But yet I think it may not be amiss, if I premise something to the Reader, about the publication of these Notes, as having been particularly concern'd in it.

By the opportunity I had of seeing some papers, of the Honourable Author of the ensuing Appendix;

I perceived that the Notes which I had deſign'd it ſhould conſiſt of, were indeed moſt of them laid together in ſome (though but a careleſs) order, and ſo were without much difficulty fitted for the Preſs: but others of them lay ſcatter'd up and down amongſt many others, about differing ſubjects in his Philoſophical Memorials, which particulars not being ready at hand, when the Enſuing Notes *were ſent to* Oxford *to the* Printer, *they could not be publiſh'd with the reſt, but muſt expect ſome other opportunity, to appear abroad, either alone; or in their company.*

Perhaps the Reader will not need to be told that beſides the Application of ſome of the Experiments contained in the following Notes, moſt of the Experiments themſelves are new. But ſo many years are paſt betwixt

betwixt the firſt *Edition of the* Sceptical Chymiſt, *and the* ſecond *that now comes forth; that it may be requiſite (though otherwiſe it would be improper) to advertiſe this Reader, that he is not to think, that the Author has borrowed from others thoſe Experiments and Notions, that may be met with in Bookes written in later years, as well as in the* Sceptical Chymiſt. *For the firſt* Engliſh *Edition having been put forth in the year* 1661. *and never ſince by the Author at all enlarg'd, or alter'd; 'twill ſufficiently ſhew that this Book could not borrow from thoſe that never were ſeen till after, and perhaps long after his was publiſhed. Which Advertiſement may be particularly apply'd to the late Learned Treatiſe, Intituled* Philoſophia Vetus & Nova, *wherein in one long Chapter may be*

met with an *Abridgment of a great part of the* Notions, *Experiments and Ratiocinations of the* Sceptical Chymiſt, *without any mention there made, either of the great and famous Authors Name, or his Book in which they firſt appear; Though the* Latine *Verſion of that* Treatiſe, *was publiſh'd many years ago, and reprinted many times ſince. And though this be not the only VVriter, that hath thought fit to make uſe of conſiderable portions of the* Sceptical Chymiſt, *without owning it, I thought, what he has been pleas'd to do, required to have particular Notice taken of it: becauſe, though his modeſty hath perſwaded him to conceal his Name, his Learned Book hath made him ſo juſtly famous, that if the Reade were not advertis'd, he might eaſily ſuſpect, that* Mr Boyle *had not lent to, but borrow-*

ed

ed of an Author, who appears ſo capable of enriching the Curious with excellent things of his own. And upon the ſame grounds I thinke it neceſſary to obſerve, that the Experiments to be met with in Mr. Boyles Hiſtoy of Colours, *having been publiſh'd many years ago, could not be borrow'd from that moſt ingenious Treatiſe, though in that Chapter of it which treates* de coloribus, *between* 20. *and* 30. *Experiments, (If I miſremember not the number) will be found the ſame with the like Number of* Mr. Boyles; *whoſe Name, though elſewhere very civilly taken notice of on ſome other occaſion, is in that whole Chapter left unmention'd.*

I might here informe the Reader, that the Sceptical Chymiſt *having been many years out of Print, it chanc'd that when the*

Notes,

Notes, that make up the following Appendix, were drawn together for the Press, this Author had not a Book at hand, by comparing whereof with the particulars of his design'd Appendix, he might be sure to avoid, (what he now but hopes *he hath;) the suffering any thing to passe in the latter, that is truly coincident, with what was already extant in the former: (I mean, to the same purpose, and on the same occasion; for otherwise an Experiment or Notion may be more then once employ'd without meer Repetition.)*

And lastly I dare not omitt to let the Rrader know, that since the Appendix was printed, it appears, that by an oversight, some leaves were left behind, that treating of the difference of Common Mercury's *themselves, should have been annex'd, as a kind of Appendix, to the last of the three*

three Mercurial Tracts, to be met with among the following papers: from whose perusall the Reader shall no longer be detain'd by

His

Humble Servant

I. M.

THE INTRODUCTION to the following NOTES.

THough the Pompous title of *Hypoſtaticall Principles*, which Chymiſts have beſtowed upon the Ingredients they would have mixt bodies to conſiſt of, has perhaps ſerv'd to procure them a veneration from vulgar Heads, that are wont to eſteem things the more becauſe they underſtand them leſs; yet the maine thing, that has recommended the Chymical Principles to more diſcerning men, ſeems to be, that by the help of a few ſimple Ingredients (whereof nature is ſuppos'd to have laid up great Magazines at the beginning of things) aſſociated in differing proportions, all mixt bodies

may be compounded: and so men may acquaint themselves with the natures of *a multitude* of bodies, by first knowing the natures but of *a few*. He therefore that acknowledges he does not acquiesce in the Chymicall *Hypothesis* of the *Tria Prima*, or their's that add to them *Water* and *Earth*, can scarce employ a more proper Argument to shake it, than, upon good ground to call in question what they teach when they affirme *That their Principles are ingenerable and incorruptible*, and that Nature does only *compound* and *dissociate* them, without either *producing* or *destroying* any of them. It will be therefore very well worth while to examine, what evidence there is in an Assertion, which, in so many of the Chymists Reasonings and explications is either manifestly imploy'd or not obscurely suppos'd. And indeed this Tenent of theirs is so principall a Pillar of their *Hypothesis*, that, in case it faile them the whole structure will be in danger of ruine. For if the Bodies they call *Principles* be produc'd *de Novo*, how will it be demonstrable

demonstrable that Nature was oblig'd to take those Principles made ready to her hand when she was to compound à mixt body, and how will it appeare in every *Analysis* made by fire, that the Salt (for instance) thereby obtain'd was not produc'd by the Chymicall operations, but was preexistent in the body in minute parts, which by the action of the fire were only extricated and separated from the other Principles or Ingredients, and afterwards brought together: since in case the Chymical supposition be erroneous, not only the obtained Salt may be in part due to a new Production or Transmutation, but part of that which was really salt, if any such thing there were antecedently to the Analysis, might be either destroyed by the operation, or made to appear under some other forme.

OF THE PRODUCIBLENESS Of CHYMICALL Principles.

The first Part.

Of the Producibleneſs of Salt.

AMong the ſubſtances upon which Chymiſts have conferr'd the Title of Principles, *Salt* ſeems in their eſtimate to have had the Precedency, ſince they are wont to name it firſt in the enumeration of their *Tria Prima*. And 'tis generally granted, that *Salts* are wont to be the moſt conſiderable and active parts obtain'd by Chymiſts from mixt bodies. And yet perhaps the

the inviſible particles that compoſe the viſible portions of a Salt may be ſuch, and ſo conſtrued, as to be fit to make and to have perhaps actually made other portions of matter endowed with thoſe Qualities, for which Chymiſts are wont to call a body ſulphureous or mercurial, as may be inſtanced in the *Inflammability* of *Nitre*. Wherefore it may deſerve a greater meaſure of curioſity, than ſeemes to have been employed or even deſign'd by vulgar Chymiſts, to enquire, whether *Salt* indefinitely ſpeaking, may be produc'd *de Novo* (as they phraſe it) or deſtroyed; and whether at leaſt the particular, and much differing, *Species* of Salts may be changed into one another, and thereby after a manner be *produc'd* in reference to the acquired *Species* of Salt, and *deſtroy'd* in relation to that which the ſame portion of matter belong'd to before.

To premiſe ſomewhat in generall to render it probable that *Salts* may be produc'd *de Novo*, I ſhall briefly repreſent two things: The *firſt* is, that ſince *Salts* differ much in ſeverall other

ther attributes, ſome being *fixt*, ſome *volatile*, ſome *Acid*, ſome *Urinous* &c. the two qualities wherein they agree, and which therefore make up the common and moſt received Notion of *Salt* in generall, are, that it is eaſily diſſoluble in water and that it affects the Palat with a ſapor, whether good or evill: and *the other* thing, is, that whether we allow the *Epicurean* Hypotheſis or the *Carteſian*; the firſt Saline Concretions that were produc'd by Nature muſt be confeſs'd to have been made of Atomes, or of Particles, that before their conjunction, were not Saline, and therefore there appears no abſurdity in conceiving that by the action of the fire or other fit Agents, ſmall portions of matter may be ſo broken into minute parts, and theſe fragments may be ſo ſhap'd and connected, as, when they are duely aſſociated, to compoſe a Body capable of being diſſolved in water, and of affecting the organs of Taſte.

That a Diſpoſition to be diſſoluble in this or that liquor may be acquir'd by mixture and the new Tex-

ture

ture of parts, is not without example, for as I elſewhere obſerve, though powder'd ſulphur will lye in well rectifyed ſpirit of wine, ſome Weekes or Months, without being at all viſibly diſſolv'd in it, and though the ſame liquor will for as long a time ſwim upon Salt of *Tartar* without making a ſolution of it; yet if this Salt and Sulphur be mixt together, ſpirit of Wine will in leſs than an hour and ſometimes in leſs than a quarter of that time diſſolve enough of this matter to be richly colour'd by it, and this without the help of external heat. And I ſee not, why it ſhould be impoſſible that the action of the fire, may reduce the Corpuſcles of bodies to ſuch a minuteneſs, and aſſociate them either among themſelves or with the Corpuſcles of other Bodies which without preparation will not diſſolve in water, that the pores intercepted between them may be enter'd & their looſe Texture diſſolv'd by that *Menſtruum*. Of which Conjecture though we have not a perfect inſtance, yet we have a Probable one in that which I ſhall hereafter

after deliver concerning the making of Fixt *Nitre*. For though the Chryſtalls of well purifyed *Salt peter* may be kept many weekes or months in an ordinary Lodging chamber (for I had not occaſion to try it In a cellar) without relenting by the moiſture of the Air; yet if without the addition of any body diſſoluble in water or moiſt aire it be in great part reduced, as perhaps it may be almoſt in a trice, to a fixt *Alcali*, this Salt will be eaſily enough penetrable by the vapours that rove up and downe in the Aire, and will by that moiſture, in no long time, be brought to relent, and at length will be reſolved into a liquor very Analagous to that which the Chymiſts make of Salt of *Tartar* left in moiſt Cellars to deliquate.

As for the *Sapor*, which is the ſecond Qualification to be conſidered in the vulgar Notion of a Saline body, I doubt, whether the neceſſity of it be agreeable to another Principle of theirs, and to experience. For 'tis plaine that chymicall oyles, even thoſe pure ones that they call *Eſſentiall*, or even Ethereal ones, are highly ſapid:

and yet, theſe not diſſolving in water, it ſeemes there is no ſtrict connection betwixt being ſaporous and being ſoluble in that liquor; and that, if bodies be reduc'd into a multitude of Parts minute and ſharpe enough, 'tis very poſſible that ſome of theſe, either in part, or in Conjunction with others, may acquire a ſize and ſhape that fits them ſenſibly to affect the organ of Taſte, though perhaps the Bodies themſelves, or perhaps thoſe Bodies that afforded them, are more of ſome other nature than of a Saline. This may be illuſtrated by theſe groſs Examples: that a ball of glaſs, for inſtance, though whiles 'tis entire it will not pricke and hurt the skin, yet if it be broken and beaten, the little fragments will, not as they are glaſs, but as they have points or edges. And ſo, though a ſtick being graſped in a Mans hand, will not pierce the skin or put him to paine, yet if it be cut into Tooth-picks or reduced to ſplinters, their ſharpneſs and ſtiffneſs gives them a power to wound, that they had not before. Something Analogous to what we in theſe examples ſee

ſee to be done upon the organs of Touch, may be conceived to be done upon the organs of Taſte (which is a kind of Touch) of which an almoſt full inſtance may be given in purified *Salt-peter*. For though this concrete have but a faint and languid Taſte, yet if it be carefully diſtill'd with ſome Additament that is not diſſoluble in water, and is inſipid, the parts of it being by the action of the fire, either broken aſunder, or cleft or rub'd, or ground againſt one another till they are reduced to edged and pointed Corpuſcles: *Salt-peter* I ſay, thus treated, will be reſolved into differing ſubſtances, each of which has an extreamly ſtrong and penetrant Taſte, which whence it ſhould proceed but from ſome ſuch Mechanicall change as we have been deſcribing, is not eaſy to declare; and perhaps alſo the Phlegmatick liquor, that is wont to come over in this *Analyſis*, may at leaſt, as to part of it, be produc'd by the Operation of the fire, and ſo the Phlegme being inſipid, the Taſte, I meane as much as was in the unanalyzed *Nitre*, may be

as well destroyed as those of the spirit and *Alcali* are generated by the operation of the fire: But perhaps there needs no other Argument that the same parts of matter, according to its differing states, may have the qualities that Chymists would have to be proper to this, or that Principle, than what we have took notice of in Chymicall Oyles, which do more strongly affect the Taste than the most of Salts themselves are found to do. And to confirme our Doctrine of the Produciblenes's of Salts by the Authority of *Helmont*, which is very great, at least with the Chymists of his own Sect, I shall observe that he assures us, that by *Paracelsus*'s *Sal circulatum* from solid Bodies, among which he particularly, and in the first place instances stones, may be transmuted into actual Salt Equiponderant to the body whereof it was made. So that upon the Chymists supposition, that in these mixt Bodies there is both Sulphur and Mercury, besides a *Terra damnata*, the same portions of matter that preexisted in the forme of either of those simple Ingredients, must

Vide Helmontium in Tractatu dicto Elementa, no. 11. & alibi.

must by the operation of the fire, and an Anomalous *Menstruum* have been turned into Salt; and if the *Helmontian* Experiment be allowed of, whatever becomes of the Chymical supposition, we may safely conclude, that salt may be made of matter, that was not salt before, and consequently that salt may be *de Novo* produc'd. And thus much of the possible origination of Salts in generall, which I thought fit to premise to what I am going to offer about the Production of the Particular sorts of Salt. Though I have elsewhere enumerated and distinguished severall kinds of these Bodies, whereto Chymists have given the Title of *Salts*; yet those that more properly deserve that name and more directly appertaine to our present disquisition, seem to be chiefly these three: The *Acid*, such as Vinegar, spirit of Salt &c. the *Alcalizate* or *fix'd Lixiviat* salts, made by burning, such as salt of Tartar, and of Wormwood, Barillia, Pot-ashes &c. and the *Volatile* and *Urinous* Salts, such as salt of Hartshorne, of Urine, of Blood, of Soot &c. which taste and

ſmell like that of Urine. Wherefore, if we can ſhew, that theſe may be produc'd *de Novo*, or, (which we have intimated to be equivalent for our purpoſe,) *tranſmuted* into one another, we ſhall I hope be thought to have ſucceeded in our preſent Attempt.

I. SEC-

I. SECTION.

Of the production of Acid Salts.

AND to begin with *Acid* Salts, we ſee that even *ſweet Wines* will but too often without addition degenerate into ſoure vinegar, which will diſſolve Corall and divers ſtones, calcin'd Lead, and ſeverall other mineralls. The raine water that is imbibed by the roots of Trees is in thoſe that bear Lemmons and Berberies changed into liquors, abounding with ſaline Corpuſcles, that enable them to affect the Taſte, and act on powdered pearles, and ſeverall other Bodies as Acids are wont to do. Alſo *Guajacum* and divers other woods, that do not at all taſte ſoure, will, being diſtilled in Retorts, afford ſpirits that are furniſhed with ſtore of Acid particles, which, as I have tryed, will hiſs upon *Alcali's*, and will diſſolve Corall, and even lead it ſelfe calcin'd into *Minium*, and make *Saccharum Saturni* of it. Many other vegetable Bodies alſo

do, without addition, afford the like acetous liquors. And if it be objected, that theſe were preexiſtent in the Bodies whence they were obtain'd, and were only extricated by the operation of the fire, it will concerne thoſe that affirme this to prove it, (which no body that I have met with hath yet done) and I ſhall the rather require it, becauſe I find that the ſweeteſt bodies and thoſe of differing kinds, as (to omit, Raiſons of the Sun) ſugar and honey themſelves, afford ſuch a ſort of ſpirits, which the tryalls I elſewhere mention, ſhew to be ſharp and piercing enough. To which may be added, that in divers caſes, where we are ſure that *Acid* ſpirits were plentifull ingredients of a compoſition, as in *Saccharum Saturni*, & that magiſtery which the Chymiſts call *Salt of Corall*, (which are not the only mixtures I have made tryall of,) experience witneſſeth, that the liquor, which comes over by diſtillation in Retorts, is not *Acid*, but quite of another kind; I would not, by what has been ſaid, be concluded to deny, that Acid Salts *may* in ſome mixt bodies,

dies, be ſo aſſociated with others, and obſcured by them, as not to be diſcernable by the Taſte, till they be ſeperated by the operation of the fire. But to ſhew that ſuch Acid Salts *were de facto* preexiſtent, as acid ones in the Body that affords them, their muſt be ſome poſitive proofe, other than the liquors diſtill'd from them, ſince they, as we have already argued, may be not barely *extricated*, but may have their acidity produc'd by the operation of the fire; And wee ſee, that Salt-Peter, though it have no Acid Taſte, may be made to afford by (a certaine way of) diſtillation, above three quarters of its weight of a highly Acid liquor; and yet it appeares not, that ſuch a great proportion of *Acid particles*, or poſſibly any conſiderable proportion at all, was employed by nature in the compoſition of *Salt-Peter*. At leaſt having diſtill'd Earth, that I cauſed in my own preſence to be dugg out of a Pigeon houſe below th Dunge; I had from it a Salt indeed, and ſome little Saline liquor, but of a nature, as for as I obſerv'd, very differing from

from that of the Acid Spirit of *Nitre*. (But this Experiment I mention occaſionally without building upon it.)

Nor do I think, it ought to ſeem incredible, that *Acid* Salts, as well as others, ſhould be producible by the various ſplittings, attritions, coalitions and changes of Texture, which may be cauſed ſeverall wayes, and eſpecially by the Operations of the Fire, which moſt active Agent, making a vehement and various agitation of all the Minute parts that a body conſiſts of, may conſonantly to what hath above been intimated, ſplit or breake ſome of them, and as it were grind others againſt one another, and in ſhort, ſo alter their bulke, figure and motions, as to make them fit to ſtabb or cut the tongue, and the other bodies that they worke on, after the manner of thoſe Bodies we call Acid. But of this you may find more in our Notes about the Mechanicall Origine of Taſtes, wherefore I now proceed to the ſecond part of my Taske.

The

The II. SECTION.

Of the production of volatile Salts.

AS to the production of *volatile* Salts, we have an eminent Inſtance of it in the ſalt obtainable by diſtillation from *Soot*, for though the Woods we burn in our Chimneys ſeem not to have any thing of the taſte or ſmell, of Urinous ſalt, nor have the diſſolutions of the ſaline parts of ſuch Woods communicated to water by their infuſion in it, been obſerv'd (that I know of) to be of affinity in taſte or odour with the ſalt of *Soot*; yet when Wood is firſt burnt in the fire, and then the *Soot* afforded by it is duely diſtill'd and rectifyed in fitly ſhaped veſſels, there is obtained a ſpirit and a white volatile Salt, that in ſmell taſte and divers operations by which we have examined them, appear to be of great affinity with thoſe of Humane blood, or Urine, and may be eaſily enough miſtaken for them.

But

But this double operation of the fire is not alwayes neceſſary to the production of volatile Salts out of Vegetables; for, though by their diſtillation in Retorts we generally obtaine from them no dry ſalt at all, but a ſowriſh Spirit, with which I have diſſolv'd Corall, Lead, and other hard Bodies, that Urinous ſpirits have not been obſerv'd to worke on, and they will, being put upon Urinous ſalts, make ſuch an hiſſing and conflict, as are look't upon as great tokens of antipathy; yet I remember that ſeverall years agoe, I did from Muſtard ſeed, that had been kept for a convenient time, obtaine by diſtillation a volatile Salt, that faſtned it ſelfe in prettily figured graines to the upper part of the Receiver, and this at the very firſt diſtillation, ſo that there was no need of rectifying the diſtilled matter to ſeparate that Salt. And to enforce this proofe by ſomething more conſiderable than it ſelfe, I ſhall add, that by an eaſy way by word of mouth communicated to me by a very ingenious perſon (Dr. D. E.) one may, out of very many

many vegetables firſt duely prepared, without adding any thing to them, by bare diſtillations in Retorts, obtaine good ſtore of volatile ſpirits and ſalts, which by their fugacity, colour, ſmell, taſte, and divers experiments that I purpoſely made to examine them, were ſo like the ſalt and ſpirit of Urine, Soot, &c. that one, that knew nothing of the way they were made by, would readily have concluded they belonged to one or other of the newly named ſorts of Bodies.

I remember that I have alſo ſometimes produc'd a *Volatile Salt*, that one would readily have pronounced Urinous, of a *Minerall* it ſelfe; nor was that the onely *fixible* from which Experience perſwaded me, that ſalt of this kind might be obtained.

Some other particulars relating to the production of *Volatile Salts*, I think fit to reſerve, till I ſhall have occaſion to mention them in another Section (as Inſtances of the production of Urinous ſpirits.) Only there is one thing, that I think not fit here to pretermitt, becauſe I have not met with

with it in any Chymicall writer, the contrary being rather generally taken for granted; I ſhall add then, that it is not univerſally true, that ſaline ſubſtances, that are Volatile and aſcend in the form of ſalt, are of an urinous nature, and enemies to Acids. For I have had from Verdegreaſe diſtilled *perſe* with a ſtrong fire, a very acid ſpirit which being warily rectify'd, afforded firſt a ſowre phlegm, and then a penetrant ſpirit ſharper than it, leaving behind it in the veſſel ſome few ſpoonfulls of a dark coloured liquor, which being ſett aſide, and ſuffered to reſt, did in a great part, ſhoot into tranſparent Chryſtalls large but thin, almoſt like thoſe of Silver diſſolv'd in *Aqua fortis*: They appeared prettily figured at the edges but were ſo oddly connected among themſelves, that I was not able to refer them to any of the known Geometrical figures; and their brittleneſs made them the leſs tractable, but their ſmell which was ſtrangely piercing and not inoffenſive argued them to be of the ſame nature with the Acid ſpirit which had come over with them. But

But there is a more conſtant and eaſy way of producing ſuch a Volatile ſalt, as my obſervation mention's. For if *Amber* be gradually and warily diſtill'd it will afford beſides the phlegm, ſpirit and oyle, a dry ſubſtance which though the Chymiſts call the *Volatile ſalt* of *Amber*, I found to be really of an Acid nature, by ſeveral of thoſe tryalls, by which we are wont to diſcern, that a body belongs to the family of *Acids*.

The

The III. SECTION.

Of the production of Alcali's or Lixiviate Salts.

THe third and laſt ſort of Salts, which we are to endeavour to ſhew to be producible, are the *Alcalies* or *Fixt Salts*, which ſeeme to have an Antipathy with *Acid* ones, by making a conflict with them, and exerciſing diverſe operations contrary to their's, (as I have in another Diſcourſe more fully declared.)

As for the Origine of theſe Fixt Salts of Burnt Bodies, the Spagiriſts are not of the ſame mind about it. For, the almoſt univerſall opinion of the Chymiſts that preceded *Helmont*, and the more common opinion even of later Chymiſts ſeems to have been, that theſe fixt *Alcalies* are preexiſtent in mixt Bodies, and that the fire does but ſeparate or extricate them from the other parts of the compounded Body. But *Helmont* (followed in that

Vide Helmontium in Blas humano no. 38. & 43.

that by ſeverall Chymiſts that diſſent from him in other points) has ingeniouſly conjectur'd, that theſe Lixivial ſalts do not preexiſt in their Alcalizate forme in the Bodies that afford them, but are Productions of the Fire, by whoſe Violent action a part of the Salt, which in the Concrete is naturally all volatile, lay's hold of ſome parts of the ſulphur of the ſame Body, and both together are colliquated and fixt into an *Alcali*, which Fixation he ſomewhere exemplifies by that which happens, when *Salt-Peter* and *Arſenick*, that are both volatile, being expoſed to the fire, are by it's operation fluxt and made to fix one another. But though this account be ingenious, yet I doubt, whether it be ſo cleare and ſatisfactory, eſpecially ſince 'tis applyed to *all* fixt *Alcalies*, as the Embracers of it thinke it. For, beſides that it may be queſtion'd whether it have yet been well proved (what *Helmont* teaches) that all the Salt of mixt Bodies before their combuſtion is volatile, it is not declared, what volatile ſalt is meant,

Vide Blas humanum, No 41.

though it be plaine, that ſome Bodies that afford a fixt Salt, do abound in Acid ſpirits, as Oake, Box, and many other Vegetables; and others, as Hartshorne, Blood, Urine &c. abound with urinous, that exerciſe hoſtility with Acids: And I have found that from ſome Bodies I could obtaine both *Acid* ſpirits, and ſuch as are wont to be called *Urinous*. 'Tis not eaſy to explaine how the Volatile Salt comes to unite it ſelfe ſo intimately with the oyle (or ſulphur) and though it be alſo volatile it ſelfe to compoſe with it a Body capable of enduring the violence of the Fire, ſince we have more than once tryed, that the Volatile Salt of Urine, or of Harts horne, and a Chymicall oyle, as of Turpentine or any ſuch, being put together, the Salt will indeed aſſociate to it ſelfe ſome particles of the Oyle, but will nevertheleſs in their company ſublime in the forme of a Salt, with a very gentle fire. And the Example, that *Helmont* ſomewhere gives of Arſenick and Nitre, do's not ſatisfy me, becauſe that when

Vide Helmontium Complex: atque Myſt. &c.

when I made equal parts of thoſe two Bodies to be mingled, and in a ſtronge Crucible fulminated together, a great part of the mixture was driven away by the fire, ſo little alter'd, that 'tis very dangerous to be too bold with the fumes, and a good part of what remained was fixt only in compariſon of the crude Arſenick, but not comparably to Salt of Tartar, or ſome ſuch other true *Alcali*; and the conſtancy of the part, that was more fixt, may probably be aſcribed to the Salt-peter, which we know will without the help of Arſenick afford a great deal of fixt ſalt, if about halfe of it be burnt away, by the help of powdered Charcoal, or ſome other convenient additament. It may alſo ſerve to weaken this inſtance of *Helmont*'s, that there are other inſtances, in which we may obſerve, that no ſuch thing happens as his *Hypotheſis* may make one expect. For *common Sulphur* is by Chymiſts ſaid to abound in an Oyly part, upon whoſe account it is very inflammable, inſomuch that they would have other inflammable Bodies to be

ſo, by their participating of Sulphur. That this concrete alſo abounds in Salt, is evident, according to their principles, by the acid *Menſtruum* afforded by it, that goes under the abuſive name of *Oleum Sulphuris per Campanam*. And yet theſe Ingredients, combin'd by nature, make up a Concrete which is ſo volatile, that both in cloſe veſſells and the open fire, 'tis almoſt totally volatile. And in that mixture of highly dephlegm'd ſpirits of Wine and Urine, that *Helmont* calls the *offa alba*, though the Urinous ſalts do manifeſtly combine themſelves with the ſpirit of Wine, which being totally inflammable, the Chymiſts refer to their oyle, or ſulphur, yet the coagulated mixture do's not by this aſſociation of Ingredients grow fixt, but proves very volatile. I will not here urge, in favour of the common opinion of the Chymiſts of the Preexiſtence of *Alcalies* in mixt Bodies, that a Corpuſcularian may ſay two not inconſiderable things whereof the *firſt* is, That there is no need of ſuppoſing a Colliquation of ſalts with Sulphurs, Oyles, or any thing elſe to produce fixt ſalts; ſince, beſides that that ſuppoſition do's not explaine, how two volatile bodies come to compoſe one that is fixt, 'tis plaine, that a body yet more fixt may be made without any aſſociation of differing Principles. For the Earth, that together with the *Alcali* remaines in the aſhes of a burnt Body, is more fixt than the *Alcali* it ſelfe, and yet derives not its Fixity from any combination of Elements, or Principles, but from the groſſeneſs, ſolidity, or weight, and unfitneſs for avolation of the Corpuſcles it conſiſts of. And the Corpuſcularian may add in the *ſecond* place, that whereas ſome inſtances are alledg'd wherein there is ſuppoſed a leſſening of the quantity of the fixt *Alcali* of the Concrete, by operations that are ſaid to carry off the volatile ſalts, before the Body comes to be incinerated; It may be anſwered, that perhaps thoſe very operations did but rarefy and volatilize part of the preexiſtent *Alcali*, and ſo left the leſs of it to be recover'd by burning; as the Chymiſts tell us, that Fermentation rarefy's the

oyly parts of the Juice of Grapes, and ſubtilizes them into vinous ſpirits, and ſo do's much leſſen the quantity of the oyle. And when *Wood* is burnt in a Chimney, 'tis not in the forme of an acid ſalt, which is the only that is commonly obſerv'd to be driven away by Diſtillation in cloſe veſſels, but in that of an Urinous ſalt, (which is a kin to *Alcaly's*, and an Enemy to *Acids*) that the ſaline part of the wood is made to aſcend; as may appear by the Diſtillation of Soot. Such Arguments as theſe, a Corpuſcular Philoſopher might, as I was ſaying, urge in favour of the more received Spagiricall opinions. But inſtead of inſiſting on them, I ſhall only invite you to take notice of what I obſerve in *Salt-peter*. For, though by diſtillation or any other way that we yet know, there is no oyle to be ſeparated from it; yet above halfe the body of it may be eaſily and quickly turn'd into a fixt ſalt, in Colour, Taſte, and Operation, much like that of Tartar, and other incinerated Vegetables. And ſuch an *Alcali* I have made without the help of injected Coales or any other

other Body furniſhed with a combuſtible Sulphur; ſo that it ſeems not, at leaſt univerſally true, that to the Production of an *Alcali*, there is neceſſary to be at hand an oyle, or Sulphur to be laid hold on by the volatile ſalt, and fixt together with it. But this Experiment is far more congruous to our Doctrine, which derives all thoſe ſalts from the ſize, ſhape, and ſolidity or weight of the ſaline Corpuſcles, ſince the ſame *Salt-peter*, whoſe greater portion may, by the operations newly mention'd, be reduc'd to a fixt *Alcali*, may, by being diſtill'd with a convenient *Bolus*, have its greater portion brought over in the forme of an Acid ſpirit or ſalt, which it ſelfe may afterwards be made materially to concurr to the Production of an *Alcali*. I might add, that even from one of *Helmonts* own Experiments, my concluſion may be inferr'd, ſince he ſomewhere, and, if I miſtake not, in more places than one, affirmes, that by the addition of more Alcalizate ſalt and the operation of the fire, the Earth it ſelfe that is in the Aſhes may be turned into Salt,

Cinis proprio ſuo Alcali fit Sal mercu. complex. atque miſt. no. 12. Idem Helmontius in Blaſ. humano no. 39. videatur.

which if true, argues, that a fixt ſalt may be made of that which was not before either of ſaline, or of an oleous nature; and conſequently without any ſuch Combination of Salt and Oyle or ſulphur, as his *Hypotheſis* ſuppoſes. From which Experiment I may alſo inferr the poſſible Origination of *Alcali's*, by the Mechanicall changes, that without the addition of oyle or ſulphur the Operations of the fire may produce in the part of a mixt body; ſince Earth, excepting water, ſeems the moſt indiſpos'd of any part of the Concrete to be turned into fixt Salt.

I muſt not here pretermitt an obſervation that I have made, which ſeems to overthrow the opinion of thoſe learned Chymiſts, who will have the violence of the fire to be alwayes a neceſſary Agent, as I allow it to be ordinarily, to the production of a fixt or lixivial *Alcali*. I ſaid *ſeems to overthrow*, becauſe I had not the opportunity to repeat my tryalls, and am not ſure, that the Salt I employed was altogether genuine, in regard I cannot

not here in *London* meet with it, at any Rate; but I have great cauſe to thinke it was right, both for other reaſons and becauſe it was ſent with other things, for a preſent out of the Eaſt, to an inquiſitive Noble Man, who had been lately Ambaſſador for his *Britiſh* Majeſtie at the *Ottoman* Court, and who was pleaſed as a rarity to preſent it me.

This *Salt* was affirmed to be the true *Egyptian* Nitre, mentioned ſo much by Ancient Writers: and indeed I found it to agree much better with the Notion, that books had given me of it, than with that ſort, to which Chymiſts generally give the name of Nitre, and which is indeed the only Nitre, to be uſually met with in our *European* ſhops: where it is beſt known by the vulgarly received name of *Salt-Petre*. But to ſay ſomething of our *Egyptian* Nitre, though it be not pertinent to mention here all that I obſerv'd about it, yet I muſt not here omit two things, that I made tryall of, with that little, which eſcaped the misfortune that loſt me all the reſt, that

that ſeem conſiderable in the preſent occaſion.

The firſt whereof is, that this *Nilotick* Salt was very apt to imbibe the moiſt aire, as calcined Tartar, and other fixt *Alcali*'s are wont to be, to which reſolution we do not find our Salt-peter, if it be unmixt, diſpos'd. But the other & more important thing I obſerved, was this, that having upon this *Egyptian* Niter, Crude as it was, poured ſpirit of Salt, this Acid liquor did preſently, even in the cold, worke briskely upon it, as if it were a fixt *Alcali*, or at leaſt abounded with ſuch a lixivial Salt. And here upon the By, give me leave to take notice of a text of the holy Scripture, that has ſometimes puzzled not only me, but far better Criticks in the *Hebrew* tongue then I. And it is a Paſſage to be found in the 25. *Chap.* of *Solomons Proverbs*, where to illuſtrate Things very incongruous to one another, the diſagreement of Vinegar and Nitre is mentioned, for ſuppoſing the words to be rightly tranſlated, as beſides the Authority of

of I know not how many verſions, the very ſound of the *Hebrew* word *Næter* or *Næthar* argues it to be, it ſeems very hard to find what ſhow of Antipathy there is between Vinegar, and the *Salt-peter* that is commonly ſold in our ſhops for Niter; wherefore ſtrongly preſuming that *Solomon*, who raigned in *Judæa*, a country near to *Egypt*, and had much commerce with the *Egyptians*, whoſe Kings daughter he had marryed, made uſe of *Egyptian* Nitre as the beſt known, if not the only in his time and Country, and might have found in this Nitre, ſome quality very differing from any we find in our Salt-peter; as I remember that in the Prophet *Jeremy* Niter is *Jer. 2. 22.* mentioned, as a very abſterſive thing, and fit to cleanſe Womens skins, which is a knowne vertue of our fixt *Alcaly's*, but not obſerved in pure Salt-peter; wherefore when once I receiv'd the Niter that I have mentioned, and ſaw in it ſignes of an Alcalizate nature, I quickly poured upon it ſome ſtrong Vinegar, and found as I expected that there preſently enſued a manifeſt conflict, with noiſe, and ſtore of bubbles, with

with which Experiment I afterwards acquainted some Criticks, and other learned men who were not ill pleased with it. But this Theologicall use of the Alcalizate nature of Niter, not being that which I chiefly mentioned it for, I shall now make the Philosophicall use I intended, by taking notice that *Egyptian* Niter being acknowledged to be a Native Salt, and made only by the Evaporation of the superfluous water of the *Nile* (or some other such liquor) is yet of a lixiviate nature, or at least abounds with particles that are so: Though as I freshly intimated, it was produced without any precedent Incineration, and the matter of it suffer'd not, or at least needed not suffer any violence of the fire, to make it afford an *Alcali*.

I have represented these things, not for that I pretend to be sure that *Alcaly's* may not be produc'd in multitudes of mixt Bodies, especially in a good number of Vegerables, after the way proposed by *Helmont*, or by some such like: But *partly*, because it seems not alwaies necessary to the existence of

of an *Alcali* in Nature, and to be the only way it can be produced by; and *partly* because I would give you and your Chymical friends occasion to cleare (as far as they can) and confirme the doctrine I have questioned. 'Tis true that being a far greater friend to Truth, than an Enemy to the Chymicall *Hypothesis*, I would not stifle what may serve to advance that, in favour of *Helmonts* doctrine, though this would never so well accommodate my present argument. But I have no great temptation to surmount in this case, for it concerns very little the maine scope of this discourse, whether *Helmonts* way or any other, of the production of *Alcaly's* be embraced, since it will suffice for my purpose, if some Bodies belonging to this family, or kind of Salts may be *produc'd*; I say *some*, because (as I have already intimated) I will not peremptorily assert, that all fixt *Alcaly's* are productions of the fire, or made by the help of it; though I do not readily remember, that I have met with any (except *Egyptian* Niter) that are not. But I shall wave that question,

queſtion, becauſe my intended bre vity calls upon me to proceed t the mention of ſome particular in ſtances, fit to perſwade us, of th producibleneſs of ſome *Alcaliza* Salts.

'Tis known that Chymiſts gene rally looke upon *Spirit of Nitre* an *Aqua fortis*, as Liquors containin not *Alcali's* but *Acid* Salts, which they conclude not only from the Taſte but from the great ebullition that is made, when thoſe liquors are poured on the Salt of Tartar, fixt Nitre, Por-aſhes, or other ſuch unqueſtion'd *Alcali's*. That Sea-ſal likewiſe do's not containe *Alcali's*, is generally taken notice of; the ſpirit of it being juſtly reckon'd among the Acid ones, and when I purpoſely examined that Concrete by Diſtillation, the remaining Salt, though the fire had been violent, was very differing from *Alcalies*. And yet my conjectures inclining me to ſuſpect what the event would prove, I ſeverall times made the following Experiment upon Sea-ſalt, that yet retain'd all its acid ſpirit in it,

Upon

Upon well dryed and powdered Sea-ſalt we put into a Retort ſometimes an equall, and ſometimes (which I preferr) a double weight of good ſpirit of Nitre, or *Aqua fortis*, and leaſurely diſtilling all that would come over, we took out the dry ſalt remaining at the bottom, which we found much chang'd, both as to colour, (a good part of it being uſually very reddiſh) and as to taſte, which was differing enough from what it had been before, and might probably have been made much more ſo, if freſh ſpirit of Nitre had been once or twice more abſtracted from it. This Salt being againe powder'd (for 'twas in a lump when taken out) and put into a Crucible, plac'd in a convenient fire, was by the repeated injection of fragments and well kindled Charcoal made to flaſh divers times almoſt like melted Nitre; and when it would flaſh no longer, the remaining matter being taken out did in great part appeare to be brought to an Alcalizate Nature, for it had a fiery taſte upon the tongue: if Spirit of *Nitre* or *Aqua fortis* were poured on

it,

it, it would make an Ebullition; it would turne Syrup of Violets green, and in ſhort, exhibit diverſe *Phænomena* of Alcalizate Salts.

Another way there is like that mention'd of making an *Alcali* out of Nitre, which is thus done; Poure upon it an equall weight, or halfe the weight of ſtronge oyle of Vitriol, and having diluted the mixture with a convenient proportion of faire water, diſtill it by degrees, till there remaine a ſubſtance very dry; powder This, and mix it well with about an eighth part of beaten Charcoal, keep them in fuſion in a ſtronge and cover'd Crucible, till the maſs grow very blacke, and a little of it, being taken out with a wire, taſte fiery upon the tongue, (which may happen in about halfe an houre or an houre according to the quantity of matter, and degree of Fire) Then take out the blackeſt or deeply red mixture, which will very eaſily imbibe the moiſture of the Aire, and you may finde it, at leaſt whiles 'tis hot and dry, of a more fiery Lixivial Taſte than Salt of Tartar it ſelfe.

ſelfe. It will make an Ebullition with Acid ſpirits, and precipitate diverſe ſolutions made with them, it will turne Syrup of violets green, and in ſhort diſcover it ſelfe many wayes to be of an Alcalizate nature, though it be aſſociated with a Sulphur, that may by diverſe methods be made appeare to be contained plentifully in it.

It is alſo conſiderable on this occaſion, how the ſame Body, without the addition of any other Salt, may, by the various manner of the fires application to it, be made to afford, either little elſe than Acid Salt's, or a leſſer or greater quantity of *Alcali*: For, if fine Salt-peter be dexterouſly diſtill'd with about thrice it's weight of ſome fit Earth, (but not as is uſuall, with powder'd Brickes,) it will ſometimes afford very near as much Spirit of Nitre as the Salt weighed, and though this like other liquors, be not without phlegmatick parts, yet beſides that it may be doubted, whether moſt or many of them were not produc'd by the tranſmuting operation of the fire,

we may ſuppoſe, that five parts of ſix, or ſix of ſeven have been diſtill'd into depble m'd ſpirit.

But if according to the way I have * elſewhere circumſtantially delivered, (which is by frequent injecting into flux'd Salt-peter, ſmall peices of kindled Charcoal, till one can make it flath no more at all,) you make fix'd Nitre, you may obtaine from Nitre thus handled halfe it's weight and perhaps better, of an *Alcalizate* Salt, that many would by it's taſte and operations gueſs to be Salt of Tartar.

**In the Eſſay of the differing parts and Reintegration of Nitre.*

But to ſhew yet further how much the Production of this *Alcali* depends upon the operation of the fire, which as 'tis variouſlly applyed, may vary the Texture of the Salt-peter, my Conjectures led me to try the following Experiment, which I did with ſucceſs from the beginning; We tooke a pound of good Salt-peter, which was but grofly beaten (for it ſhould not be finely powder'd) and having laid it on a Conical heap upon a flatt tile, that the aire might on all ſides have acceſs

acceſs to it, wee Cauſed the upper part of it to be kindled by a little fragment of burning coal (which may be afterward thrown away:) then we cauſed the Laborant with an iron rod dexterouſly to ſtirr the kindled part of the Nitre, that the Ignition might be preſently communicated to as many parts of the Salt, as was poſſible; and this nimble ſtirring of the Maſs, that the fire might be more diffuſed, and more parts might be obverted to the Aire, we cauſed him to continue to the end of the operation: by which method within few minutes, we obtained, more than once, out of 16 ounces of Salt-peter, about 10. ounces or better of fixed Nitre, very lixivial in taſte and operation; and for the colour it was of a pleaſant greeniſh blew, and deeper than Salt of Tartar will uſually be brought to, by being (in a Crucible,) kept twenty times as long, in a good fire.

The other ſcopes and uſes deſin'd in this new and quicke way of making the *Alcali of Nitre* belong to another diſcourſe, the Experiment,

which will scarce succeed without adevtrous management, being here mentioned to shew, what quantity of Alcalizate fixt may by a differing operation of the fire, be obtain'd from Nitre; which (crude Nitre) in distillation skilfully made for the purpose, may be in great part driven over, in the forme of Acid spirit, and Phlegme, and leaves so little true *Alcali* behind it, that I have wondered at it, being sometimes scarce able to find any at all, though I purposely tryed to seperate it from the Tobacco-pipe clay, which the Peter had been mix'd with after a distillation, wherein not half of the Salt had been driven into the Receiver, in the forme of spirit.

And to shew, that to make the fixed Salt of Nitre, the Actual inflamuation of it, in the open aire, is not necessary, as very learned Men have supposed, and that 'tis possible, whatever is presum'd to the contrary, to make an *Alcali* of Nitre, though charcoal, or some other combustible Body be not added to it,

it, to kindle the Corpuscles of the Nitre by its sulphur; and by the association of some part of the same Sulphur with the saline parts of the Nitre, to compose an *Alcali*; to shew this, I say, I more than once made the following experiment: With a convenient quantity of good Saltpeter we carefully mingled about an eighth part of tobacco-pipe clay, and putting the mixture into a Crucible closely lured at the top, we kept it by a fitly graduated fire, in fusion for some houres, and found as we expected, that the remaining Salt, (for part would get through the lute, or Commissures in the forme of fumes) was turned into an *Alcali*, of a faire blew colour, like the better sort of that fixed Nitre, which is made with Charcoal. This Experiment and that formerly made with Tobacco-pipe clay, seem plainly to argue, that to the making of fix'd Nitre, which is confess'd to be an *Alcali*, a congruous change of Texture may suffice, whether that change be attempted to bee made in open vessells, or in close ones, with, or

without the addition of the ſulphur of Charcoal, or any other ſuch combuſtible Body. Upon the ſame ground, that I had for trying the former Experiment, I attempted, and not without ſucceſs, to make an *Alcali* of Salt-peter, by Colliquating moderate quantities of it, ſeverall wayes, (and keeping it in fuſion) with ſome Metalls: I ſay, *moderate quantities of Nitre*, becauſe an Ingenious Gentleman, to whome I communicated this Practiſe, could not make it ſucceed in any conſiderable quantities. And to obviate the ſuſpition, though perhaps groundleſs, that ſome Chymiſts might have of the material concurrence of a good portion of the combuſtible ſulphur, preſumed to be in the Ignobler metalls to the Production of the Nitrous *Alcali*; I ſhall add, that our Experiment ſucceeded, when we tryed it more than once, with more than ordinarily fine ſilver, whoſe Sulphur, if it have any, is granted to be fixt or incombuſtible. And I remember the laſt Tryalls afforded us a blewiſh *Alcali*, though there were employed

ed but a fifth part of ſilver, in reference to the Nitre; and though the fire (which was continued for ſome houres) was ſo moderate, that the Metall, though thinly laminated, was not melted. And of an ounce, that was put in, there wanted but foure graines, which ſmall loſs might eaſily be imputed to diverſe accidents.

After what is ſaid of the Production of *Lixiviate Salts* and *Alcali's*, it will not be impertinent to add, that as they may, by the operation of the Fire, be produc'd, ſo by the operation of the fire, they may be deſtroyed or diſpoil'd of their Alcalizate forme, and turn'd into a ſubſtance of a Nobler nature. This I am induc'd to thinke very probable, by ſome Experiments, among'ſt which that which ſeem'd the moſt conſiderable was this: We tooke a pretty quantity of good ſalt of Tartar, that had been purifyed by ſolution and coagulation, and having put it into a Cleane Crucible, we kept it in a ſtrong Fire (that made the Crucible red hot) for a good while; then giving

it at length a ſtronger fire, we poured it or (afterwards) tooke it out of the pot, and diſſolved againe as much of it as we could in cold water, which being ſet to run through Cap-paper, there appeared, as I foreſaw, in the filter a pretty deal of Matter, that would not (as the whole Salt had done at firſt) be diſſolved in the water, but was turned into a kind of earthy Subſtance. Then coagulating againe the ſolution that had paſſed through the filter, into dry Salt; we expoſed it againe in the Crucible to a ſtrong fire, and putting it againe into water, we perceived it would not totally diſſolve, but left in the filter a ſlime or mudd. And in this manner we proceeded to ignite, diſſolve, filter, and coagulate the ſame ſalt of Tartar many times, for, if I much miſtake not, it was 16 times, and ſtill found ſuch an earthy ſubſtance as has been ſpoken of remaining in the filter; and the reſt of the Salt of Tartar ſo little alter'd, that being ſomewhat tyred, and other wayes diverted, I deſiſted from proſecuting the operation to the

the uttermoſt, concluding it highly probable, that the remaining Salt, might by the ſame way of management be brought to yeild more and more, of that ſame ſubſtance, which either was earth, or of kin to it, being at leaſt ſomewhat that was of a nature very differing from Salt of Tartar, ſince it was not like it, fiery on the tongue, and was indiſſoluble in water, as Earth, but not Salt of Tartar, is knowne to be.

The

The IV. SECTION.

IT may bring ſome illuſtration and add ſome probability to what has been diſcours'd about the *producibleneſs of ſalts*; if we conſider what happens in the Compoſitions and Decompoſitions of ſaline particles and their operations on other bodies and on one another. For if it appear that by theſe manifeſt and Mechanical wayes, ſuch Alterations may be made and ſuch qualities produc'd as are either altogether or very near as conſiderable, as thoſe which diſcriminate the ſeveral families of *Salts* formerly ſpoken of from one another, and form this or that Chymical principle; it will, I preſume, be judged the more credible, that theſe families of *Salts* may be either tranſmured into one another, or otherwiſe *produc'd*, and ſo may not be Primordial and Immutable beings in the ſenſe wherein the Chymiſts would have them to be ſuch. I have elſwhere taken notice of the Production of Vitriols

Vitriols, ſal Armoniac, Borax, and diverſe other factitious ſalts, for which reaſon, I ſhal not inſiſt on them here, the rather becauſe it may ſuffice for my preſent purpoſe, to take notice of two *Salts*, whereof the one is meerly factitious, and the other ſuch in great part, and yet each of theſe by a very ſlight and eaſie way of ordering it, afforded me differing ſaline Concretions, ſome of which reſembled a Salt which many judg the moſt ſimple and natural that we yet know of.

In the Eſſay of the uſefulneſs of Chymiſtry to the Empire of Man.

To ſhow then, that common *ſalt* it ſelf that ſeems the moſt primitive and ſimple amongſt groſs and viſible ſalts may be produc'd by a change of Texture made in body's very differing from common Salt, I ſhall recite an experiment which though it have ſometimes failed me, yet it has divers times anſwered my deſire, though I ſhall now relate but that ſingle one of my laſt tryals that ſucceeded beſt.

That which our *Engliſh* Glaſſmen call *ſandever*, and the *French*, of whom probably the name was borrowed, *ſuindever*

ſandever, and is you know that recrement that is made when the materials of Glaſs, namely *ſand* and *a fixt lixiviate Alcali*, having been firſt baked together, and then kept long in fuſion, the mixture caſts up the ſuperfluous ſalts, which the work-men afterwards take off with Ladles, and lay by as little worth: This Salt ſeldome uſed by Mineraliſts and ſcarce wont to be mentioned by the writers of Courſes of Chymiſtry, I have thought fit to employ about ſeveral purpoſes, invited thereto by conſidering the uſual way wherein it is produced. For in *ſandever* we have a Salt which was once altogether Lixiviate, but which having been kept long melted in a ſtronge fire with ſand (or flints or pebbles) muſt have had its ſaline corpuſcles variouſly and forcibly ground or rubb'd againſt another, and againſt the particles of the ſand, ſome of which it may alſo have diſſolved and retained with it, by which rude juſtlings and mutual Attritions, I thought it very Probable, that the *Alcali* muſt not only have been conſiderably altered, but variouſly

ouſly too, ſome parts being changed more and after a differing manner than others, by which means *ſandever* may conſiſt of portions differingly qualify'd both in reference to the lixiviate ſalt that was at firſt employ'd and to one Another.

We took a pretty quantity of good *ſandever*, and having diſſolved it in fair water, and filtered it, we ſet it to evapora e in a digeſtive furnace, till a ſaline cruſt, as if it were a thin plate of Ice, ſpread it ſelf upon the top of the liquor, then ſuffering it to cool and chryſtallize, we broke the mentioned cover to come at the Chryſtalls, and ſet the liquor we had poured off from them to evaporate further and ſhoot again: and in this Method we proceeded whileſt we judged worth while to do ſo; by this means we obtained a good ſtore of Chryſtalls, whoſe figures were not the ſam, but many of them differing enough, though moſt of them tranſparent and prettily ſhap'd, as if nature had at once affected variety in their figuration & yet confin'd her ſelf to Geometrize; but the chief thing for which I mention this experiment,

periment, is, by this way of proceeding, I more than once obtain'd (not on the Very ſurface of the water, as is uſual in the concretion of ſea-ſalt) but in other parts, and Chiefly beneath the ſurface of the Saline plate formerly mentioned, a conſiderable number of grains of Salt, that better anſwered to the deſcription of Common ſalt, than diſſolved and filter'd ſea-ſalt it ſelf is wont to do; for theſe grains that were of no deſpicable bigneſs were as like little Cubs or die's, as if they had been made by a skilful Jeweller, and their Surfaces had a ſmoothneſs & gloſineſs much ſurpaſſing whatever I had obſerved in Marine or Common Salt.

I may confirm the difference I have mentioned to be between *Sandever* and Common *Alcali's*, if I here add that ſome while ago having ſet a good quantity of filtered ſolution of *Sandever* to coagulate in a cool place, & thereby brought a great part of the ſalt to coagulate into Chryſtalls, almoſt like thoſe of Nitre, but ſo very Diaphanous that divers of them were clear as roch chryſtall it ſelfe; I did not obſerve them to relent by the moiſture of the

the Aire in along time, though the Glaſs they were kept in were negligently enough covered with paper only, which argues their Texture to have been remote enough from that which is proper to *Alcali's*. And to ſhew that they were alſo Salts of a peculiar nature, I ſhall further obſerve, that if they were expos'd though but to a gentle heat, they would in no long time looſe their Tranſparency, and be reduc'd to a white and fine *Calx*, which being weighed and rediſſolved in water, and made again to Chryſtallize, would be Diaphanous, and concoagulate with it ſelf ſo much of the water, as ſuffic'd to give a very notable increaſe of the weight

Sandever, which afforded me the firſt of the two Inſtances I promiſed you of the Production of ſalts, is one of thoſe body's that many would reckon amongſt thoſe that are almoſt meerly Artificial. I ſhall now mention a ſecond inſtance of a body wherein Art ſeems to have little to do ſave the eaſy extrication of its particles, from thoſe wherewith nature had

had blended it in a Humane body: If then *Mans urine* after having been kept ſome weeks in a clos'd veſſel be expoſed to a moderate fire, firſt it will yield a ſpirit and a Volatile ſalt, and then a very copious phlegm, which being totally exhal'd there will remain a dry *Caput mortuum*, and this being warily calcined, diſſolved in water, and coagulated, if the Experiment ſucceed with you as it did with me, you will find the Salt very different from a common Lixiviate *Alcali*, rather you will find ſaline Concretions of differing formes, if not kinds; for I obſerved ſome to be oblong and to look like ſmall Chryſtalls of Nitre, others to be of figures reſembling thoſe, that Geometricians call *Rhombus's* or *Rhomboides*; and one of the fairеſt of theſe Lozenges, I remember for my all ſake, I kept for many dayes expos'd to the aire, and that in winter, without finding it run *per deliquium*, as a peice of Common *Alcali* of that bigneſs would have done, in a little part of that time. But beſides thoſe numerous ſaline concretions that

I could not eaſily reduce to any known figure, there was (which I chiefly expected and would have you take notice of) a conſiderable number of fine grains that lookt like common Salt, and were indeed more exactly cubicall in their figure, than the grains of ſea-ſalt themſelves are wont to be; And I have the leſs cauſe to doubt that the ſea-ſalt abounding in our *Caput mortuum* was not a common lixiviate *Alcali*, but conſiſted of parts of other natures, eſpecially of ſuch as compos'd ſea-ſalt, becauſe I obſerved, that the *Caput mortuum* when expos'd to calcination began early to melt in the fire, before it was near calcin'd, as not an *Alcali* but ſea-ſalt would have done; alſo because the taſte was much nearer to that of brine than to that of *Lixivium*; and becauſe laſtly it would make no conflict with the ſpirit of ſalt, as an *Alcali* would have done, but did make of a ſolution of ſilver in *Aqua fortis* a white precipitate like that we make of that mixed with ſea-ſalt, but not with *Alcali's*.

And becauſe a miſchance unſeaſonably

 blyde-

deprived me of the *caput mortuum* of domeſtick Urine prepared in my own Laboratory, I was fain to procure a ſupply of fixt ſalt of Urine made by a diligent Spagiriſt of my acquaintance, who had wrought much upon that liquor; and having diſſolved and filtered a pretty quantity of this ſalt, and ſuffered the ſolution to evaporate ſlowly, till it began to have a skin, I found the Chryſtals it afforded in a cool place to be ſome of them an Inch or two long, and ſhap'd almoſt like Chryſtalls of Nitre, ſave that they were ſharper at both ends, and to many of them were faſtened ſtore of minute and oblong Chryſtalls prettily ſhap'd, which were placed almoſt perpendicularly upon the greater portions of ſalt, which by this means obtained a ſhape; not much unlike that which the *French* Engineer's call *cheval de friſe:* theſe Chryſtalls as they did not reſemble common *Alcali's* in there figures, ſo they were unlike to them in divers other reſpects. For though ſome oyle of Tartar *per diliquium* being poured upon ſome of them, there enſued no manifeſt

manifeſt commotion, as is wont to be produc'd when that liquor is mixt with a ſalt, where an Acid is predominant, yet being beaten and mixt with an Acid ſpirit as that of Common ſalt, they made not the leaſt ebullition or conflict, though they were ſtirred up and down to excite it, nor did *aqua fortis*, good enough to be worthy of that name, produce any hiſſing noiſe or froth when it was put upon the ſalt of Urine, though at length it diſſolved a good proportion of it. And though ſtrong oyle of Vitriol being put upon ſome of the forementioned Chryſtalls, did readily work upon them and in corroding them excite a good number of bubbles, yet that did not ſurpriſe me, nor make me conclude the ſalt to be Alcalizate, becauſe I have obſerved oyle of Vitriol (the not ſpirit of ſalt or *Aqua fortis*) to work after the like manner upon common ſalt, of which that the fixt ſalt of Urine did participate I judge very probable, *partly* upon the account of the *Phænomenon* newly recited, *partly* becauſe I found that by impregnating

good *Aqua fortis* with a competent quantity of the fixt ſalt inſtead of diſſolving in it ſea-ſalt, I could make it capable of corroding foliated Gold, even in the Cold; and *partly* alſo, becauſe that ſome part of the ſolution of our fixt ſalt, that was more ſlowly congulable, being mixt with oyle of Tartar, preſently grew thick and muddy, and ſoon after let fall a precipitate copious enough: And another part of the ſame ſolution did readily precipitate Silver diſſolved in *aqua fortis*, but would not ſo much as diſcolour a ſtronge ſolution of ſublimate, (made in fair water) from which a common Lixiviate *Alcali* would have immediately ſtruck down an Orange coloured powder.

A light ſuſpition I once had that the common ſalt, that moſt men eat to ſeaſon their Aliments, may in ſome degree impregnate *Mens Urine*, gave me the Curioſity to examine that of *Horſes*, which I found to require rather a ſhorter than a longer putrefaction than Humane Urine to make it fit for diſtillation; but the *Caput Mortuum* of this alſo, I was by an accident

accident hindered to examine ſufficiently, but by the ſpirit and Volatile ſalt the liquor after putrefaction eaſily afforded, it ſeem'd probable enough, that the fixt ſalt would have been not unlike that of *Mens Urine*; of which laſt nam'd olid and deſicable liquor I choſe to make an Inſtance in this place, becauſe Chymiſts are not wont to care for extracting the fixt ſalt of it, (which is therefore commonly preſumed to be like other *Alcali's*) but as ſoon as they have diſtill'd the ſaline ſpirits, throw away all the reſt as nothing worth: which practice, as generall as it is, I cannot commend, for though I am not altogether of *Helmonts* mind, where he ſaies, that *Wiſdom deſpiſes thoſe that diſpiſe the indagation of Urine, and refuſe by the fire to ſearch out its Contents*; yet I think that thoſe who underſtand the myſtical writings of ſome of the beſt Chymicall Philoſophers of former times, will look upon it as a more tolerable *Hyperbole*, than other Men or even Vulgar Chymiſts imagine it to be.

The Second Part.

Of the Producibleneſs of Spirits.

The I. SECTION.

Of the Production of Vinous Spirits.

AS for what the Chymiſts call *Spirit*, they apply the Name to ſo many differing things, that this various and ambiguous Uſe of the *Word* ſeemes to me no meane proof, that they have no cleare and ſettled Notion of the *Thing*. Moſt of them are indeed wont in the generall, to give the name of *Spirit* to any diſtill'd Volatile liquor that is not inſipid, as is *Phlegme*, or inflammable, as *Oyle*. But under this generall Terme they comprehend liquors, that are not only of a differing, but muſt be, according to their Principles, of a quite contrary nature; ſome of them being *Acid*, as Spirit of Nitre, of Salt, and of Vinegar it

it ſelfe; and ſome of them *Urinous*, or, as ſome would have it, *Volatile Alcali's*, which are ſuch Enemies to the former, that, as ſoon as they are put together in due proportions, they tumultuate and grow hot, and uſually continue to fight till they have diſarmed or mortifyed each other. Beſides theſe two Hoſtile Families of Spirits, there is a third ſort, which they call *Vinous* or *inflammable*, which though very ſubtile and penetrant, is not manifeſtly either Acid, or Alcalizate; I ſay, *manifeſtly*, becauſe the Taſte and ſmell of this ſort of Spirit is differing from both the ſorts laſt named; and yet is referr'd to one, or the other of them, by ſome Learned Spagiriſts; with whom I neither need, nor deſire to diſpute about this matter; ſince it may ſuffice for my purpoſe, if it can be made out, that all the three ſorts of Spirits above mentioned, the *Vinous* or *inflammable*, the *Urinous* or *Alcalizate*, and the *Acid* may be produced, and conſequently may be other than Primevall bodies.

And to begin with the firſt named, theſe *Vinous* Spirits are ſo producible

by Art, that we ſeldome find them produced by nature alone, which does indeed make the Juice of Grapes, but does not make wine, nor the Spirit of wine, unleſs, by the help of Man, that juice be preſs'd out, and fermented. And the caſe is yet more plaine in the ardent Spirits made of Ale, Beere, and in the like vinous ſpirits made by the decocting and fermenting the ſeeds and other parts of Vegetables. And 'tis obſervable to our purpoſe, that *Muſt* (or the Juice of grapes newly preſs'd out) does not in diſtillation yeild a Vinous and inflammable Spirit. And I remember, I had once the pleaſure to laugh at a Man, otherwiſe very ingenious, who, to catch the ſubtile Vinous Spirit that he would have me thinke was loſt in the common way of handling wort, made it worke in a huge Copper Limbeck, to catch the Spirituous parts that he thought would otherwiſe fly away; by which meanes, inſtead of the ardent ſpirit he expected, he got nothing in his Receiver but a nauſeous Phlegm. I have alſo found by Tryall, that Raiſons (which

(which we know are but dryed grapes) being diſtill'd alone afforded an *Acid* and Empyreumaticall, but not a vinous Spirit, whereas, when I carefully fermented them with a due proportion of water, they would afford me in diſtillation an ardent ſpirit like that of wine.

If it be objected, as I preſume it will, that the Vinous and inflammable Spirit, that is by fermentation obtained from body's, was actually in them before, and is only extricated by Fermentation, I anſwer, that this is *Gratis dictum*, and is therefore not to be admitted till it be proved; ſince Raiſons, and ſuch other Fermentable body's do not, upon the ſuppoſed *Analyſis* made by Diſtillation, afford a Vinous Spirit, but one that is very differing from it. And I ſee not, why the change of Texture may not turn ſome part of the Juice of Grapes, into a Vinous and inflammable liquor, ſince a little further change is able to turne the ſame Juice into a liquor that is *Acid*, and neither Vinous nor inflammable, as 'twas before. And I have found by

by tryall, that even this Vinegar; crude as it is, being Saturated with *Calx of Lead* made *per ſe*, would afford a Spirit not acid, but of a very differing Taſte, and inflammable, like the ſpirituous parts of wine. And if it ſhould be further objected, that theſe inflammable Spirits were not produced by theſe operations, but, preexiſting in the newly expreſs'd juice of Grapes, were only extricated by Fermentation, and being afterwards cover'd or diſguis'd by the acid particles of the Vinegar, were againe extricated by diſtillation, the Acid Salts having fixt themſelves upon the Lead they corroded, and thereby given the Spirits leave to forſake them: If I ſay, this be objected, I might refer you to a more full anſwer that I have elſewhere given. And at preſent it may ſerve the turne, that I put you in mind againe, that the Objection alledges no *Phænomena* to make appeare the actuall pre-exiſtence of vinous ſpirits, either in the juice of Grapes, or in the ſolution of Lead.

And though I need but deny what is barely affirmed, not proved; yet to

to examine this matter further than I had found others to have done, I did (as I elſewhere mention) make a *Saccharum Saturni* with an Acid liquor made without Fermentation, or the Addition of any liquor, from Wood it ſelfe; and then, diſtilling it alſo without any Additament, I had, (as I expected) a Spirit that readily took fire and burn't away in a blew flame, like that of Spirit of Wine. I know another Objection may be framed from the doctrine of ſome Chymiſts, who would have Spirit of Wine to conſiſt of the oyly parts of the juice of grapes rarefyed and ſubtilized. But with theſe learned Men (for ſuch I know ſome of them to be) I have not here any need to enter into a diſpute, ſince, without examining whether their opinion be true or no, if it be admitted, it will be conſiſtent enough with mine. For to ſay, that by ſubtiliation, rarefaction, a peculiar kind of Commixture with the Phlegm, or the like meanes, the oyle contained in the Juice of Grapes, (and ſeperable from it, in the forme of Oyle, if

is

it be distill'd before it be fermented;) becomes spirit of Wine, is but to assigne the *Modus* whereby Vinous Spirits are produced, but not to deny there Production. And all that my purpose requires, is, that it be proved or granted, that Inflammable Spirits are really produced, by what way soever they come to be so. I shall add, that though experience Witnesses, that Honey being skillfully fermented with a due proportion of water, will yeild a greater plenty of inflammable Spirit than the Wine it self's, that is made in diverse Countries, yet when we have carefully distill'd Honey before fermentation, it afforded us a great proportion of considerably acid Spirit, that would dissolve some Metalls, but so little oil, that the paucity seemed strange, and made it appear unlikely enough, that so inconsiderable a proportion of that liquor, should be rarefiable into so much ardent spirit, as may be obtain'd from well fermented Honey.

The

The II. SECTION.

Of the Production of Urinous Spirits.

I Proceed now to the other sort of Spirits, as those of Hartshorne, Blood, Sal-Armoniac, soot, of wood &c. That we have formerly call'd *Urinous*, because of their great affinity in many Qualities, to the more familiarly known liquor, *Spirit of Urine*. But as for these, I know not, whether it will be necessary to treat of their Origine apart; since, for ought Experience has yet assured me, these Spirits are not simple but compounded bodyes, consisting of the Volatile salt of the Concrete that afforded them, dissolv'd in the Phlegm, and for the most part accompanyed with some little oil, at first undiscerned by the Eye though afterwards it grow Visible. The presence of this Oil in most Spirits, belonging to this family, may be probably argued from the deep Tin-

cture

dure that in proceſſe of time, ſpirit of Hartſ-horne, of Blood, and diverſe other ſubjects, will acquire by ſtanding, though preſently after their diſtillation, and Firſt or ſecond Rectification, they were cleare, and colourleſs as water: The oily portion, which, whils't 'twas in very minute particles, lay conceal'd in the mixture, becoming diſcoverable in proceſſe of time by their extricating themſelves a little, and aſſociating, though not ſo farr as to emerge and flote, yet far enough to diſcloſe themſelves by the colour they give the liquor. But in Spirit drawn by the help of an *Alcali* from *Sal-Armoniac*, a Concrete not abounding in oily parts, like Hartſ-horne, blood &c. kept not only for many months, but diverſe yeares, I obſerved no ſuch diſcolouration, which was one inducement to make me, in ſpeaking of the Oleaginouſneſs of Urinous Spirits, to employ the word *moſt* rather than the word *all*.

Having therefore hitherto by Rectifications and Digeſtions obſerved nothing in theſe *Urinous Spirits* but a Chriſtalline *Volatile Salt*, moſt commonly

monly ſep rable in a dry forme, and the *Phlegm* it was diſſolved in, beſides ſome *Oleaginous Particles* that had (though at firſt unperceivedly) aſſociated themſelves to it; I ſee no great need to trouble you, with particular Inſtances about this ſort of Spirituous liquors; what has been ſaid, making it allowable for me to referre you, to what I deliver about the *Production of Salts*, where that of *Volatile* ones is mention'd.

The

The III. SECTION.

Of the Production of Acid Spirits.

AS for *Acid Spirits* that some of them may be generated or produc'd *de Novo*, seems probably deducible *partly* from what has been already delivered (in the first part of these notes) concerning the Production of *Acid Salts*; and *partly* from what will be ere long recited of *Acid* as well as of *Urinous* and of *Vinous* Spirits, obtain'd by distillation from one and the same body. And if we take the word *Acid*, as I usually do in these notes, in a familiar sense, without Cryptically distinguishing it, from those vapors that are a kin to it, perhaps the spirit of sea-salt and that of Nitre may be fitly enough propos'd as Instances of the production of Acid spirits. For though *sea-salt* and its distill'd liquor have upon some bodies the like operations;

as either of them will precipitate silver out of *Aqua fortis*, yet not only the taste of the spirit of *salt* (especially that which rises last in distillation) is exceeding different from that of crude salt, not only in strenth and penetrancy, but in this, that, the spirit is highly acid: Whereas the crude salt has a taste not properly acid, but that which by a distinct name is in *Latin* commonly call'd *Salsus*, such as that which predominates in Brine; and it does not appear; that this acid spirit did as such preexist in the salt whence it was obtain'd, so that we may suppose it to have been made rather by transmutation, than extrication. And the like I think may (and that with greater probability) be said of the spirit of *Nitre*; for though this be highly acid, yet the *Nitre* that afforded it is not at all sensibly acid; and this new vehement taste of the spirituous parts, as well as their great efficacy in dissolving Metals; and divers other bodies, seems to have been produc'd by the Violent action of the fire, (agreeably to what I formerly noted) *see Part the 1.*

which by cleaving the Nitrous corpuſcles, or by rubbing them one againſt another, or by both theſe wayes, and perhaps by ſome others, makes a comminution of them into fragments or particles, which both becauſe of their ſmalneſs and lightneſs may be elevated by the action of the fire, and becauſe of the ſame Minuteneſs and their ſharp and pointed figures may gett into the Pores of many other body's and divide their parts. I know that Chymiſts may object, that all the Acid ſpirit that can be deſtilled from *Nitre*, was really preexiſtent in it, and only clogg'd and diſguis'd by the *Alcalizate* Ingredient Wherewith it was aſſociated, as may appear by what I my ſelf relate of the ſpeedy way of making *Salt-Peter*, by putting a due proportion of the ſpirit of *Nitre* to the *Alcali*, or fixt part of *Nitre*, that remains, after the *ſalt-peter* has been fulminated or burned. But to this I anſwer, that this proves indeed, (what I readily grant) that *Salt-peter* may be Artificially compounded of a *Nitrous* Spirit and a fixt *Alcali*, but does

does not prove that Nature does alwayes, or ſo much as ordinarily produce Nitre by the ſame wayes, that is, by compounding it of the ſame Ingredients: for it does not appear, that wherever *ſalt-peter* is generated in the Earth, Nature has before hand laid in a proviſion of Lixiviate Salt, which (at leaſt in theſe Countreys) is not wont to be made without the violence of an incinerating fire and of Corroſive Spirits, to obtain which or either of them, Artiſts are fain to employ Vehement fires; whereas it ſeems that *ſalt-peter* is ſlowly generated in the Earth by gradual or ſucceſſive Alterations of ſome Idoneous Matter, wherein for ought I have obſerved, not an *Acid* but an *Urinous* ſalt is predominant, as may be made probable by what I have formerly related about Earth, that had long *lain* covered with pigeons dung in a dove-houſe, which I found by Deſtillation to yeeld a *Volatile* ſpirit and ſalt, much like thoſe of *Vine*. Therefore I will not affirm, that Nature does never employ *fixt Alcali's* and *Acid Spirits* to make

salt-peter, yet I see not that Chymists have hitherto given us, or perhaps offer'd us any cogent proof, that she must necessarly do so. I further observe this more considerable Argument, that, according to what I formerly noted, *salt-peter* destill'd in close Vessels afforded us but an inconsiderable quantity of fixt salt, and that too, was but a very imperfect *Alcali*; though the quantity of *Nitrous Spirit* was great enough to perswade us, that not any-thing near so much as was wanting of the entire weight of the *salt-peter* had pass'd into the Receiver. And elsewhere I relate, that a freind of mine with the helpe of a peculiar Clay obtain'd near a pound of Spirit of *Nitre* from a pound of *salt-peter*; whereas on the other side by a differing way of Managing it, and without Additament, I obtain'd, as I there relate, about ten ounces of *fixt Nitre* from a pound of salt-peter: whence it seems probable, that the same substance that in crude *Nitre* is almost insipid, may by an operation of the fire be de-

stil-

still'd into a highly *Acid Spirit*, as well as by another operation and way of management, be brought into the nature of a fixt and Caustick *Alcali*. It may also be worth considering, whither the Spirits of *Nitre* themselves, when after being made *sui juris* they compose a distinct liquor and are specificated, may not be depriv'd of their *Acid Nature*, and may become or at least materially concurr to make up a fixt *Alcali*: For if sea-salt, which Chymists do not pretend to contain any such *Alcali*, be thorowly dissolved in a sufficient quantity of *Spirit* of *Nitre*, and impregnated, this compounded salt will, as I have formerly noted, yeeld a considerable proportion of fixt *Alcali* like that of *salt-peter*, which is as likely to proceed from the Nitrous, as from the Marine part of the resulting salt; and if it do, it will make it the more probable, that it is not necessary, that the saline corpuscles of Spirit of *Nitre* should be primordial bodies, since they may be destroy'd or turn'd into o-

ther ſalts, which is not leſs repugnant to the nature of a *Principle*, than 'tis to be *De Novo* producible from a body that was not *Acid* before.

The

The IV. SECTION.

IT may add much probability, to what has been above diſcourſed, concerning the producibleneſs of the differing ſorts of *Spirits*; if it ſhall appeare, that the ſame body, meerly by different wayes of ordering it, may be eaſily enough brought to afford, either *Acid*, or *inflammable*, or *Volatile* commonly called *Urinous* ſpirits, as the skilfull Artiſt pleaſes.

An Inſtance of this may be afforded us, by ſome *Legumen's*, as Peaſe, or Beanes; which if they be newly gathered and diſtilled in a Retort, 'twill I preſume be eaſily granted, that they will like many other green vegetables afford, beſides a great deal of Phlegme, an Acid Spirit, and if I much miſremember not, I had ſuch a ſpirit from either peaſe, or beanes, or both, after they had been kept long enough to looſe their verdure: But if theſe ſeeds be at a fit time duely fermented with common water,

I thinke it will not be doubted, but that they, as well as other mealy seeds, will yeild an ardent spirit, but it will not so easily be suspected, much lesse beleeved, that without adding any thing to them, or medling with them, barely by keeping them in a dry place, for a certaine number of months, they will yeild a spirit that by one, that did not know whence it proceeded, would be judged near of kin to the spirit of *Urine*, or of *Hartſ-horne*, and to other saline liquors drawn from animall substances; for having distill'd these *Legumen's* by themselves, without any additament, and without so much as breaking them, they afforded me spirits, not only far more like in smell to those, I have compared them to, than they were either to *Acid*, or *Vinous* Spirits, but very like them, in more intimate qualities: since they would, as the Spirit of *Urine* and *Hartſ-horne*, make a conflict with *Acid* spirits, turne Syrrope of Violets greene, dissolve Copper blew, precipitate a solution of sublimate into a white substance, and in a Word performe

performe those things, which I many yeares ago delivered in the Tract about *Colours*, and severall ingenious writers have since embraced, as the distinguishing markes of *Volatile* and *Urinous* salts, or spirits. I say *salts or Spirits*, because I found that these drawn from Vegetables, as well as those afforded by Animalls, may easily by a dexterous sublimation be brought to exhibit many of their nobler parts in the forme of a dry salt, as well as in that of a spirituous liquor.

Another instance I shall take from the juice of grapes, though Chymists will perhaps thinke it strange, that I should undertake to accommodate it to my present purpose, but there is no great mystery in the business, for the fresh juice of grapes or must, though sweet in taste, will if it be timely distill'd to the Consistence almost of a Syrrope, yeild a copious flegme, but not an ardent Spirit: if the superfluous moisture be skilfully evaporated, there will remaine a kind of *Rob* or *Sapa* of a pleasant tartnesse, which I have known used in some places, (as especially in, or neare

neare *Suizerland*,) for an excellent ingredient of ſauces, and alſo, to be ſpread upon bread to be eaten inſtead of butter.

But if this *Raiſinee* or *Sapa* were preſently diſtilled, I ſuppoſe it would yeild no *Vinous*, but an *Acid* Spirit: I ſaid, *I ſuppoſe*, becauſe for want of Vineyards in *England*, I could not examine any liquor taken out of great Veſſells of Muſt, and therefore cannot ſay preciſely and experimentally, what diſtilled liquors it would afford; ſince I know not certainely whether the great quantity of the ſweet liquor, and its continuance for ſome time (though not a long one) in the ſtate of what they call *Muſt*, may not ſomewhat alter it's productions, but if, as it is probable, that diverſity be not conſiderable, I may ſafely ſuppoſe, that the *Vinous* ſpirit afforded by the Juice of Grapes, after fermentation has turned it into Wine, is a produced thing, and was not in that forme preexiſtent in the Juice; for having purpoſely cauſed ripe grapes to be moderately preſs'd, that their Juice may without much dreggy matter

matter be Squeezed out, we put this liquor into a glaſs head and body, and diſtilling it with a gentle fire, we obtained a ſcarce credible proportion of flegme: And then tranſferring the ſomewhat inſpiſſated remainder into a Retort, after having kept ſome of it (which had a grateſull mixture of ſweetneſs and acidity) for *Raiſinee*, we proſecuted the diſtillation with a ſtronger fire, and obtained not a *Vinous*, but an *Acid* Spirit, as we found not only by it's ſmell and taſte, but by it's corroding fragments of Corall, even in the cold, by it's growing ſweet upon *Minium*, &c. Agreeably to which experiment I found by tryall, that Raiſons, which conſiſt chiefly of the Juice of Grapes, inſpiſſated in the skins or huskes by the avolition of the ſuperfluous moiſture through their pores, being diſtill'd in a Retort did not afford any *Vinous*, But rather an Acetous Spirit, that, as an *Acid* liquor, would worke upon diverſe bodies, as ſpirit of Vinegar would have done, and yet as it was formerly noted, 'tis known that *Raiſons* being

ing in a due proportion fermented with common water will after a certaine time afford a *Vinous* and inebriating liquor; and though this time in the better ſort of the knowne wayes, of making artificiall wines, is wont to amount to many months, yet I have practiſed a way (which conſiſts chiefely in a determinate proportion of the water to the *Raiſons*,) by the help of which the liquor in very few weekes becomes fit to drinke, and conſequently to afford by diſtillation a *Vinous* ſpirit; but this only upon the by.

I ſhall now add, which probably you will thinke ſomewhat ſtrange, that from the Juice of Grapes even after it has been duely fermented, there may be Obtained a diſtilled liquor, which having not found mentioned in Authors, I thought that I might take the liberty to name, and upon the account of it's taſte, and ſome other qualities to call it the *Acid ſpirit of Wine:* to ſatisfy you therefore, that there is ſuch a liquor, I will not make uſe of *Rheniſh* wine or other wines, that are thought to reliſh

reliſh of Acidity, but I will acquaint you, with an Experiment that I choſe to make upon Sack, as a Wine fully ripe, and more remote from an Acid and Tartarous nature, than thoſe are wont to be, that are made in leſs hot Climates. We tooke then ſome good *Sacke*, and having a digeſtive Furnace, and in a glaſs-head and body ſlowly drawne off the Ardent ſpirit firſt, and then the Phlegm, (which even in this generous Wine was copious) till there remained a liquor of the conſiſtence of a ſomewhat thin ſyrup, we removed it into a Retort, and diſtill'd it by degrees of fire, whereby we obtained, beſides a ſouriſh flegme that came firſt over, a true acid ſpirit, as appeared not only by the taſte, but by the hiſſing noiſe and numerous bubbles that were produced, when we poured it upon a Lixiviate ſalt; as alſo by this, that having put it upon powdered Coralls, it began briskely to diſſolve them, even in the cold; we likewiſe made it corrode ſome metalline, and minerall bodies, of which 'tis not here neceſſary to give you an account, no more than

than of the black ſubſtance that remained after the diſtillation; only two things I will here intimate about them. The one, that as this Acid ſpirit of Wine has its origination differing from that of other known Acid ſpirits, and even from ſpirit of Vinegar, ſo I thought it not irrationall to conjecture, that it might have ſome peculiar qualities, whoſe diſcovery I leave you (if you think it worth the while) to proſecute: only by way of encouragement, as well as hint, I ſhall tell you, that having put ſome of it, for a certaine reaſon, upon filings of copper, in ſuch manner that ſome of them, after being wetted with the ſpirit, ſhould remaine expos'd to the Aire, and others lye beneath the liquor, I found though the tryalls were made in the cold, that in a day or two, the expoſed filings had gained a fine blewiſh green colour, but the ſpirit that ſwam upon the other filings, did in few hours acquire a fine redneſs, which afterwards in two or three dayes degenerated into a colour, like that of the expoſed filings. The other thing I will

will note, relates to the *Caput Mortuum* of the diſtilled Wine, which I found a more fixt body than one would have expected, and it is that though probably the finer part belonging as to other Vegetable mixts, ſo to the Juice of Grapes, being attenuated and ſubtilized was changed into an ardent ſpirit, and therefore appeared not in the diſtillation, in the forme of Oyle, yet 'tis not unlikely that the courſer part of the oleaginous ſubſtance remained ſtill in the *Caput Mortuum*: for holding it in the flame of a Candle, I obſerved that it would partly exhale in thick ſmoke, partly melt, and as it were fry, and and partly burn with an actual flame, which was not only continued while the flame of the Candle cheriſhed it, but would after it was removed from the Candle, continue a pretty while to flame upon its own account, and a parcell of it, being caſt upon quicke, (but not upon flaming) coales, burned with a blaze, almoſt as if it had been Amber, or Bitumen. I could here tell you, of fine *Chryſtalls of Wine*, that I many yeares

yeares ſince made by a peculiar way, of the above mentioned extract of Sacke; but this may be elſewhere more fitly mentioned.

To returne therefore to our Juice of Grapes, we ſee that meerly by a ſeemingly ſlight difference in the management of it, it may be made to afford either a *Vinous*, or *Acid* ſpirit, and I ſhall now add, that it may alſo be brought to yield a *Volatile* or *Urinous* one; for 'tis known that in proceſs of time, Wine affords *Tartar*, and though Chymiſts ſuppoſe the ſpirit of *Tartar* to be of a quite differing nature from that of *Urine* and of *Soot*, and though I have elſewhere ſhewn that *Tartar* diſtilled the common way affords a double ſpirit, namely an *Acid*, and another that I thought fit to call *Anonymous*; yet I elſewhere ſhow that by a peculiar and ſlow way of operating, I have been able to obtaine (though perhaps not conſtantly) from crude *Tartar*, without any Additament, a ſpirituous ſubſtance, that in taſte, ſmell, and divers manifeſt operations, much more reſembled the Volatile ſpirit of *Urine*

or rather that of *Soot*, obtained as mine of *Tartar* was, by meere diſtillation, than an *Acid Spirit*: with which (ſo little did they agree) it was diſpoſed to make a conflict as ſoon as they were put together. But ſuch a kind of *Volatile* ſubſtance may be far more eaſily obtained from the Lees of Wine, than from *Tartar*, for having been accidentally informed, that an expert Chymiſt in *Germany* had found the way to get ſtore of *Volatile Salt* from lees of Wine, I reſolved to try whither it might not be done without any addition, and having procured ſome of the beſt lees (I could get) of *Rheniſh* Wine, I cauſed them to be expoſed in broad Veſſells to the Sun, and the free aire, (which circumſtance yet I am not ſure is neceſſary) that they might leaſurely be dryed, if not alſo be impregnated in order to the *Volatility* of their ſaline parts. Then theſe dryed *fæces* being carefully diſtilled in a Retort by degees of fire, the liquor was ſlowly rectified, by which meanes there aſcended before the Phlegm a ſpirituous

part, which would turne Syrup of Violers greene, precipitate diſſolved ſublimate into a white powder, ſoon colour it ſelfe upon Copper with a deep blew, and in ſhort do ſeveral things, by the performance of which we have elſewhere diſtinguiſhed *Volatile Salts* and Spirits, from *Acid*, and from *Vinous* ones. By all ſuch Tryalls upon the Juice of grapes, we may inferr the truth, we intended to prove by them, namely that the ſame matter as it is differingly managed, may be made to afford an *Acid* (beſid s one that is truly *Acetous*) a *Vinous* and a *Volatile* ſpirit: beſides that, *ex abundanti* it may alſo be made to yeild, as I have noted in mentioning the diſtillation of *Tartar*, another ſort of ſpirituous ſubſtance, as yet *Anonymous*.

The

New obſervations about the Adiaphorous ſpirits of Woods and divers other Bodies.

AND now having faln upon the mentioning of this ſort of ſpirits that I have call'd *Anonymous*, ſince I Remember not that the notice I gave the Publique of them * has engaged any writer to examine them; I am content on this occaſion to touch upon ſome of the more quicke and eaſy tryalls that I have made about this kind of Liquors, that I may both excite and ſomewhat aſſiſt the Curioſity of thoſe enquirers, that ſhall attempt to make a farther diſcovery of the nature of theſe ſpirits, which when I firſt ſeparated from the Acid ſpirits, wherewith Chymiſts had before confounded them, as ſtiling them and taking them to be meerly the Acid ſpirits of *Tartar*, *Wood*, &c. their properties were ſo little known to me, that I contented my ſelfe to ſtile them *Anonymous ſpirits*: but ſince having found them

* *This was done in the Sceptical* Chymiſt

them to differ in divers qualities, both from *Vinous*, from *Acid*, and from *Urinous* ones, and having not sufficiently discovered their positive properties; I was wont to give them a negative appellation, and call each of them the *Neutrall* or *Adiaphorous* spirit of the body that affords it (whether it be *Tartar*, *Wood*, or any other like concrete.)

But before I descend to particulars, it will not be improper to premise in generall, three or foure things not unfit to make way for the observations that are to follow them.

1. I know not whether it will be requisite to repeat in the first place, that our *Adiaphorous* spirit may be obtain'd by distilling the Liquor that is afforded by Woods and divers other bodies, *by Distilling this Liquor* I say from Coralls, or calcin'd Lead, for by this meanes the Acid corpuscles of the *Menstruum* will worke upon the Corall or the Lead, and so fasten themselves to what they corrode, that they will easily enough part with the *Adiaphorous Spirits*, which by this meanes are permitted to ascend by them-

themselves and fall into the Receiver, in the forme of a liquor. This, as I was saying, I know not whether it be necessary to insist on in this place, because I have already mentioned it in another paper: but I think it may be very pertinent to relate here, that I endeavoured to try whether there was not a difference in gravity or fixedness between the *Acid* and *Neutrall* spirit of Wood, without mortifying the first, and whether by the help of this gravity and fixedness I might not be able to separate, at least in great part, the *Acid* from the other, and so preserve it in its distinct nature.

In order to this, I caused a pretty quantity of the rectifyed spirit of *Box* to be slowly distill'd in a glass Body and Head plac'd in a sand cappel with the flame of a Lamp, as that which would give a more gentle and regular heat than Charcoal, as indeed in the first 24 houres or thereabouts this furnace afforded but about two spoonfulls of liquor, and though the *Menstruum* first put in scarce exceeded by our guess one pint or pound (if it were so much) yet it was divers dayes

and nights in drawing over. And in this operation the next obſervable circumſtances were theſe two. 1. that the liquor that firſt aſcended was not Phlegme, but had a very penetrant taſte, yet without any manifeſt Acidity, diſcoverable by the tongue, though by putting it upon fine powder of Corall (whether crude or calcin'd I remember not) yet had ſome operation that made mee think it not altogether devoid of Acid particles. Secondly having often ſhifted the Receiver, the better to judge whether the portions of the aſcending ſpirit were conſiderably different in quantity, I found that towards the latter end the liquor that came over was ſharper than before, and having at length diſtill'd all I could make to ariſe, we found the laſt parcell of liquor (which was copious enough) to be of a good yellow colour, (though thoſe that preceded it were limpid enough) and both to ſmell ſtrong of Vinegar, and to taſte more acid upon the tongue than ſpirit of common Vinegar it ſelfe: ſo that if I had not known how it was obtain'd, I had ſuſpected

ſuſpected it to be what the Chymiſts call *Acetum radicatum*, and accordingly I found it to be a very active *Menſtruum* in the diſſolution of ſome body's that for tryalls ſake were put into it. All which ſeems to argue, that the Acid portion of ſuch diſtill'd liquors as I have been ſpeaking of, is more ponderous, or more fixt than the *Adiaphorous* ſpirit which upon this account may be in great part ſeparated from it, by bare diſtillation, if it be warily enough made.

My ſecond generall remarke ſhall be, that I have obſerv'd theſe *Neutrall Spirits* to be not all of them in all things of the ſame nature, ſince though they agree in ſome generall attributes, which ſuffice to entitle them to the ſame ſpecies or denomination, yet they ſometimes differ from one another in particular qualities: which advertiſement I thought it neceſſary to premiſe, that it may not ſeem ſtrange, and that I may not be blamed, though ſome of the tryalls I ſhall ſet downe do not punctually ſucceed in their hands, that ſhall not make uſe of the *Anonymous* ſpirit of *Box*, which I employ'd;

not becauſe I think it better than any other, but becauſe amongſt divers that I have made uſe of, I had then a greater quantity of it at hand. But though for this reaſon, when I ſhall ſpeak what I have obſerv'd in an *Adiaphorous* ſpirit, without naming it, I would be underſtood of the ſpirit of *Box*, which I had freed from its Acid mixture by diſtilling it from calcin'd Corall, yet I ſhall not ſo confine my ſelfe to this, as not to mention now and then, ſome other ſpirit of the ſame family.

The third generall obſervation that I ſhall make about our *Adiaphorous* ſpirits, is, that though the few Chymiſts that have taken any notice of the diſtilled liquors, for example, of *Woods*, were wont by reaſon of their Acid taſtes to looke upon them, as of a meerly Acetous nature, and having accordingly call'd them the Vinegars or Acetous ſpirits of Wood, yet really the Acid portion of theſe diſtill'd liquors, is far from being the greateſt: for beſides what other tryals I have purpoſely made, I remember I took eight ounces of the rectifyed

ſpirit of *Box*, wherein the Acetous and neutrall ſpirit remain'd confounded, as they had been in the firſt diſtillation, and having poured this upon a quantity of Calcin'd Corall, ſufficient to ſatiate the Acid Corpuſcles, (which quickly fell to corrode it with noiſe and bubbles) we gently diſtill'd it to a dryneſs in a glaſs head and body, by which meanes we obtained of *Adiaphorous* ſpirit, but eight grains leſs than ſeven ounces and an halfe, and ſome of the *Menſtruum* having been waſted in the operation, the Acid corpuſcles remaining in the bottom with the Corall they had corroded, weighed but between two and three drachmes; which ſhews, that notwithſtanding the not contemptible quantity of ſtrong ſpirit of Vinegar, that by our lately recited obſervation the diſtilled liquor of *Box* do's containe, the Corpuſcles that make it ſo Acid being concentred, take up but a little roome. And ſince it was rationall to ſuſpect that the Acetous Corpuſcles being made without fermentation, might have ſomething peculiar in their nature, I caus'd them

to be gradually diſtill'd with a ſtronge fire from the Corall, and thereby obtained a very red ſpirit, of which, though many Chymiſts would take it for a *Volatile* tincture of Coral, I ſhall only obſerve, that its ſmell was very ſtronge, and its taſte exceeding penetrant, but very differing from that of *Acid liquors*.

Whether our *Adiaphorous* ſpirit may (as I ſometimes ſuſpected it may) be generated, by a commixture of the finer parts of the oyl of the wood reduc'd to an extraordinary ſmalneſs, and thereby capable of being exquiſitely mixt with the Phlegme, and ſtrictly aſſociated with it's particles, I ſhall ſtay till I be better furniſhed with experiments, before I venter to determine.

Having premis'd the foregoing generall obſervations, I ſhall proceed to particular *ones*, as ſoon as I ſhall have advertis'd you, that for the better diſcerning the *Phænomena* to be produc'd, I choſe to make almoſt all the following tryalls in Cylindricall glaſſes of about an inch in *Diameter*.

To the *Phenomenon* I am about to take notice of, I therefore give the firſt place, amongſt thoſe produc'd by the help of our *Adiaphorous* ſpirit, becauſe 'tis uncommon and not unpleaſant: for though we have many Experiments of the ſuddain *tranſmutation* of colours, whereby we change one into another, yet we have very few of the production of colours *De Novo*, in body's that were colouriesſs before. And I remember not, that the writers I have ſince met with, have added any Experiments of this kind, to thoſe three or foure that I have mentioned in the *Hiſtory of Colours*.

1. I ſhall begin then with obſerving, that having into our *Adiaphorous* Spirit of Box dropt a convenient quantity of ſtronge and tranſparent oyle of *Vitriol*, and ſhaken the liquor together, there preſently emerg'd a rich and lovely red colour, which at firſt was *Diaphanous*, but afterwards grew ſo deep, that it was opacous, though by ſhaking the glaſs, the thin liquor that would ſlowly glide downe the inſide of the glaſs, being

being held againſt the light, manifeſted, that the colour was ſtill red, though much more darke and muſcadine-like than before.

2. Some common *Aqua fortis* being put to our neutrall ſpirit and ſhaken a little with it, preſently gave it a rich Amber or high yellow colour, but not a true red: but if the liquors were not mingled by Agitation, the ſpirit did but ſlowly and gradually obtaine the above mentioned colour, which was ſomewhat deeper than that of Sacke; after this change the liquor continued tranſparent, and (which is a circumſtance not to be omitted) the change at firſt was wrought without any manifeſt precipitation, though afterwards, when the mixture had reſted a good while, there appeared ſome little and light feculency at the bottom of the glaſs, and the inſide of it, as far as the liquor reached, was ſullyed with a cloudineſs not eaſy to be waſhed off. One circumſtance more of this tryall I muſt not omit, which is, that notwithſtanding the ſtrong and offenſive ſmell that is wont to be juſtly complained

plained of in *Aqua fortis*, in our mixture it was either none or but very faint, being conceal'd (if I may ſo ſpeake) or ſuppreſſed, and partly perhaps diſguis'd by the predominant odour of the *Adiaphorous* ſpirit.

3. Some ſpirit of *Salt* being mingled with our ſpirit of *Box*, the mixture became much leſs *Diaphanous* than the liquors had been before their conjunction, and for a day or two was only whitiſh, but when we removed it into a digeſtive furnace, and kept it there for many houres, it acquired a colour high enough, partaking of browne and yellow, and appeared to have let fall ſome little ſediment to the bottom of the glaſs.

4. Having put ſome of our *Adiaphorous* liquor on ſalt of *Tartar* it had not any ſenſible operation on it that we tooke notice of, ſave that it diſſolved the ſalt, and after ſome digeſtion appeared of a yellow colour tending to browne, and faſtned to the inſide of the Phiall in many little graines of Salt, that ſeem'd to have been firſt diſſolved and then coagulated

ted againe in newly emergent figures.

5. Our *Adiaphorous* liquor being confounded with high rectifyed ſpirit of *Wine*, neither of them appeared to change colour much (for ſome change there was towards yellowneſs) or be opacated by their conjunction, even after ſome dayes digeſting; but the *Vinous Spirit* did not hinder the other from being turned red by the action of ſome potent *Acid*, when it was poured on the mixture.

6. Rectifyed ſpirit of *Urine* being put to our *Adiaphorous* liquor did not make any conflict with it, but joined with it quietly, as the above mentioned ſpirits had done, and did not manifeſtly change the colour of either of the liquors, whiles they were kept many hours in the cold, but being transfer'd into a digeſtive furnace and kept there a night or two, the liquor acquired a high colour, which was almoſt Orange-browne, and there appeared ſome little *fæces* at the bottom. Having made theſe tryalls upon our ſpirit with ſimple liquors,

liquors, I thought fit to make ſome with ſuch compounded liquors, as the ſolution of Metalls are, to ſee if our ſpirit, though neither manifeſtly of an *Acid*, or an *Urinous*, or a *Lixiviate* nature, would procure precipitations of any part of the diſſolv'd Metalls.

7. In proſecuting this enquiry I dropt into ſome of our ſpirit, a little ſolution of refin'd Gold, which at firſt imparted there to it's own colour (perhaps ſomewhat hightned) but the mixture quickly loſt it's tranſparency and grew muddy, and after a while let fall a conſiderable quantity of ſediment or Precipitate, the ſupernatant liquor having acquir'd a browniſh colour.

8. Having mixt our ſpirit with a good ſolution of crude *Lead*, made with an appropriated *Menſtruum* that diſſolves it readily and cleare, almoſt as *Aqua fortis* does common *Silver*, the mixture preſently grew muddy, and at length after ſome dayes let fall a copious ſediment, over which ſwam a liquor between brown and red.

9. We

9. We put to our ſpirit of *Box* ſome fine ceruleous tincture or ſolution of Copper, made with an Urinous ſpirit, (as of putrifyed Urine or Sal Armoniack) and ſoon perceived the mixture to grow troubled, which afforded us, though but very ſlowly, a copious reſidence.

10. We mingled with our ſpirit a convenient quantity of ſtrong infuſion of *Sublimate* made in faire water, but found not any manifeſt reaction betweene thoſe liquors, no more than we did between dry and undiſſolved *Sublimate* and the ſame ſpirit, when we kept them together in this ſame Phial.

11. Mixing our ſpirit with oyle of *Tartar per deliquium* there did not ſuddenly appeare any manifeſt change, but having digeſted the mixture for ſeverall dayes, there precipitated a light feculency, and the ſupernatant liquor, which was tranſparent, appeared of a colour inclinable to red.

12. We alſo mingled with ſome of our ſpirit a convenient quantity of *Vitriol of Copper* diſſolved in faire water, till the liquor ſeem'd ſatiated with the

the Vitriol, but I remember not that in ſome dayes, the ſolution grew manifeſtly opacous or diſcoloured.

13. We put to our ſpirit a ſolution of *Tin*, made in a *Menſtruum* that diſſolves it cleare, and found very little alteration to enſue, though we left the liquors many houres together.

14. But when I put to our ſpirit a convenient quantity of the ſolution of *Mercury*, made in *Aqua fortis*, the colour of the mixture became firſt deeply yellow, and in a minute or two intenſely red, and being digeſted for ſome dayes, I found at the bottom of the Phial a white Precipitate, much more copious than I expected, and the tranſparent liquor, that ſwam above it, was of a rich golden colour; whether Phyſitians or Surgeons ſhould thinke fit to employ this Precipitate, or this tinged liquor for Medicinall purpoſes, I ſhall leave them to conſider.

15. Severall of the foregoing Experiments were tryed with the ſpirits of other Woods than *Box*, and in particular with thoſe of *Oake* and *Guajacum*, the *Prænomena* of which Expe-

riments were not alwaies the ſame with thoſe above recited, which may probably argue ſome difference in the nature of ſuch ſpirits, as well as there is in the conſtitution of the Woods that afforded them; nor for certaine reaſons have I thought fit to recount here all the tryalls I have made with the *Adiaphorous* ſpirit of *Box* it ſelfe, of which ſort I ſhall for example ſake name only two, which I remember as having been the lateſt I made, whereof the *firſt* was, That having put ſome of our neutrall ſpirit upon ſome pieces of fine red *Corall*, and kept them there many dayes, the liquor did not appeare to have extracted any tincture from them, though the upper part of the higheſt fragments ſeem'd to be turn'd white. And the *other* was, That having taken a parcell of ſpirit that came over by rectification in a Lamp furnace long before the more fixt Acetous ſpirit came to aſcend, and having purpoſely expos'd a Phiall ſcarce halfe full of it, in a very ſharpe frоſty night in a Garden covered with Snow and Ice, it was taken up the next morning

ning, not at all frozen, but leſs limpid than before, and this little opacity did (ſomewhat to our wonder) remaine more or leſs for ſome weekes after.

The third Part.

About the Produciblenes's of Sulphurs.

THose ſubſtances, that Chymiſts are wont to call the *Sulphurs* of the mixt bodies, that by the help of the fire are brought to afford them, are not of ſo uniforme a Nature as might be expected in the portions of the ſame Principle. For as on the one ſide Chymiſts make *inflammability* to be the conſtituent Character of *Sulphur*, ſo on the other ſide, 'tis obvious enough to thoſe that are any thing vers'd in *Spagirical* operations, that there are at leaſt three ſubſtances manifeſtly differing in Conſiſtence, Texture, or both, that, according to the notion lately aſſign'd

aſſign'd, ought to be referr'd to *Sulphur*. For *ſometimes* the Inflammable ſubſtance, that is obtain'd from a mixt body by the Intervention of the Fire, appears in the forme of an oyle, that will not mingle with water; *ſometimes* in the forme of an ardent ſpirit, that will readily unite with that liquor; and *ſometimes* alſo in the forme of a Conſiſtent body, almoſt like common *Sulphur*.

Notwithſtanding theſe various formes, in which it appeares 'tis not impoſſible but that in *many* mixt bodies, not to ſay in *all*, what is called *Sulphur* may be no Primordiall Ingredient, but rather a Generated or Reſulting thing. For that which is common to theſe differing bodies, that paſs under the name of *Sulphurs*, and which is the conſtituent quality (if I may ſo call it) that diſcriminates them from the other materiall Principles of mixt bodies, muſt be confeſs'd, if we will ſpeake intelligibly, to be *Inflammability*, or if you pleaſe, a *diſpoſition to be turned into Fire*, and uſually alſo into flame. Which being premis'd, I con-

ſider here, that *Sulphur* it ſelfe is made of the ſame Univerſall matter, whereof other Bodies conſiſt, and is but a Coalition of certaine particles thereof, whoſe Aggregate, by having ſuch a Contexture, Motion, &c. acquires thoſe properties, for which a Body is called *Sulphur*. And therefore if the like contexture happen to be found in other Portions of matter, or (to expreſs my ſelfe more fully) if Art, or chance can frame and bring together Particles of matter, and give them ſuch a Contexture as is apt and ſufficient to diſpoſe them to be kindled and flame or burn away; Theſe Qualifications of ſuch an Aggregate of Corpuſcles will ſuffice to conferr on it the nature of a *Sulphur*, whether this portion of Matter do, or do not conſiſt, or copiouſly participate, of the Chymiſts Primevall *Sulphur*. For it is not by vertue of the long preceeding Duration of a thing, but by that of the Eſſential Qualities belonging to it, that a Body deſerves this, or that Denomination. As the *Snow* that fell yeſterday, and was

was generated in a trice, is as true *Snow*, as that which has laine, perhaps for many years, on thoſe *Alpes* that are alwayes cover'd with *Snow*, or on the higheſt Mountaines of the frigid zone. And in the Judgment of the Chymiſts themſelves, a Pound of *Quick-Silver* recently tranſmuted by a graine or two of their *Elixir* into Gold, becomes as true Gold, as that which was coevall with the Mountaines, where nature has form'd the Ancienteſt Mines of that Metall.

The I. SECTION.

Of the Production of Oyles.

That 'tis not neceſſary, the *Oyles* or *Sulphurs* obtain'd by the Fire from mixt bodies, ſhould be a Primevall Element or Principle, may be probably argued from the Experiment mention'd in the *Sceptical Chymiſt* about the Growth of Plants nouriſh'd by meer water, which nevertheleſs by Diſtillation afforded an oyle. And we ſee that in Almond trees, walnut trees, and divers others, the raine water, that inſinuates it ſelfe into their roots, is by ſucceſſive changes of Texture reduc'd into the Oyle which the Fruit by expreſſion ſo plentifully affords. And to confirme our Experiment from the growth of Plants by tranſmuted or aſſimilated water, to obviate the ſuſpition of common waters being impregnated with the groſſer Juices of the Earth, I employ'd diſtill'd water. About which

which Experiment I find this ſhort memoriall among my *Adverſaria.*

[A Sprigg of Mint put into Raine water diſtill'd, and fed almoſt wholly with rediſtill'd Raine water weighed July 15. gr. 3. and was taken out Auguſt the 14. and being well dryed with Paper and a Cloath, weighed 10. graines and about a Quarter: So that within leſs than a Month it grew to be three times as heavy, as when 'twas firſt put in. Another put in, and taken out at the ſame time, with the former, had attained within leſs than a Month to near four times it's firſt weight, and had ſhott out a ſecond ſprigg much higher than the firſt, and ſtore of Roots, ſome of them near as long againe, as the whole plant when it was firſt put in]

If we conſider what a great quantity of Oyle is afforded by an Olive-yard, whoſe Trees are probably, as well as thoſe that beare Apples, Cheries, and other kinds of Aqueous fruits, nouriſhed chiefely by Raine water, that being imbibed by the Roots is by various digeſtions, or preparatory changes, turn'd into

to Oyl in the Olive, it will not appeare unlikely, that *Oyle* may be produced of other ſubſtances; ſince in our inſtance it ſeems to have been made by tranſmutation of water, though this be generally reputed to be of all Liquors the moſt contrary to it, and is evidently of a nature exceeding diſtant from it.

And here I ſhall relate an Experiment, by which I attempted to produce it, out of only two diſtill'd liquors, that according to the common eſtimation of Chymiſts are uncompounded Bodies, and whether they be really ſo or not, are each of them readily diſſolvable in water, and in one another. Take then of Oyle of Vitriol, and of ſuch ſpirit of Wine as is totally inflammable, an equall weight, mix them together by degrees, leſt the heat they will produce ſhould breed ſome inconvenience, and having digeſted them a good while (which yet is not abſolutely neceſſary) with a very wary management of the fire (for elſe the Experiment will eaſily miſcarry) draw off what will come over,

over, and if you goe to worke, as I have ſeverall times done, you ſhall obtaine beſides a ſubtill and odoriferous ſpirit of Wine and an *Acid* ſulphureous Liquor, a conſiderable quantity of Chymicall Oyle, which I have had ſometimes deeply colour'd, ſometimes clear like faire water, and this Oyl you will perchance looke on as an odd liquor, when I tell you that I have had it, ſometimes exceeding fragrant, and (though the oyl of Vitriol be ſo highly Corroſive) without any Acidity at all, the Taſte of it being very ſubtile and penetrant, but no way like that of any ſaline liquor, that we know. This hath ſometimes inticed me to doubt, whether it hath been made of the ſpirit of Wine, or of the oyl of Vitriol. The Circumſtances laſt mentioned ſeem to perſwade the former; eſpecially if I add to them, that I found by Tryall purpoſely made that this oyle would readily mix with good ſpirit of Wine that had never had to do with oyle of Vitriol, but on the other ſide it ſeem'd conſiderable, that the

oyl

oyl of *Vitriol* by this operation was much weakened and changed, and it appear'd not, whence the ſpirit of Wine ſhould have ſo great a fragrancy, which conſiderations were back't by this more weighty Argument, that this Oyle was ſo ponderous as to ſinke not only in common water, which is yet a far more heavy liquor than pure ſpirit of Wine, but in the *Acid* ſpirit it ſelfe, which ſeem'd to be the remains of the alter'd oyle of *Vitriol*, which, by reaſon of it's abounding in Salt, you will eaſily grant to be far heavier than Common water. But I need not much trouble my ſelfe, to determine, which 'tis of the two liquors, that affords this ſtronge oyl; for it may well be (though not equally) compoſed of both, by their mutuall Action, and the operation of the Fire, united in the forme of Oyle. And if it be objected as probably it will, that this inflammable ſubſtance is made but by extrication of the parts, that lay conceal'd in the liquors before they were brought together, it may be anſwered, that this

this ſhould not be ſuppoſed, but proved. which till it be our cauſe will be favour'd by our Experiment, wherein there appears nothing ſo likely as a Change of Texture; to which may be aſcribed the Production of our *Anomalous* Chymical Oyle, ſince this plainly ſeems to reſult from two bodies whereof neither was a true oyle before. For each of them would readily mingle with water, whereas this produc'd oyle of our's, being ſhaken with water, would breake like common oyles, into numerous little globul's; which would preſently after ſinke to the bottom and reunite there into a liquor, which for Tryall ſake I have kept diverſe weekes in the water, and found it at laſt undiſſolved by it Some odd property's of this oyl make it ſeem likely to participate of ſome of the nobler parts of *Vitriol*, and the ſulphur of that Metall having extraordinary vertues aſcribed to it, by ſome of the famouſeſt and Intelligenteſt Spagiriſts, (as *Baſilius Valentinus Helmont* &c.) I kept ſome quantity of this oyle by me for ſeverall yeares, to obſerve,

as

as I did with pleaſure, the alterations that time would produce in it, and afterwards I imparted either ſome of the Medicine it ſelfe, (whereof the firſt Tryal proved very ſucceſsfull) or the wayes of preparing it, or both, to ſome ingenious Men, who (I am told) did not all of them remember me in the free mention they made of it.

But this concernes not our Argument, upon occaſion whereof I ſhall obſerve upon the by, that though Chymiſts ſhould be able to prove that our *Oyl* was but ſeperated from the ſpirit of Wine, or the oyl of *Vitriol*, in which it was latent before, yet ſtill the Experiment would afford me a conſiderable reaſon for queſtioning a maine point in the doctrine of the vulgar Chymiſts, who confidently pretend to prove from the number of ſimilar ſubſtances (as they ſuppoſe them) obtain'd from a mixt body, that it was actually compounded of juſt ſo many diſtinct and true material Principles and ſuch a quantity of each. For if from a diſtill'd Liquor, as the oyle

oyle or rather ponderous and *Acid* ſpirit of *Vitriol*, or from *Alcohol of Wine*, which is commonly reputed to be uncompounded, a liquor of quite another kind may be (not *made* but) *ſeparated*, how little reaſon have we, to take it for granted with the Chymiſts, that every diſtill'd liquor, that they looke upon as one of the Component Principles of the Body that afforded it, is a *Homogeneous* ſubſtance not further diviſible into differing parts.

The

The II. SECTION.

Of the Production of inflammable Spirits.

AFter what has been hitherto delivered concerning the production of Oyles, I ſhould now proceed to that of another ſort of liquors, referr'd by the Chymiſts, to the principle they call *Sulphur*; though better known to others, by the Name of *inflammable Spirits*. But of theſe I ſhall purpoſely forbear to diſcourſe in this place and rather refer to what I have ſaid to them in another, where I thought it more proper to conſider them; Namely, in one of the Sections of that part of theſe Notes, that treats of the producibleneſs of *Vinous Spirits*.

The

The III. SECTION.

Of the Production of Conſiſtent Sulphurs.

IF you ſhould here tell me, as perhaps you will do, that what I have been hitherto ſaying relates but to Inflammable liquors, whereas *Sulphur*, in it's moſt proper and primary Acception, Signify's a Minerall Body; I ſhall anſwer, that, as I formerly intimated, the Chymiſts uſe the terme *Sulphur* ſo ambiguouſly, and ſo uncertainly, that they have made it difficult for other Men's diſcourſes to avoid all appearance of participating of the Confuſedneſs, they ſeem to have affected in theirs. But becauſe the moſt intelligible, and leaſt indefinite Notion their writings ſuggeſt of *Sulphur*, is, that 'tis a Combuſtible and Inflammable Principle; I have hitherto treated of it as ſuch. And as for that *Sulphur*, that is commonly known by that name, and bought in ſhops, though I know there are ſome

Chymiſts that have affirm'd, that from Vegetables and Animalls they can ſeparate ſuch a *Sulphur*; yet ſince they are not wont to teach us the way of doing it, nor give us any proofs beſides there own word, of there having ever done it themſelves, the thing has ſeem'd ſo improbable, that I find few or none of the more Judicious of their own Party, that looke upon it, as other, than a Bragg: only a follower of *Glauber*, I find to have undertaken, by his Maſter's directions, to produce a real *Sulphur*, like the Minerall, out of Vegetable Charcoal, by a way, which, becauſe it has deceived more than him, and is ſpecious enough to impoſe upon thoſe that either are not Chymiſts, or, if they be Chymiſts, are not *cautious Men*, I ſhall here ſet down, and examine, as after the Author I made it.

We tooke then equall quantities (ſuppoſe a pound of each) of good ovl of *Vitriol* and of common ſea-ſalt, diſſolved in as much water as was requiſite: This mixture was ſlowly diſtill'd till the bottome was throughly

throughly dry; (which it will not be ſo ſoon as it begins to look white, or appeare coagulated) then ſetting aſide the Liquor, (whereof the firſt part that came over was Phlegm, and the other part ſpirit of Salt) we tooke out the *Caput Mortuum*, (which if one pleaſes, may be purifyed by being diſſolv'd and philter'd) and having beat it to powder with about $\frac{1}{4}$ or $\frac{1}{5}$ part of its weight of Charcoal, we put it in a ſtrong Crucible, and kept the mixture melted in a Vehement fire, till it grew of a darke reddiſh colour, for by that time ſuch a change was made in the Maſs, that it both ſmelt and rated rankly enough of Sulphur; and if ſpirit of *Sal Armoniack* were ſeaſonably diſtill'd from it, with a competent, but not over haſty fire, the aſcending ſpirit would be manifeſtly impregnated with *Sulphur* not difficultly ſeparable, which may alſo be divers other wayes obtain'd from the ſame fixt *Caput Mortuum*.

But for all this ſpecious operation, I do not take the *Sulphur*, thus produc'd, to have been the Vegetable

Sulphur of Charcoal, but a Minerall Sulphur that lay conceal'd in a liquid forme among the ſaline parts of the Oyle of Vitriol.

For, *Firſt*, 'tis not likely that ſo ſmall a quantity of Charcoal, as was employed in this Experiment, and much leſs that ſo ſmall a quantity as *may ſuffice* to make it, could containe ſo much Sulphur as may this way be obtained.

Next, that common *Vitriol* is not deſtitute of Minerall Sulphur, may be eaſily conjectur'd by the Sulphureouſneſs of the Marchaſites whereof 'tis wont to be made. In ſo much that in divers Countreys, as about *Liege*, and in ſome parts of *Italy*, from the ſame ſubſtance that affords them Vitriol, they obtaine by ſublimation great quantities of common Sulphur, which is ſold for uſe into divers other Countreys. And I have found by Tryall, and do not at all thinke my ſelfe in that ſingular that one may obtaine from Vitriol an oyle, and a *Caput Mortuum*, which being put together afforded a ſmell of common Sulphur ſo ſtrong, that it was ſcarce able to indure it.

And to come yet more cloſe to our Experipment I have (as I have elſewhere mentioned) purpoſely tryed, more than once or twice, that by diſtilling together common oyl of *Turpentine* and common oyle of *Vitriol*, the former of thoſe liquors, would make a ſeparation of ſome of the Sulphur that lay conceal'd in the latter, and as it were extricate and extract it: ſo that beſides an exceedingly Sulphureous liquor, which ſometimes was made white by the copionſly diſſolved (and partly precipitated) Sulphur, that paſſ'd into the Receiver; we had in the Necke of the Retort a yellowiſh conſiſtent body, which being put upon a quicke Coal, would, after a little yellow flame (probably proceeding from ſome adhering parts of *Turpentine*) afford good ſtore of Blewiſh flame, like that of common *Sulphur*, which it alſo emulated in it's ſmell. And ſuch a kind of *Sulphur* I have alſo ſeen, in tract of time, ſettle it ſelfe, in no inconſiderable quantity, at the bottom of the Liquor, diſtill'd from the mixture of the two

above mention'd Oyles. Nor ar
theſe the only wayes, by which I hav
obtained from oyle of *Vitriol* manifeſ
proofes of it's containing a *mineral*
Sulphur very like to common *Sul*
phur.

And in particular it now comes in
to my mind, that I once put into
Retort, together with one part
running *Mercury*, four parts of oy
of *Vitriol*, and having diſtill'd off th
Menſtruum, by degrees of fire, ther
remain'd at the bottome of the Gl
a very white powder. This *Calx*
being afterwards gradually preſt wi
a ſtronger fire, afforded in the u
per part of the Retort a great man
ſmall bodies, that look'd like hal
Beades of Amber, and ſeem'd to
of very fine *Sulphur*, (but were a
terwards confounded with many
ther aſcending corpuſcles.) Th
Amber-like Body (which was ſom
what copious and as to ſome port
ons of it whitiſh) by its readineſs
be melted, by its ſmell and by th
blewiſh flame it afforded when it bu
ned, appeared to be a kind of *Su*
phur, which you will eaſily grant,

be far more unlikely to have proceeded from ſo Homogeneous a body, as the *Quickſilver*, than from the Oyle of *Vitriol*, which we have already ſhown to conſiſt of divers Sulphureous as well as many Acid corpuſcles. And on this occaſion I remember, that, whereas upon mingling the oyles of *Turpentine* and of *Vitriol* in a due proportion, I have conſtantly obſerved, that they incorporated into a mixture, that was deeply red, (and this may eaſily be tryed by letting fall two or three drops of oyle of *Vitriol* upon ſome drops of that of *Turpentine*, and mixing them in a concave Veſſell, or even in a hollowed piece of paper) whereas, I ſay, I obſerv'd this, I was thereby induc'd to ſuſpect the *Chymicall* (for I ſay not, the *Opticall*) cauſe of that *Phænomenon* might be, that the *Terebinthinate* Oyle had made a ſolution of divers ſulphureous Particles it met with, in the oyle of Vitriol, and by that meanes acquired ſuch a redneſs, as we ſee that common flower of *Sulphur* gives to the oyle of *Turpentine*, when 'tis diſſolv'd

in it. And to examine this conjecture, I found that divers other Chymicall oyles, and oyle of *Aniſeeds* it ſelfe, as remote as 'tis from redneſs, would preſently acquire that colour, being carefully incorporated with a due quantity of oyle of *Vitriol*. But this conjecture is propos'd only upon the by.

As for the *Sulphur* of Mineralls and Metalls, I confeſs, I have not yet found enough, either in Chymiſts Bookes, or in my own Experience, to make me willing to ſpeake Dogmatically about them. And this the rather, becauſe *firſt*, as to the *Sulphurs* that are ſometimes obtainable from ſome of the Mineralls, I thinke it may be doubted, whether they belong'd to thoſe Mineralls as Eſſential Ingredients, or were only Corpuſcles of Common *Sulphur*, perhaps a little alter'd, that were mingled in the bowells of the Earth, with other parts that are eſſential to the nature of the Minerall. As we ſee, that in native *Cinnabar* the Mercury, which according to Chymiſts is a compleat Metall by it ſelfe, is

ſo mix'd with another body, as not to be diſtinctly diſcernable till it be ſeparated by the fire. And this *Cannabar* affords me an inſtance, the more fit for my preſent purpoſe, becauſe I have ſometimes by an eaſy way obtain'd a Sulphur alſo from it: and ſince we have lately noted, that the Vitriolate *Marchaſites* afford great ſtore of common Sulphur, by a groſs way of ſeparation, it ſhould not ſeem irrationall to ſuſpect, that ſome common *Sulphur* may remaine more cloſely mixt with the ſaline and metalline parts of the Vitriol afforded by the ſame *Marchaſites*; from which Latent corpuſcles of *Sulphur* may in part proceed, the ſulphureous ſmell, and other like things that we have lately taken notice of in Vitriol, and it's oyle. And perhaps by the ſame conſideration one may account for the ſulphureous qualities that are ſometimes to be met with in the Liquors that paſs for the Vinegars of Minerall Bodies, and particularly *Antimony*; to which may now and then be added ſome metalline Oar's: ſince I remember, I have had ſuch a ſulphureous Li-

quor

quor from good lead-oar, that I had ordered to be purpoſely digg'd out of the Mine at *Minedeep*, and being put in cloſe Veſſells ſpeedily conveyed to me. And that nature her ſelfe may blend an imperfect minerall with Lead, I have had occaſion to obſerve by an oar, whereof the owner found a Mine, but not being able to diſcover what it was, deſir'd me to enforme him. For this gave me occaſion to conſider the Oar (whereof I have yet a Lump by me) and to obſerve, that 'twas ſo differing from the other oar's of that Country, that I did but diffidently gueſs, that 'twas a mixture that Nature had made of *Lead* and *Antimony*, till particular Tryalls had juſtified my ſuſpitions.

But this is not all I had to ſay about the *Sulphurs* of Foſſiles: For though I know that Chymiſts pretend to teach us wayes of Extracting the true *Sulphurs* of Mineralls, and Metalls; and Experience aſſures me, that a reall combuſtible *Sulphur* may be in a pretty quantity obtain'd from *Antimony*; yet there are two ſcruples that ſuffer me not fully to acquieſce in what

what they teach. The *firſt* is this, That Chymiſts oftentimes deceive others and themſelves too, by miſtaking thoſe things for the true *Sulphurs* of Mineralls, and Metalls, that really are not ſo: Of which I ſhall give a plaine inſtance in the preparation that many Spagiriſts deliver of the *Sulphur* of *Antimony*:

For when they have boil'd that Minerall in a ſtrong *Lixivium* of Potaſhes, they ſuppoſe, that, as by the ſame operation, common *Sulphur* is diſſolved, ſo the *Menſtruum* ſeeks out, and takes up, only the Sulphureous Parts of the *Antimony*: And as common *Sulphur* is precipitated out of the *Lixivium*, wherein 'tis diſſolv'd, by ſprinkling on it Vinegar, or ſome other *Acid*, ſo they preſume, that what is ſtrucke down the ſame way from the ſolution of *Antimony*, made in the ſame *Menſtruum*, muſt be the true *Sulphur* of that Minerall; in which they are confirm'd by the colour: And yet in reality, not only the *Sulphur* (ſuppoſing that there is one) but the other parts of the *Antimony* will be diſſolved by a ſtrong

ſtrong *Lixivium*, and the yellow powder, that is precipitated, is but a kind of *Crocus*, which will ſometimes after a while (at leaſt in part) ſubſide of it ſelfe, without the help of an Acid. Nor do's it convince me, that ſuch a Body obtain'd from a Minerall, or Metall, is its true Sulphur that it may be made to burne; for unleſs the colour and ſmell of the flame concurr, I ſhall be prone to ſuſpect, that the inflammability may be apt to riſe, partly from the great comminution made of the prepared Body, and partly from the additament employed in preparing it. For theſe two, and perhaps even one of them, may contribute ſo much to the inflammable diſpoſition of a body, that little, or no true *Sulphur* will be neceſſary to make it burne. Of this I elſewhere give an inſtance in plates of Copper; from which an equall weight of ſublimate has been diſtill'd: For the remaining Maſs will melt and burne at the flame of a Candle, almoſt as readily as ſealing Wax. And of theſe Inſtances I mention more in another paper, where I endeavour to

ſhew, that combuſtible and inflammable bodies may be made up of Parts or Ingredients, that ſingly had not ſuch Qualities. And yet the contrary of this is ſuppoſed in the Chymicall argument that inferrs from theſe Qualities, the preſence of *Sulphur* in all thoſe Minerall preparations, wherein they are found. Yet by this diſcourſe I would not be thought to derogate, from the Medicall vertues, or other Utilities of ſuch ſuppoſed *Sulphurs*. For they may be very uſefull Concretes, though they be not true Principles; the finer parts of the Minerall being in ſome of theſe preparations extracted, and further divided, and perhaps very luckily aſſociated with the finer parts of the Body, employ'd to act on them. By which meanes there may emerge new Concretes of great vertue and uſe. And therefore I intend not to derogate from thoſe Metalline *Sulphurs*, which ſome Few Maſters of Chymicall *Arcana* reſerve with great care among the chiefeſt they are proud of. And that you may the better examine

Of the Producibleneſs of Inflammability.

examine theſe fine *Crocus's*, as I am apt to thinke moſt of them, and try both what they are, and what they do; if I can light on the Proceſſe, (for I dare not truſt my Memory) I will at the end of this *Appendix*, impart to you a way of preparing ſome of thoſe that are made of Metalls, thoſe being accounted the moſt difficult as well as noble. And thus much I now remember of the Tryalls I made according to this way; That I employ'd not any *Acid Menſtruum*, or liquor made of any particular ſalt; but a *Neutral* or compounded ſalt; which whiles it was in actual fuſion, would diſſolve or corrode the very thinly laminated Metall.

I do not looke upon theſe ſubſtances as the true *Sulphurs* of the Metalls that afford them, but rather (as I lately intimated) ſuſpect them to be a ſort of fine *Crocus's*, and perhaps Magiſtery's; which by reaſon of the ſubtility and ſometimes Fixtneſs of their parts, may prove uſefull to conſiderable purpoſes both in *Alchymy* and *Phyſick*.

But there is another ſort of Body's obtain'd

obtain'd from ſome Mineralls, and perhaps from Metalls too, that has a greater reſemblance to Minerall *Sulphur*, than the newly mention'd *Crocus's* have.

To this purpoſe I remember that by putting *Aqua fortis* in a certain proportion upon Crude *Antimony*, and after it was almoſt totally diſtilled off, increaſing the fire till a dry ſubſtance began to ſublime, we had in the upper part of the Retort a yellow and brittle ſubſtance, which being carefully ſeparated from the dark coloured Antimoniall powder, that was alſo elevated by the force of the fire, appear'd not only by its own colour, but that of its flame, and ſome other ſignes, to be much of the nature of common *Sulphur*: nor is this the only way whereby we have obtained ſuch a ſubſtance from Crude *Antimony*, from which (if I much miſremember not) I have had a yellow and combuſtible *Sulphur* even without the help of a *Menſtruum*.

Paracelſus pretends to have a way of drawing *Sulphurs* from all Metals; of which proceſs becauſe I have found little

little or no notice taken by Chymiſts, I ſhall for the oddneſs of it, and the reputation of the Authour (whom I looke upon as a Man of great Experience in Metalline affaires) ſubjoyn it, as I find it among ſome of his looſe papers or fragments.

Sulphur Metallorum Theophraſti.

Sulphur Metallorum eſt oleitas ex ipſis extracta, prædita virtutibus pro hominis ſalute. Sulphur aliud ex Metallis antequam ignem ſunt paſſa elicitur, ut ex Marchaſitis aureis, aut argenteis, &c. ſecundum nobilitatem mineræ, etiam nobile & præſtans: & "paucis interjectis, (Extractio Sul"phuris ex mineris Metallicis) *Etiam fieri poteſt per lixivium acre & deputatiſſimum: ſed* (vel potius illa) *alia ſulphura pro intrinſeco corporis uſu minus ſunt commoda propter alkali cinerum, ex quo clavellatum conficimus erodens, & propter calcem ex quibus talia fiunt lixivia. Sulphur ſic extractum poteſt*

teſt ablui aqua dulci, & præcipitari. Digeſtio duplum requirit temporis. Debet & rectificari lixivium per ipſius ſublimationem ab omni reſidentia terreſtri, ne cum ipſo incorporentur talia Sulphura, & fiant corroſiva ad perniciem ægrotorum: quod ne fiat dicta debet fieri ſeparatio. Tantum de crudis.)

Sed jam fuſis & depuratis elicias ipſorum Sulphur: certa nobilior meliorque via non dabitur, quàm per aquam ſalis ſeu oleum ipſius præparatum, eo modo quem in Alchymia luculenter deſcripſi. Talis quippe aqua fundaliter & radicitus extrahit omnibus corporibus Metallicis liquorem ipſorum Naturalem, ſeu Sulphur & crocum præſtantiſſimum tam pro operibus Medicis, quàm pro Chymicis. Reſolvit & frangit unumquodlibet Metallum, ex Natura ipſius Metallica deducens in aliam, pro varia intentione & induſtria laborantis.

Thus far *Paracelſus*'s proceſs; but as I know not whether it be true, becauſe I am not able to reduce it to practiſe; ſo becauſe I do not clearly underſtand his meaning, and what is

the true nature of the Inſtruments he would have us employ, I will not take upon me to determine, whether or no, the *Sulphurs* he teaches us to be obtainable by this method, be genuine ones, and fit to decide the queſtion we are now conſidering.

But whatever become of this obſcure *Paracelſian* proceſs, what I was ſaying about a ſort of body's leſs remote than the formerly deſcrib'd *Crocus*'s from the true *Sulphurs* of Metalls (if they have any ſuch) may well ſubſiſt. For I remember we have ſometimes (though the Experiment did not alwayes ſucceed) by cementing very thin plates of a certain Metall with burned allum, and afterwards dexterouſly elevating the more diſpos'd parts with Sal-Armoniack, obtain'd a ſublimate, from whence we ſeparated, by ablution with faire water that diſſolved the Salt, a ſubſtance, which by its inflammability appeared a kind of metalline Sulphur.

And this may ſuffice touching the *firſt* ſcruple I thought fit to propoſe concerning the factitious Sulphurs of metalls

metalls and Minerals. (To proceed therefore now to my *ſecond* ſcruple,) it may I think be ſuſpected, that even this ſort of Body's which I have mentioned to have been drawn from a Metall and from *Antimony*, may not be the effects of a *bare ſeparation* of preexiſtent *Sulphur*, from the other Ingredients of the Bodies that yeilded them, but new Concretes produc'd by the *operation* of the Fire on thoſe Bodies, and by the *combination* of ſome of their parts with thoſe of the *additament*, employed to obtaine the *Sulphurs*. For, as far as I have yet ſeen, either Salt-peter crude or diſtill'd, or Menſtruums made of it, or of other Salts, or elſe Oleaginous liquors, are wont to be made uſe of on theſe occaſions. And 'tis very poſible, that ſome of the more diſpos'd parts of theſe additaments may aſſociate themſelves with thoſe of the Minerall or Metall to be wrought upon; and ſo from this Combination of the Ingredients, there may reſult a Body of a new Texture, which Texture may diſpoſe it, to be combuſtible, or inflammable, whe-

ther the Ingredients in their ſeparate condition were ſo or not. As I remember I have elſewhere ſhown, that though *Aqua Fortis* be not inflammable, nor a piece of Crude Copper inflammable or combuſtible in a common moderate fire, yet the Metall being diſſolv'd in *Aqua fortis*, and the ſuperfluous moiſture warily exhal'd, there will remaine a fuſible Concrete, wherein the Copper being much comminuted, and its ſmall parts fitly aſſociated with the ſaline ones of the *Menſtruum*, compoſe a kind of Vitriol that being held to the flame of a Candle, or even of a piece of Paper, will readily burne away in a flame finely colour'd; and which may, if one pleaſe, be kept in a flame diſtinct from the other.

To conclude what I have to ſay about my ſecond ſcruple; it ſeems not improbable, that if any of the Metalls be by a fit *Menſtruum* or ſome other congruous additaments, reduc'd to parts minute enough, and that theſe parts be fitly aſſociated with ſome of thoſe of the *Menſtruum*; the Metall may thereby be brought

brought to burne or flame, as I have ſucceſſefully tryed by a way elſewhere declared, upon *Gold* it ſelfe, whoſe Sulphur the Chymiſts would have us looke upon, as (what ſeems not very agreeable to the Nature of Sulphur) incombuſtible, ſo that, for ought yet appeares, 'tis allowable to ſuſpect, that the Sulphur *obtain'd* from this or that Metall, is not *ſo much* an Elementary or Hypoſtaticall Principle barely extracted, as 'tis a Magiſtery, or ſome other new compound, made by the Combination of the Metalline particles with all or ſome of the Body that workes on them. But if a Chymiſt *will have* Metalline preparations of this kind to be Sulphurs; I may be allowed to make them ſerve for Inſtances of the Producibleneſs of Sulphurs.

Yet theſe doubts concerning the Sulphurs of Metals I propoſe, but as *ſuſpitions*, to draw on further, and more accurate Tryalls; by which perchance they may be happily remov'd. And ſpeaking of the *Sulphureous Principle* of mixt body's, in that general notion of it, wherein

the Chymists often use it, and indeed must employ it; we may be thought to have said enough to our present purpose, though we had left *Mineral Sulphurs* untouch'd; since wee have shewn, that inflammable parts of mixt bodies may be *produc'd*, and therefore cannot be safely affirm'd to have *all* been *preexistent* in them.

The

The forth Part.

Of the Production of Mercury,

THe complaint I have divers times had occasion to make, of the darkness and ambiguity that Chymists have allowed themselves, if not affected, in treating of their *Three Principles*, is applicable to nothing more justly than to what they have written, about that which they call *Mercury*. For when they would seem to tell us what they mean by that Principle, they are wont to do it, in terms so loose and so ambiguous, that the representations they make of it, are more like to Panegyricks, and sometimes to Riddles, than to *clear definitions*, or so much as *good descriptions*. Since then they have given us no setled notion of what they call *Mercury*, but have left us to guess what they mean by it; I hope a mistake about it (if I should run into any)

would appeare pardonable. That which is agreed on by the moſt of Chymiſts, when they ſpeake ſomewhat intelligibly of the Principle they call *Mercury*, is, that 'tis a crude ſubſtance, and that 'tis a volatile liquor, which by being ſo, may be diſtinguiſh'd from the *ſaline* principles, eſpecially from the *Alcalizate* or *fixt* ſalt, as it may alſo be from the oyle or *ſulphur*, by it's not being inflammable. But theſe marks will not diſcriminate it from *Phlegme*, which is alſo a fugitive and uninflammable liquor; and therefore to make the difference, they muſt add ſome other quality, ſuch as *ſapor*, (which yet agrees not to *Quickſilver* it ſelf,) that is wanting to *Phlegme*. So that according to this doctrine, the nature of a Chymicall *Mercury* or *Spirit* will conſiſt, in its being a liquor volatile not inflammable like oyle or ſulphur nor yet inſipid like phlegm: How odd a principle this muſt be, that comprises ſuch differing body's, as are *Acid ſpirits*, as thoſe of Nitre and Vitriol; *Urinous*, as thoſe of blood Hartſhorne; &c. and *Anonymous* ones

as thoſe of Guajacum, Honey, Raiſons, and &c. forc'd from their acidity; and the running Mercury's of Minerals and Metals, as Cinnaber, Antimony, and Lead; under one Principle, which to deſerve that name ought to have all the portions of matter belonging to it *Homogeneous*; I may ſafely leave any conſidering Naturaliſt to Judge. And therefore inſtead of taking further notice of this, it may ſuffice for my preſent purpoſe to mind you, that as for the *Mercury's* or uninflammable *ſpirits* of Vegitables and Animals, I have endeavoured to ſhow their production where I diſcourſe of that *of ſpirits and volatile ſalts*. And therefore I need but ſay ſomething of the Production of *Mercury* more properly ſo called, that is, *running Mercury*: about which perhaps it will not be leſs acceptable to you, and I am ſure it will be leſs troubleſome to me, if I leave you to gather my opinion out of three papers, that were written for differing *Vertuoſi*, at ſeverall times, and on diſtinct occaſions; upon which account, beſides thoſe particulars

particulars that relate to our preſent Argument, you will perchance find ſome things, that you have not elſwhere mett with.

Whe-

Whether Mercury may be obtained from Metals and Minerals,
Or
(*To ſpeake Chymically*) An dentur Mercurii Corporum?

THat there may be extracted or obtained from Metals and Minerals a fluid ſubſtance, in the forme of running *Mercury*, is the common opinion of Chymiſts; in who's books we may meet with many proceſſes, to make theſe *Mercury's*: which becauſe they are ſaid to be offorded by Minerall, and eſpecially Metalline bodies, theſe Writers affect to call (how aptly I now examine not) *Mercurios corporum.*

But notwithſtanding all this, divers of the more learned of the Spagiriſts themſelves, have look'd upon the pretenſion of other Chymiſts to the art of making theſe *Mercury's* as but a Chymical brag: and ſome judicious modern Writers, applauded therein by moſt of the mechanicall Philoſophers,

phers, have proceeded ſo far, as to explode all theſe *Mercury's* of body's as meer *non entia Chymica*, nay ſome of them have not ſcrupl'd to cenſure all thoſe who pretend to have ſeen or made any of them, as credulous or Impoſtors.

In the management of this controverſie, I confeſſe I am not ſatisfy'd, with either of the contending parties; and therefore though I ſhall not refuſe to comply with your curioſity to receive in a few lines my thoughts, whither there are or may be any ſuch *Mercury's* as are diſputed of; yet I deſire leave to premiſe ſuch a ſtate of the controverſie, as I think will avoid ſome verball janglings, and at leaſt acquaint you clearely with the ſenſe wherein I deſire to have my opinion underſtood.

Waving then, in the preſent enquiry, the Queſtion that may occur, *Whither or no the Mercury's ſaid to be obtain'd from Metals and Minerals are primitive ingredients, or Hypoſtaticall Principles only extracted or ſeparated from*

from the body's that afford'd them? I ſhall propoſe the queſtion in these terms: *Whither or no from a Metall or Minerall body, there may, without the addition of any body, that we may be ſure has any common Quick-ſilver in it, be obtained, by the help of Art, a ſubſtance reſembling common Quickſilver, by being ponderous, fluid when actually cold, Amalgamable with Gold and ſome other metals, and indiſpoſed to wet or ſtick to ones hand, or to body's not of a Metalline nature.*

To give you now my preſent thoughts, about this queſtion, I ſhall offer them to your conſideration, in the following propoſitions.

There are divers proceſſes of making the mercury's of body's, that are ſo darkly deliver'd, that the generality of Chymiſts cannot ſufficiently underſtand them, to be able to try them; for ſome of theſe proceſſes are ſet down in termes of Art, which, for their great darkneſſe or ambiguity, are not to be underſtood but by the authors themſelves, or thoſe who are vers'd in the more

The firſt propoſition.

more myſterious parts of *Hermetick* Philoſophy. And others there are of theſe proceſſes, that require ſome *menſtruum* ſalts, or other inſtruments, that 'tis not in the power of ordinary Chymiſts to procure. Inſtances of this kind may be frequently enough mett with, by thoſe that have the curioſity to peruſe heedfully the Writings of thoſe that paſſe for the *Adept Philoſophers*. And for a *ſpecimen* of ſuch proceſſes, I am content to annex to the cloſe of this paper, the way delivered by *Lullius* of making *Mercury* of Silver, *Helmont's* way of preparing *Mercury* of Lead, and *Paracelſus's* way of extracting the *Mercury's* of all Metals.

The ſecond Propoſition.

There are divers proceſſes to make Mercury's of body's, that are either falſe, or accompanied with circumſtances that make them unfitt to be truſt'd. For there are of theſe proceſſ's that having been curiouſly try'd, by thoſe that had a great deſire to find them true, have not been found to ſucceed at all in practice. Hence we have ſo many complaints of Chymiſts, that have

have loſt their labour in endeavouring to make according to *Beguinus's* directions (in his *Tyrocinium Chymicum*) the Mercury of Silver, though I do not take that to be one of the difficulteſt to be prepared; and he that converſes much among thoſe that have made attempts to make the *Mercury's* of other body's, as Gold, Antimony, &c. according to the vulgar proceſſes extant in Chymicall books, will (if I miſtake not) find by their confeſſions, how little the events of their endeavours anſwer their labours and expectations. Nor doe all the Manuſcript proceſſes that are communicated to private freinds, as great *Arcana*, much excell thoſe I have been ſpeaking of; as ſeverall of my acquaintance have complained to me, that they have found to their coſte. And here not to mention my own experience (which by the help of good Principles made me timely deſiſt from unlikely attempts) amongſt the many Chymiſts I have known, I remember not to have found above three or four credible perſons, that would affirme to me, that they made or ſaw made the *Mercury* of any

ny metall or minerall (except of native *Cinnaber*, which is the natural oar of Quickſilver) in a conſtant way, by any proceſſe he had found in printed books, ſo that, ſo many of theſe proceſſes having been upon triall found falſe, wary men may be excus'd, if they do not think fit to beleeve other proceſſes of *mercuriſication*: which though not yet try'd ſeem'd not more probable, than thoſe that have been already found ſo unſuccesful, that not only many learned modern Naturaliſts, but *Angelus Sala*, and divers others eminent Chymiſts themſelves, have publiſh'd to the world, that theſe *Mercury's* are to be found no where, but in the bragging Chymiſts books and premiſes; and ſome have, as has been already intimated, gone ſo far as to brand all thoſe, for cheats, that pretend they can make ſuch *Mercury's*, and thoſe for credulous that believe they can be made. But what I think of this ſevere opinion I ſhall quickly have occaſion to declare.

The third propoſition. *There are ſome proceſſes, wherein it is thought that the Mercury of a metall or Minerall is obtained; when indeed the obtain'd ſubſtance is miſnam'd, or the true Mercury that is ſaid to be extracted, was put in, though in a diſguiſed forme, by the operator.*

I will not here give inſtances of the ſubtile cheats, that may be put upon the ignorant and unwary, and ſometimes too upon the skilfull, if they be not alſo cautious; but ſhall content my ſelfe to illuſtrate the propoſition, by a few known and therefore innocent inſtances; and firſt there are ſome, who finding themſelves unable to make the true *Mercury's* of metals or minerals, make bold to aſcribe the name of *Mercury's*, to productions who's qualities are very remote from thoſe, that are agreed to be eſſentiall to Quickſilver. Thus *Globerus* ſpeaks much of his *Mercury of Luna*, which yet is far from being running *Mercury*, or having the ponderoſity and other properties of true Quickſilver. So *Angelus Sala* himſelfe in his Anatomy of *Antimony* would have us to look upon the Reguline parts of that *mineral*, as its *mercury*: becauſe

he takes it for granted, it muſt contain *mercury*, and is pleaſed to fancy no other can be obtained from it. But the difference of the Reguline part of Antimony, and running mercury in point of conſiſtence, gravity, and other quality's, will, I preſume, indiſpoſe men to confound them. And therefore, I will proceed, to confirme the ſecond part of our propoſition; by ſhewing that the *Mercury* obtained by ſome proceſſes that may ſucceed, made part of the Additament imploy'd by the Artiſt in the operations, and ſo was not properly extracted from the metal, but only recovered from the body, compounded of the metal and the Additament. Of this, I remember, I have elſwhere given an eaſy inſtance; in a deluding experiment, that I long ſince ſhewed ſome *Vertuoſi*, in who's preſence having mingled the filings of Copper with a certaine ſalt, and put them in a conveniently ſhap'd veſſel of Glaſs, I warily held it over a competent fire of well kindled charcoals, till the ſalt was thorowly melted, and in part ſublim'd: by

by which operation the Copper ſeem'd to be quite chang'd, eſpecially in colour, and was really become inflammable, and there remained in the lower part of the Glaſs, a pretty deal of running *Mercury*, ſo that they would have gone away perſwaded, that they did ſee me make the *Mercury* of *Venus*, if I had not been carefull to undeceive them, which I did by telling them, that this Quickſilver was only the common *Mercury*, that lay diſguiſed in the compounded Sublimate I had imployed together with the Copper, which ſet the *Mercury* at liberty from the corroſive ſalts it lay concealed in before, by preſenting them a Metall more diſpoſed to be wrought on by them than Quickſilver is.

The fourth propoſition.

It is poſible to obtain, att leaſt from ſome metals and Minerals, true running Mercury, that cannot be juſtly thought to come meerly from the additament. This propoſition a Chymiſt might more compendiouſly expreſs by turning it into this ſhort Aſſertion, *Dantur Mercurii corporum*; but I thought the words

I have imployed would expreſs my ſenſe more warily and clearly; and yet *ex abundanti*, I ſhall add this further explication, that though the propoſition ſpeaks affirmatively, but of *ſome* Metals and Minerals; yet it does not deny, either that *more* Minerals or that *all* Metals may afford true running *Mercury*: by which I underſtand (according to what I formerly noted) a Minerall body fluid, opacous, exceeding ponderous, Amalgamable with Gold, and not apt to wet or ſtick to one's fingers, or any other body's beſides ſome Metalline and Mineral ones.

That ſuch a Mercury may be obtained without the help of Additaments, whereof Quickſilver is an ingredient, I have been perſwaded to believe by the following obſervations.

I remember that many years ago, having had an occaſion to diſtill Copper with certaine ſaline ſubſtances, I was not a little ſurpriſed to find in the veſſels (that had been luted together) ſome globules of running *Mercury*, which I could not reaſonably ſuſpect to come from the Additament, which was not Sublimate, nor any thinge I could Judge to containe Quickſilver. And though the indiſpoſition I had to admitt the *Mercury's* of body's, that ſo many learned men looked upon as non entities, made me ſomewhat diffident of the genuineneſs of the *Mercury* I had obtained, (whereof I had not quantity enough to make Juſt tryals) yet afterwards, when I found that accidents of the like nature had happen'd to ſeverall of my freinds, I began to think, that what I had kept only for a few dayes as a queſtionable rarity, might really have been *Venerial Mercury*.

A laborious Chymiſt of my acquaintance comming to viſit me once when I was not well, was very earneſt with me to communicate to him the way of making the *Mercury* of *Antimony* and of *Saturn*, and when I told him that I had no ſuch proceſſes of my own, and that I was far

from believing those that I had met with in printed books, to be true ones, he would not acquiesce in this answer, but declaring that he resolved to make attempts to gain such *Mercury's*, and had rather do it, by Methods of my proposing, than of his own devising, he prest me so much to let him know which way I would go to work, in case I had the same design, that he then had, that to be rid of his importunity, I told him what on a sudden came into my thoughts: and as sometimes the mind, being put to such plunges, happens upon a lucky hit, and such as much premeditation would not have led it to: so it happen'd at that time to me, for when I, because of my distemper, had forgott this affair, the Chymist, who was a plain honest man, came to me with great joy to give me thanks for the instructions I had given him, bringing along with him some *Mercury* of *Antimony*, and a little *Mercury* of *Lead*, that he had already made by the help of those instructions; by pursuing which, he expected to obtaine much more *Mercury* from the Minerals when they

they should be longer digested with the concourse of the air, in those Salts that I had advised him to grind with them. This pleasing success of directions, which I had as to divers particulars forgotten, made me desire them of the Chymist, who, beginning to be proud of his attainment, when he perceived I remembered not so much as he thought I did, ungratefully delay'd to bring me the account he promised me at first, till the plague reaching to the place where he lived, and dispatching him, deprived me of the hopes of satisfying my curiosity.

Two gentlemen of my acquaintance, but unacquainted with each other, working almost at the same time upon Silver, did each of them to his wonder, find parts of his Silver turned into running *Mercury*, with which odd accident each of them came to acquaint me, bringing along with them a little portion of the unexpected Mercury; one of these portions a servant of mine lost by mistake before I could try any thinge with it; the other I found by a tryall unknown

to the maker of it, not to be common, but metalline *Mercury*; of which the Chymiſt complained to me, that he had, ſometimes had conſiderable quantity's to his great loſs, becauſe much of the Silver he employed in an operation, that he expected would prove *Luciferous*, being turned into Quickſilver had Swallowed up all his gaine, and this was that which invited him to apply himſelfe to me, hoping to be able to prevent or remedy this inconvenience by my advice, which I willingly gave him, but becauſe of his departure out of *England*, could not know with what ſucceſs.

A fellow-traveller of mine, having occaſion to employ a ſaline body about *Lead*, after he had finiſh'd his operation, left the Lead and ſalt together for ſome months, in a veſſel which he lay'd by in a Garret, where the air had acceſs to it, afterwards wanting ſuch a veſſel, and not being able to ſupply himſelfe readily in the country (in which his experiment was made) he remembred this long neglected

ed veſſel, and comming to ſee whither it was fitt for his turn, he found to his wonder, that tho he had employ'd no Mercuriall body to work upon the *Lead*, yet part of it was already turned into Quickſilver, ſeparable by ſtraining, and more ſeem'd in a near diſpoſition to admitt the like Change: Whereupon he brought me, as a rarity, a part of the Metall and a little of the Mercury, which I found by experience on Gold, to be of a Nobler kind than common *Mercury*. And I the leſs wondred att this Mercurification, becauſe examining the Gentleman that chanced to make it, I found the maine thinge he had imployed in the operation was common, or Sea-ſalt.

An expert Metalliſt of my acquaintance, being deſirous to try, what Gold and Silver he could gett out of a fine *Engliſh Marchaſite* I had preſented him at his deſire, he examined it according to his method, without any Mercurial preparation, and found to his ſurpriſe, that it yeelded him, beſides other things, ſome running *Mercury*,

cury, which he brought and gave me, becauſe it was afforded by the *Marchaſite* I had preſented him.

The *Mercury* of *Antimony* more than one of my freinds have made, by unſuſpected additaments, ſuch as ſalts, that have nothing to do with Sublimate, or other compoſitions where of common *Mercury* is an Ingredient. One of theſe Antimonial Mercury's look'd ſo oddly, that though it were made by diſtillation, I had that curioſity to try, whither it would not operate on Gold, in a peculiar manner, and having accordingly put a little fine *calx* of that metall (as about half a drachme or a drachme) into the palm of my hand, I added to it an equal or double weight of the above mention'd *Mercury*, That immediatly incorporated with a very manifeſt heat. And this was the quick way I uſed to examine other *Mercury's* of body's, for though this alone be not a certaine ſigne of a *Mercury's* being of that ſort, becauſe I can obtain a *Mercury* ſo qualify'd by another way than any I have hither-

to

to mentioned; yet as their aſſertions and relations gave me ſufficient ground to conclude, that they had obtained thoſe *Mercury's* from the body's that they affirme to have yeelded them; ſo the readineſs of theſe *Mercury's* to mix with Gold, without the help of fire, and even to grow hot with it, which vulgar Mercury will not do, confirmed, that they were Metalline *Mercury's*, rather than of the ſame kind with common Quickſilver. And my way of obtaining incaleſcent *Mercury* is ſo quite differing from any of thoſe, that there was not the leaſt cauſe to ſuſpect, that the *Mercury's* of body's we have been mentioning were ſo obtain'd, eſpecially, ſince I knew that my way was unknown to moſt of the perſons I have mentioned, and was practis'd by none of them.

As for the *Mercury* of *Gold*, though I think I have brought a great many parts of crude *Gold* to aſſume a Mercurial forme, and to come over in that forme by diſtillation (whatever divers learned men think of the inſuperable

perable fixity of Gold) yet I confeſſe I have not ſeen any *Mercury*, that I was ſatisfy'd did deſerve the Name of the *Mercury* of that metall. But happening to be once in a place, Where a forreiner, that was a ſtranger to me, was ſhowing a freind of his, with whom I had ſome little acquaintance, a Metalline experiment, that I confeſſe, I could not but admire (for this Forreiner was ſo civil, becauſe I came ſo luckyly in, as to let me be preſent att the experiment, though not to diſcover any thing of the drug he imployed about it:) I made bold to ask this civill Traveller who ſeem'd a candid Man and I perceived had ſeen uncommon things; Whither he had mett with any way of making *Mercury* of *Gold:* to which he anſwered, that he knew no ſuch way himſelfe, but that he mett (ſomewhile before) with a very learned Man, in compariſon of whom, he confeſſed himſelfe but a Novice, that put ſome *Gold* into a little vial, full of a certaine *menſtruum*, which my relator owned he knew not how to prepare, and intimated to him, that this men-

Menſtruum would have a peculiar operation as well upon *Gold* as *Silver*. Afterward this Relatour having put the Vial well ſtopt into his pocket, and carried it about with him, was, when he came home and took it out to ſet it aſide, much ſurpriſed to find, inſtead of the *Gold* he had ſeen put in, a pretty quantity of running *Mercury*. Which the Artiſt, who only lent him the *Menſtruum*, did not ſeem to think ſtrange, when he was made acquainted with it.

If I would relate what I have heard from Men, that I judge to be either eaſily deceivable themſelves, or concerned in point of intereſt to deceive others, or at leaſt of a vain glorious bragging humour; I might eaſily ſwell this diſcourſe to a greater bulk: But I have been carefull, to mention only thoſe relations to which my ſelfe, in ſpite of my longe backwardnes to beleeve ſuch things, ſaw cauſe to give aſſent. And if it be objected, theſe inſtances were but caſual experiments, notwithſtanding which there may be no ſetled way for the obtaining the *Mer-*

Mercury's of body's: I might Answer, that some passages of what has been lately delivered make it probable enough, That even setled wayes of making the *Mercury's* of body's, or at least of some of them, are not unknown to some Artists: though for certaine reasons, and particularly for the ingratitude of many Men, they do not think fitt to divulge them. But to answer more home to the objection: I shall need only to say that though most of the above recited experiments may be said to have been made by chance, in this respect, that those that made them, did not principally designe the obtaining of metalline or Minerall *Mercury's*; yet the effects produced, were as naturally and necessarily consequent, to operations so managed as they were, as if the Artist had directly design'd them, as in some of the above mentioned relations they did. And it is not materiall for us to enquire whither the Quicksilver made by those experiments be to be ascribed to chance or skill, since whatever becomes of that question, it is plain, that

that if metals and Minerals could by either way be brought actually to afford running *Mercury*; there needs no more to prove, that such *Mercury's* are really obtainable from them.

Doubts

Doubts about the preexiſtence of Running Mercury in Metalls.

THe propos'd Queſtion, *whether or no the Mercury's of Metalls and Mineralls be Principles preexiſtent in them, and only extracted from them,* may to many ſeem, though it do not to you, a ſuperfluous enquiry, ſince the generality of Chymiſts of differing ages and Countries, have reſolutely determined it in the affirmative: which is not at all to be wondred at, ſince according to their *Hypotheſis* of the *Tria-prima*, (or three Hypoſtaticall principles) whereof they preſume all perfectly mix'd bodies to be compoſed, Metalls, being of this ſort, muſt conſiſt of *Mercury*, as well as of *Salt* and *Sulphur*; and conſequently muſt afford it upon the *Analyſis* of the body into its three Primordial ingredients. But notwithſtanding all this, the *Problem* ſeems to me difficult enough to be reſolv'd, partly becauſe ſuppoſing that there be true

true metalline *Mercury's* preparable by Chymiſts, they very ſtudiouſly conceal the wayes of preparation; and *partly* becauſe as 'tis very difficult to obtain any of the factitious *Mercury's*, wherewith to make ſuch luciferous tryalls as a Naturaliſt would deſigne; ſo thoſe few Authors that affirm themſelves to have poſſeſs'd ſuch *Mercury's*, have given us but an exceeding lame and defective account of them, not mentioning thoſe particulars which are moſt proper and deſirable, in order to the paſſing a right judgement about them. I pretend not therefore, to anſwer your queſtion otherwiſe than conjecturally, till I ſhall be better furniſh'd with matters of fact. But in the mean while that I may comply with your Curioſity, as much as I ſafely can; I ſhall confeſs to you, that for the preſent I am, by as much information as yet I have had, inclined to think, that the *Mercury's* obtained from Metalls do not clearly appear to have been preexiſtent in them, and only ſeparated from them by the Artiſt, but that I think that at leaſt ſome of them

may be rather fluid Magiſteries of Metalls than their extracted Principles. One of the moſt obvious things, that ſuggeſted this ſuſpition to me, was, that whilſt ſome Metalls, as *Tin* and *Lead*, are in fuſion, they would, to one that ſhould not know of their being melted, appear to be many parcels of *Mercury:* ſince like it they are fluid and ponderous, and ſtick not to the Crucibles, or to Stones, Bricks, or almoſt any other bodies, except ſome metalline ones, divers of which they will eaſily pierce into, as *Quickſilver* does into *Silver* or *Gold*; ſo that if the fluidity of theſe metalls were permanent, they might paſs for *Mercury's*. And if in the Moon and ſome of the other Stars, as there are Mountains, ſo there are metalline Mines in caſe the heat of the Climate or of the Soyle ſhould keep them conſtantly in ſuch a degree of heat, as we here find ſufficient to melt Lead (which we know needs not be very intenſe) theſe metalls would there emulate the nature of Mercury's, as I have learned from Travellers, that in divers parts of the Torrid

Torrid Zone, what would here be Butter, is fluid as well as unctious like oyl, and is ſold like other liquors, by meaſure not by weight: and an inquiſitive Man, who is a Scholar as well as a Traveller, aſſured me, that whilſt he was in ſome parts of the *Indies* he furniſh'd himſelf with ſome liquid ſubſtances afforded by wounded Plants, that as ſoon as he came near *Europe*, and not before, turned into conſiſtent and pulverable bodies; it did not therefore ſeem to me impoſſible, that the peircing ſalts, and other ſubtle body's employ'd by Artiſts, about the Mercurification (as ſome ſtile it) of mettalls, may either by the agility of their own nature, or by ſo altering the ſhapes, and looſing the wonted coheſion of the mettalline corpuſcles, bring them to have ſuch a Texture and ſuch pores, as may enable the Ethereall ſubſtance, whereto ſo many other bodies owe their fluidity, to agitate them. Theſe cauſes I ſay, or ſome other that may be propos'd, may poſſibly keep the prepared mettall fluid; as we ſee, That though *Cam-*

phire be a conſiſtent and tough body, yet ſome Nitrous ſpirits of *Aqua-fortis* will eaſily penetrate it, and may be brought to ſtay ſo long with it, that I have for curioſity ſake kept the oyle of *Camphire* ſeverall years without loſs of its fluidity, which I found that this kind of liquor would retain, though for tryalls ſake I expos'd it to intenſe degrees of Cold, ſuch as would freeze divers other liquors. Nor did it to me ſeem impoſſible, that a ſmall quantity of appropriated Additament might ſuffice to put a mettall into a ſtate of fluidity; for ſince we ſee that the vapour of *Lead* can arreſt *Quickſilver*, and make it a conſiſtent body; and ſince *Helmont* aſſures us, that the liquor *Alkaheſt* being once abſtracted from *running Mercury* deprives it, and that almoſt irrecoverably, of its fluidity, ſo as to make it pulverable: it appears not, why Nature or Art may not be able to ſupply ſome corpuſcles, that may expell or diſable thoſe that keep a metall in the

Eſt ſcilicet (Corallatus Paracelſi) Mercurius à quo liquor Alkaheſt ſemel diſtillatus eſt, reſidetque in fundo coagulatus & pulverabilis, nequicquam in pondere auctus aut diminutus. Helmontius *in Scripto* de Arcanis Paracelſi.

the forme of a fluid body; and eſpecially ſince, as I have elſewhere ſhewn, the matter of mettalls themſelves may (at leaſt ſometimes) have been a liquor, or ſome other fluid body.

Another Reaſon that induc'd me to ſuſpect, that the *Mercury's* of mettalls and Mineralls are not, as 'tis preſum'd, meerly extracted Principles or Ingredients, was, that I have obſerved a greater diſſimilitude between *Mercury's* all of them quick, and furniſh'd with all that is requiſite to make them paſs for true *Mercurys*, than will comport with the ſuppoſition, that they are ſimple and Primordiall Body's, barely extricated from the others with which they were at firſt commixt. But this Argument being the ſubject of an intire, though ſhort, Diſcourſe, (of the Diſſimilitude of *running Mercury*) I need not inlarge on it in this Place.

It did alſo ſtrengthen my ſuſpition to conſider, that the Chymiſts that

talke of the *Mercury's* they have drawn from mettalls, are not wont to tell us what other Ingredients they obtain'd by their ſuppos'd *Analyſis's*, which left me dubious, whether they obtain'd any ſalt and ſulphur, or not; and of what nature thoſe ſubſtances were that they did obtain. For if theſe were not true ſalt and ſulphur, the genuineneſſe of the *Analyſis* might be queſtion'd; becauſe it may be alledg'd, that the Chymical Operation and the Additament turning ſome parts of the mettal into Decompounded Bodies, which muſt be acknowledg'd not to have been (in ſuch) formes preexiſtent in them, may alſo have by change of Texture turn'd ſome other parts of the mettall into the forme of *Mercury*.

To the foregoing Conſiderations afforded me chiefly by the nature of the thing, I ſhall for the ſake of thoſe that are mov'd by the authority of *Adept Philoſophers*, as they call them, add that, which among them ought to paſs for a Proofe, from Experience. For

For *Raymund Lully*, whom I take to be one of the greateſt Chymicall Philoſophers whoſe Writings are come to our hands, though in many of his other Bookes he ſpeakes of *Mercury* in a darke and Allegoricall ſenſe; yet in that excellent little Tract which he calls his *Clavicula*, he delivers a Proceſs, (which is not to be wrought with vulgar *Menſtruums*, though they beare the ſame names with thoſe he preſcribes and names) From the cloſe whereof it ſeemes manifeſt, that his Deſigning was not to extract a preexiſtent *Quickſilver* out of the mettall propos'd, but to turne the mettall into *Quicksilver*; ſince he orders and directs us to proſecute the *Mercurification*, till the obtained *Quicksilver* be equall in weight to the Silver that was to be tranſmuted. And partly upon this I have ventured to ground the foregoing *Paradox*; That the *Mercuries* of Bodies are rather *Magiſteries* than *Extracts*. For in this *Lullian* Proceſs, it appears not, that the Mercuriall Principle was extracted from the Salt and Sulphur, but rather that the Body of the being

Vide *Lullium in Clavicula. cap. 2.*

metall (without being Analyzed) was turn'd into Mercury: and though *Magiſtery* be a terme variouſly enough employ'd by Chymiſts, and particularly uſed by *Paracelſus* to ſignify very different things; yet the beſt notion I know of it, and that which I find authoriz'd even by *Paracelſus* in ſome Paſſages, where he expreſſes himſelfe more diſtinctly, is, that it is a Preparation, whereby there is not an *Analyſis* made of the Body aſſign'd, nor an extraction of this or that Principle, but the whole, or very near the whole Body, by the help of ſome additament greater or leſs, is turn'd into a Body of another kind. As when Iron or Copper by an acid *Menſtruum*, that corrodes and aſſociates it ſelfe with it, is turn'd into Vitriol of *Mars* or of *Venus*; and *Quicksilver* having a ſufficient quantity of *Aqua fortis* ſtrongly abſtracted from it, is changed into a red Precipitate; or by being ſublim'd up with common Sulphur, is turn'd into *Cinnabar*; or, to give yet a more appoſite example, when *Quicksilver* (which is the Body we treat

treat of) is by the laſting operation of the fire, without external Additaments, at leaſt diſtinct from the Igneous Particles, turn'd into a red Powder, that Chymiſts call *Precipitate per ſe.*

I have received credible information and ſome proof too, that there is a place in *Tranſylvania*, where portions of *Running Mercury*, which when they fall out of the Earth and lye a while in the Air, do of themſelves coagulate into permanently hard bodies: ſo little a diſtance hath Nature her ſelfe there put between the Mercuriall fluidity, and the ſolid conſiſtence of the ſame portion of matter. So that if ſo ſmall a thing (and perhaps unponderable as well as inviſible) as the Contact of the Air can expell, is able by its preſence to retain a minerall body in the form of a true *running Mercury*, as well as by its receſs to leave a ſolid body, I ſee not why it ſhould be impoſſible for Art to intercloſe ſome very minute and reſtleſs particles, which by their various

and

and inceſſant motions, may keepe a Mettalline body in the ſtate of fluidity; much after ſome ſuch way, as I lately noted, that the ſpirits of *Nitre* did for whole years together keepe *Camphire* in the forme of a liquid oyle.

Having now propos'd ſome of the conſiderations, that inclin'd me to think, that the *Mercuries* obtained from Mettalls and Mineralls, may not have been preexiſtent in them; the impartiality that I think becomes a Naturaliſt, obliges me, to take notice alſo of thoſe things, that occurr'd to me, in favour of the received opinion of the Chymiſts, in behalfe of which, I objected to my ſelfe divers ſpecious Arguments.

Of theſe, the firſt was, the generall Conſent of Chymiſts, who take it for granted that all Mettalls are compoſed of *Mercury* as a materiall Principle, and commonly more copious than any other conſtituent part of thoſe bodies; but this being an Argument, drawn only from authority, was of ſmall weight with me, in a Controverſy, pro-

properly determinable by reaſon and experience.

2. A ſecond objection was afforded me, by many proceſſes I had mett with in Chymiſts Books, to extract the *Mercuries*, as well as the *Sulphurs* and *Salts* of mettalls. But neither did this Argument appear to me of any great moment, for moſt of theſe proceſſes I look'd upon as fictitious things: which if the Authors of them, had taken the paines to try themſelves, they would have found not to ſucceed in practice, and ſcarce any of them was ſo skilfully fram'd, as to ſatisfy a conſidering Naturaliſt, in caſe it had ſucceeded; that the obtain'd *Mercury*, was a pure Principle only ſeparated or extracted, from the other Ingredients of the mettalls, and not a reſult of ſome mettalline parts conjoyn'd with ſome parts of the additament, as it ſeem'd manifeſt enough to me; that the ſuppoſed ſalts of mettalls that are pretended to be made, by ſuch preparations, are not the Principles of ſuch mettalls, but new concretions, and indeed not ſimple, but decompounded

ded bodies; as is evident in the ſalt or ſugar of *Lead* made with the ſpirit of Vinegar; and in the ſalt of *Steel* made with that, or other acids.

3. A third objection, and of greater weight, ſeem'd derivable from this conſideration, that *Quicksilver* eaſily *Amalgams*, with mettalls, becauſe of its cognation with the Mercuriall part theſe bodies abound with.

4. And this Argument appear'd capable of being ſtrengthen'd by a more conſiderable one: which is, That the gravity of the metalls is ſuch, as cannot reaſonably be deduc'd from any other cauſe, than an abundance of the Mercuriall Principle, their being no other bodies (known to us) beſides *Quicksilver*, that are near ſo ponderous as mettalls.

Theſe two objections, I thought fit, to couch together, to be able in fewer words, to anſwer them both; I conſidered then that *Amalgamation* being in effect, but a kind of diſſolution of mettalls, in a *Menſtruum* or fluid body; for

for ſuch *Mercury* is in reference to them; there is no neceſſity, that the Solvent, ſhould find in the Metall, a copious ingredient juſt of its own nature: for diſſolution depends not, ſo much upon the pretended cognation between the Solvent and the body it is to work on, as upon the congruity, as to ſize and figure, between the pores of the latter and the corpuſcles of the former. As may appear by the Solution of *Ivory* and *Harts-horn* (which belong to the Animal kingdome) that may be made with *Aqua fortis*; and by that, which I have elſwhere ſhewn may be made of *Zink*, and even of *Copper*, by the ſpirit of Vinegar, the Urinous ſpirit of *Sal-Armoniack*, and ſpirit of *Vitriol* ſeparatly imployed; though the firſt of them be a *Menſtruum* drawn from a Vegetable, the ſecond from an Animal, the third from a Mineral ſubſtance. And as for *Amalgamations* themſelves, I obſerve, that the facility *Mercury* finds in joyning with a metall, does not barely depend upon the Plenty of the Mercuriall ingredient, contain'd in the mettall, at leaſt

leaſt if the greater ponderoſity, or ſpecifick gravity of the metall depend upon the copiouſneſs of the ſame Mercurial Principle, or ingredient, as the fourth objection ſuppoſeth: for we finde by experience, that *Mercury* will far more eaſily *Amalgame* with *Tin* than with *Copper*, which yet is much more heavie than it; nay than with *Silver*, which is a good deal heavier, (in Specie) than *Copper*; And is by Chymiſts preſum'd to be much neaier of kin to *Mercury* than is *Tin*. To which I ſhall add, that although *Mars* be ſpecificably heavier than *Tin*, yet it is far from being more eaſily Amalgamable with *Mercury*, that though *Tin* will readily admitt this Minerall liquor, without the help of heat, there is no way vulgarly known to Chymiſts to make an immediate Amalgame between *Mercury* and *Mars*. So that one of the two objections I lately joyned together, muſt be declin'd: ſince by the tryals I have purpoſely made, it appears, that *either* the diſpoſition of Metals to Amalgamate with *Mercury*, do's not barely depend upon the

the ſuppos'd plenty of *Mercury* contain'd in the metall; or elſe that the greatneſs of the ſpecifick gravity do's not depend upon the more plentifull participation of that Mercurial ingredient. Although the fourth objection be built upon a ſuppoſition, that the great ponderouſneſs of Metals, in compariſon of other bodies, can proceed from no other cauſe than the great quantity of *Mercury* they contain; I conſidered too, that it might be juſtly demanded, whence, *Mercury* it ſelfe, aswell as whence Metals, derive their greate ponderoſity, and I ſee not, why it may not be ſaid, that both the one and the other own it to the Solidity and cloſe order, of the corpuſcles, they conſiſt of, to which qualification it is not eſſential, that the portion of matter endued with them, be in a ſtate of fluidity, rather than in one of conſiſtence: as on the contrary we ſee that *Gold* and *Lead* are exceeding ponderous bodies, as well, when they are in fuſion, as when they are cold and hard; and ſo in *Quickſilver* as well in its wonted and liquid

liquid forme, as when it is coagulated, as Chymiſts ſuppoſe, by the vapour of *Lead*.

But this will be ſomewhat further cleared in what I ſhall ſay to the fifth and laſt objection, that my thoughts ſuggeſted to me, and which Philoſophicall candor forbids me to conceal: though I find it eaſier to be proſed than anſwer'd. It may be then alledged in the fifth place; That the *Mercuries* of mettalls muſt needs be but partial Principles of them, ſince *Quickſilver* being confeſſedly heavier, than either the Sulphureous or ſaline principle, and being ſpecifically heavier than almoſt any mettall it ſelfe; the gravity of a mettall cannot reaſonably be ſuppoſed to proceed from the whole body of the mettall, but only from ſome one ingredient heavier *in ſpecie* than the reſt, and, than the mettall it ſelfe. And this ingredient or principle can be no other, than the moſt ponderous body, *Mercury*.

This difficultie I confeſs, does keep me

me yet in ſome ſuſpenſe, till I have further opportunity, to make ſuch tryalls, as I think proper to clear it. Yet in the mean time, I ſhall offer ſome few things, which perhaps may leſſen it, if not quite remove it.

I conſider then that there is no neceſſity to ſuppoſe, that Metals, of what denomination ſoever, as *Tin*, *Iron*, *Silver*, or *Gold*, are body's perfectly *Homogeneous*, though they ſeem ſuch to our eyes. This ſuppoſition I elſwhere purpoſely diſcours of, but in this place I need not ſpend time about it; ſince the Chymiſts (who are thoſe I now reaſon with) do not only allow, but teach it, ſince they will have Metals as well as other mixt body's to conſiſt of three Hypoſtatical principles, whereof *Mercury* is one, although it muſt be much heavier *in Specie*, than either the *Salt* or the *Sulphur* it is blended with: becauſe it is from the participation of that ingredient that they derive the great ponderouſneſs which Metals have in compariſon of other bodies.

And to this granted ſuppoſition, I ſee not why it ſhould be abſurd, to add this other, That the more ſolid and heavie particles or corpuſcles of a Metal, may lye in it, not in the forme of fluid or Mercurial, but conſiſtent parts, and that theſe may be more diſpoſed than the reſt to be brought by Chymicall additaments and the operation of the fire into the forme of a *running Mercury*. Nor ought it to be judged incredible that the forementioned ſolid portion of the Metal, ſhould be more ponderous than Quickſilver, ſince as I have often tryed, *Gold*, though a conſiſtent body, is far heavier than Quickſilver, to the bare participation whereof, *Gold* cannot owe its ſpecifick gravity.

If this *Hyrotheſis* be admitted, it will be eaſie to give an account how the *Mercury* of a Metal may be heavier in *Specie* (that is, bulk for bulk) than the Metal that afforded it; for the difficultie is eaſily reſolved, by ſaying, that the ſolid parts, which by the Chymical operation, are reduc'd into

into the forme of *Quickſilver*, were far more ponderous in kind than the other parts of the Metal, which being alſo aſſociated with them did by their comparative lightneſs make the entire Metal leſs heavy (if the bulks be equall'd) than an aggregate or convention of all the ſolid parts alone would have been. Which may be illuſtrated, by what I have heedfully obſerved, of the decrement of ſpecifick gravity, ſuſtained by *Quickſilver*, when it is united by Sublimation either with Sulphur into Cinnabar, or with Salts in Corroſive Sublimate.

But I muſt not diſſemble, that againſt the forgoing diſcourſe there occurr'd to me a couple of Arguments (that I have not mett with amongſt Chymiſts) whereof the latter is very conſiderable. For I foreſaw it might be alledged, firſt, that the *Mercuries* of Metals being in a liquid forme, could not well be ſuppoſed to be ſo cloſe and ponderous bodi's, as our *Hypotheſis* requires: and next, That we our ſelves admitt an experiment of *Raymund Lully*, whereby

he pretends to reduce the whole body of *Silver* into *Mercury*, which is a heavier ſubſtance than *Silver*; and in this caſe we cannot have recourſe to this anſwer, That the corpuſcles, which aſſume the forme of *Mercury*, were far more ponderous, than the others, that concurred with them to compoſe the metall.

This twofold objection, I do not pretend to anſwer at once, but may perhaps enervate it by degrees.

And firſt, though it be very poſſible that a pretty quantity of additament may be employ'd about the *Mercurification* (to ſpeak in the Chymiſts language) of a metall, yet there ſhall really and finally adhere to the metalline parts, but a very ſmall proportion of Additament, that will continue with them, and keep them in a Mercuriall flux. And it may appear the more credible, that a very ſmall quantity of additionall matter, may have a very great ſtroke in altering the conſiſtence of that which is obtain'd from a metall, as its moſt ponderous portion;

portion: if you conſider with me, that the bare acceſſion of Igneous particles, is able in time, to turn *running Mercury*. Nor muſt I pretermitt on this occaſion, a notable paſſage I remember to have met with in *Helmont*, who relates, that by the abſtraction of the liquor *Alkaheſt* (which is wont to come all over in diſtillation from common *Quickſilver*) he did quite deprive it of its fluidity, and turn'd it into a conſiſtent body, and even into a fix'd one; whereby you may ſee how little a quantity of matter will ſerve to change the conſiſtence of a body of a Mercuriall Nature.

Beſides that, a fluid forme do's not alwaies argue the lightneſs of the body, that it is found in, ſince it may conſiſt of particles, ſo ſolid and ſo numerous, that notwithſtanding their inteſtine motion, the body they compoſe may be very ponderous: as may appeare by red hot Iron, melted Lead, and which is an Inſtance appoſite to our purpoſe, in common *Quickſilver*, which though fluid is heavier than

any known body in the world, Gold excepted.

But I conſider farther, that though the ſolid portion of a metall retain more of the additaments imploy'd to bring it into the forme of *Mercury*, than it can be prov'd to contain, yet this diſadvantage may be compenſated by the new diſpoſition of parts, that the Mercuriſi'd portion acquir's, by the operation that turn's it into a liquor, and may be ſuppos'd to bring the parts to a cloſer or otherwiſe a more expedient order than they were in before: as *Ice* when thaw'd takes up leſs roome, in the forme of water, than it did before it became a liquor. I ſee no impoſſibility, that the ſpecifick gravity of metalline bodies may be increaſed or diminiſh'd by ſuch ſmall proportions of additaments, as do not at all conſiderably add to their abſolute gravity. This the Chymiſts ought not to deny, if they conſider, what themſelves grant, of the efficacy of what they call the *Philoſophers Stone*, whereof they tell us, that one grain, if it be of a nobler order

der or degree, may tranſmute a whole pound of *Quickſilver* into perfect Gold; and conſequently the ſpecifick gravity of a metall is notably changed by an additament, which (according to the differing pounds uſed in ſeverall Countreys) amounts not perhaps to the 6. or 7. thouſand part of its weight. Beſides, the tranſmuting powder being a Compounded body, whereof but part is *Gold*, may probably be ſuppos'd to be more light *in ſpecie* than the metall that by addition of it is produc'd; which being pure *Gold* is the ponderouſeſt body yet known to us. And to confirme the Argument, I ſhall add, that there is a way, though I pretend not to know it, of making a metall far lighter *in ſpecie*, than it naturally is, by the addition of leſs than a 100. part of its weight, as experience has convinc'd me.

Wherefore to come now to the grand objection furniſh'd by *Lully's* lately mention'd experiment, it will not preſently follow, that if the whole body of a metall be brought into a mercuri-

all forme, this *Mercury* will ſwallow up and deſtroy our *Hypotheſis*: for though I grant that in this caſe, it cannot be ſaid, as in the former caſes (wherein a part only of the metall is Mercurified) it may be, that the obtain'd *Quicksilver* conſiſts of the more ſolid and ponderous parts of the metall; yet it may be ſtill ſaid, that, *for ought we know*, the *Mercury* produc'd, by the reduction of the whole metall into a fluid forme, may be ſpecifically lighter than common *Mercury*, and ſo cannot be neceſſarily concluded to be ſpecifically heavier than the metall that afforded it. I lately imployed the words, *for ought we know*, becauſe we are now upon the caſe, wherein Philoſophicall candor invited me to acknowledge, that I wanted further tryalls to give my ſelfe full ſatisfaction: for although I have had portions of the *Mercury's* of more than one or two metalls, yet it was but in ſmall quantities; ſo that the other tryalls, I had the curioſity to make with them, kept me from examining their ſpecifick gravity, and from finding by an Hydroſtaticall way that I have elſewhere declared, whether they were not lighter *in ſpecie* than inferiour metalls, and conſequently than common *Mercury*. For that *Quicksilver* may be ſpecifically lighter than the metall that affords it, I think the Chymiſts cannot reaſonably refuſe to grant; ſince they allow that *running Mercury* may be obtain'd from *Gold*, and tell us great matters of it, becauſe of its proceeding from ſo noble a body. Now if this *Golden Mercury* be ſaid, (becauſe of the ſuppos'd reſemblance of all *Mercury's*) to be of the ſame ſpecifick weight with common *Quicksilver*, then I have a notable inſtance, of a *Mercury* that is conſiderably lighter *in ſpecie*, than the metall that afforded it. And therefore, till experience have manifeſted the contrary, it will not be abſurd to preſume, that the *Mercury's* of other metalls, may likewiſe be lighter *in ſpecie*, than the reſpective body's from which they were obtained: but if it be ſaid, that this *Golden Mercury*, may perhaps be as ponderous as *Gold* it ſelfe, or even more, then 'tis plaine, that it is poſſible for a Metalline body, not-

notwithſtanding its being reduc'd into the forme of a fluid, to be equiponderant to the Metal that afforded it. And that I may not ſeem to argue, altogether, from the conceſſions the Chymiſts ought to make; I will add, by way of Confirmation, a couple of things that perhaps you will think ſomewhat ſtrange. Whereof the former is, That it is poſſible for a Metalline body to reſemble another in all the manifeſt qualities, whereby Artiſts are wont to examine them, and yet they differ much from it in ſpecifick gravity: as I had once opportunity to obſerve in a Metal that was not only white (within and without) like *Silver*, and very malleable, but did, when I purpoſely examin'd it, endure Cuppellation, and paſs'd for & was reputed by a very eminent Artiſt that ſent it me to examine, to be good *Silver* in all proofs; and yet this Metall found by Hydroſtaticall tryalls to be much lighter *in ſpecie*, than common *Silver*. And if the famous perſon that ſent it me, was not miſtaken (for ſo I muſt not think he would knowingly miſinforme me,) This odd metall may yeeld me

me a notable inſtance to my preſent purpoſe, ſince he affirmed this metall to be made without the addition of any metalline body of *Quickſilver*, which, if this be ſo, muſt, by a change of Texture, have made a conſiderable loſs of its ſpecifick gravity. But to proceed to my ſecond inſtance, which will be yet more appoſite; I ſhall add, that once I had a *Mercury* which amongſt other remarkable properties, that belong not to this Argument, had a very ſtrange one; namely, that it was conſiderably heavier *in ſpecie* than *common Mercury* (as I found & ſhewed to a great *Virtuoſo* by Hydroſtaticall tryall,) though it was made of a body no heavier than *common Mercury*, and by the help of additaments which were much lighter than *common Mercury*. And this was ſo far from being a more groſs and ſluggiſh kind of *Quickſilver* than the ordinary, that it look'd very fine, and was very agile, and had before I examined it been more than once diſtilled. By this it may appear, that from hence, *that a body is in a mercuriall forme*, we cannot ſafely determine what degree of ſpecifick gravity

vity it has. For ſince by this laſt example it appears, that a ſort of *Quickſilver* may be far more ponderous than common *Quicksilver*; it ſeems not unreaſonable, that a ſort of *Quickſilver* may be far lighter than *common Mercury*, and ſo perhaps lighter than the metalls that were reduc'd into that forme: it being far leſs likely, that the former ſhould be produc'd than the latter, in regard there is but one minerall body in the world, that we know of, at all heavier than common *Quicksilver*; whereas there are many of thoſe that are capable of being aſſociated with it, that are far lighter than it.

But as I intimated above, I am unwilling to ſpeak ſo poſitively about this matter as I might do, if I had opportunity to make the tryalls I would with the *Mercuries* of body's: only thus much I ſhall venture to ſay, that for ought yet appears, the Argument I have been anſwering all this while, is not cogent, ſince it is built upon a ſuppoſition, that the *Mercuries* afforded by metals and minerals, muſt be

be of the ſame weight with common *Mercury*; which is not only a proofleſs aſſertion, but repugnant to the Experiment lately mention'd of the diſtilled *Mercury*, that was heavier than common *Mercury*, and to the preſumption deriv'd thence, that there may be body's, in a Mercurial forme, more light *in ſpecie* than common *Mercury*. And whatever becomes of the opinion I incline to; The Argument I have been examining, of the Chymiſts, may be invalidated by what I have ſaid, where I took notice of the notable exceſs of ponderoſity, that pure *Gold* has in regard of common *Quickſilver*: for by that inſtance it plainly appears, that it is not to the participation of common *Mercury*, that metals muſt neceſſarily owe their great ponderoſity; but that nature, (and Art too,) may contrive the parts of a body into ſo cloſe an order, as to make that body (whether ſolid or fluid,) more ponderous, *bulke for bulke*, than common *Quicksilver* it ſelfe.

Having now diſpatched what I intended

tended to say in the foregoing discourse, it remains that I performe the promise I made, of adding the waies of *Mercurification* (as Chymists speake) above referr'd too, as delivered by *Paracelsus*, *Helmont* and *Lully*: about which I must give you this advertisement, that besides the obscurities, and imperfections, that a moderate degree of attention may enable you to discover in these processes, understood in the literall sense, there are, if I much mistake not, some affected Equivocations in terms that seem very plain, and free from suspicion of ambiguity. As for instance, though the word *Sal-Armoniacum* seem to be of this sort, yet amongst *Hermetick* Philosophers it often signifies, not common *Sal-Armoniack*, which is far from being able to perform the effects they ascribe to theirs, but a very differing and much more noble and operative thing, which because it may be sublim'd like common *Sal-Armoniack*, they are pleased to call by that name: and though sometimes they give it the title of *Sal-Armoniacum Philosophorum*, yet oftentimes they

they omitt the discriminating Epithite, especially in Philosophical processes, (that is, such as those wherein they deliver their higher *Arcana*,) of which sort are many of *Paracelsus*'s processes, and more (not to say most,) of *Lully's*. What is meant by *Sal-Armoniacum Philosophorum*, I think it needless to tell you here, (but may perchance do it on another occasion,) since that composition requires an Ingredient that neither of us is furnish'd with, and that you cannot procure. There may be other Ambiguities in the following processes, that will not be easily discover'd, but by such as are vers'd in the mysterious language, which some would call *canting*, of the *Hermetick* Philosophers. But I think I have said enough already to shew, that the annexed processes are fit to confirm what is delivered upon the first *Proposition* of the foregoing discourse; and therefore without offering to explain them, I shall subjoyn them in the proper terms of the respective Authors.

Ratio

Ratio extrahendi ex omnibus Metallis Mercurium Paracelſica.

Hæc extractio (Scilicet Mercurii ex Metallis) fit per aquam Mercurialem, quæ nec *Joanni de Rupeſciſſa*, nec aliis, quicquid etiam jactitent, cognita fuit. Ideoque diligenter eſt cognoſcenda, & indefeſſo labore tractanda. Hoc ergo pacto paretur dicta aqua Mercurialis.

R. lb. III. Mercurii ſublimati ſeptiès per Vitriolum, Sal Nitri, & Alumen.

SAlis Armoniaci, ter à ſale ſublimati & clari & albi iſs. Trita ſimul & alcolizata ſublima in ſublimatorio per are nam, horis 9. Ubi refrixerit, ſublimatum cum penna detrahito, & cum reliquo ſublima, ut prius. Hanc operationem quater repete, donec amplius non

non ſublimetur, & in fundo maſſa nigra maneat inſtar ceræ, fluens. Refrigeratam exime, & tritam rurſus in patina vitrea ſæpius cum ſalis Armoniaci aquâ ſ. autem præparata, imbibe, & ſua ſponte coagulatam rurſus imbibe & ſicca, ad 9. ſeu 10. uſque vices, donec ferè non ulterius coaguletur. Tritum ſubtiliter ſupra Marmor in loco humido ſolve in oleum pulchrum, quod rectificabis per diſtillationem in cineribus, ab omnibus fæcibus & reſidentia. Hanc aquam omnium facile principem diligenter aſſervabis, cujus R. unc. VIII. & impone laminas opt: ſolis aut Lunæ, optimè mundatas, pondere unc. iſs. vitro clauſo repone ad digeſtionem in cineres calidos horis 8. Corpus tuum videbis in fundo vaſis tranſmutatum in ſubtilem vaporem ſeu Mercurium. Factâ ſolutione totius aquæ Mercurialis per Alembicum lento igne à prima materia ſublimando ſepara, & in vitreo vaſculo diligenter aſſervato. Habebis hoc pacto veriſſimum Mercurium corporis. Paracelſus in Man: de lapide Philoſophorum.

Senſi (ſaies he) *cruditatem Saturni, pinguedine fixorum ſalium ſolubilem,*

ſolo quandoque igne carptim delebilem, ſicque dividi compoſiti partes, crudumque Argentum vivum currere permitti. Sulphur fugitivum ſuperans in ſaturno tr. here ad volatum, fixum, inſeparabiliter junctum. Quodque expediet imprimis Saturni ſublimatio. Cujus expreſſione nulla eſt elevati ad reſidens, coloris aut ſubſtantiæ differentia. Unde etiam caloris, fuſionis & mollitiei cauſis, poſt calcinationes & redactiones, reſiduis medullitus, ſine igne fuſionem, ſolitamque mollitiem minimè refutat. Helmontius, in potes. medicaminum. num. 40.

Ex-

Extractio Mercurii à Corpore Perfecto.

Rec. unc. 1. calcis Lunæ appellatæ, calcinetur modo quo dicitur in fine noſtri magiſterii operis, quæ quidem calx teratur ſuper porfidum in pulverem ſubtilem, quem pulverem imbiberis bis, ter, quater in die, cum optimo oleo Tartari, facto eo modo quo dicetur in fine noſtri, deſiccando ad ſolem quouſque dicta calx abſorbuerit de dicto oleo 4. aut 5. partes, plus quàm fuit ipſa calx, terendo ſemper ſuper porfidum, ut dictum eſt, & in fine bene deſiccetur calx, ut benè poſſit in pulverem redigi. Et quando fuerit bene pulverizata, ponatur in metreto cum collo longo. Ponatis de noſtro menſtruali fætenti, facto de duabus partibus vitrioli rubei, & una ſalis petræ, & prædictum menſtruum prius deſtilletur ſepties, & bene rectificetur, ſeparando fæces terreſtres in tantum, quod prædictum menſtruale ſit totum eſſentiale. Deinde lutetur benè metretum, & ponatur ad ignem cinerum, cum parvo igne carbonum, quouſque videris materiam bullire & diſſolvi. Deinde ſic ſu-

pra cineres diſtilla, donec amiſerit Menſtruum, & materia fuerit frigida totaliter, cum frigidum fuerit, vas aperiatur, & materia, quæ frigida eſt, ponatur in alio vaſe bene mundo, cum ſua cappa bene lutata ad furnum ſupra cineres, & luto bene deſiccato, fiat ignis paulatim in principio, quouſque totam recipias aquam ipſius. Poſtea augeatur ignis, quouſque materia bene fuerit deſiccata, & ſpiritus fœtentes ſint ad cappam, & in receptorio jam exaltati. Et dum tale ſignum videbis apparere, dimittatur vas infrigidari, ignem minuendo. Et poſt refrigerationem vaſis, extrahatur materia, & in pulverem ſubtiliſſimum redigatur ſuper porfidum; ita quòd pulvis ſit impalpabilis, qui ponatur in vaſe terreo bene cocto & bene vitreato. Et poſt ponatur ſuper dictum pulverem de aqua communi bulliente, movendo ſemper cum baculo mundo materiam, uſque materia fuerit ſpiſſa ſicut ſinapi. Et move dictam ſaliam cum baculo, quouſque videris apparere grana Mercurii è corpore, & quia vobis appareat quantitas magna prædicti Mercurii vivi, ſecundum quod poſueris de corpore perfecto, id eſt, de Luna, & da-

dum habueris magnam quantitatem, interim projice deſuper aquam bullientem, & tandem movendo, quoad tota materia reſolvatur in materiam ſimilem argento vivo vulgari, tollantur terreſtreitates cum aqua frigida, & deſiccetur per pannum: poſtea tranſeat per corium, & videbis mirabilia. Lullius in Clavicula. Cap. 2.

FINIS.

Of the Diſſimilitude of Running Mercury.

BEfore I undertake to give you my opinion, about your queſtion, I muſt crave leave to ſtate it ſomewhat more clearly, by propounding it thus: *Whether all the Bodies, that in the ſhops, and among Chymiſts paſs for true running Mercury's, are Homogeneous?* Or, ſo much of one and the ſame nature, that the ſeverall portions of ſuch *Mercury's* are but numerically different? Now to the queſtion thus ſtated, the fear of ſeeming to maintaine a Paradox, by diſſenting from the generality of Chymiſts, as well as Naturaliſts, (who are wont to employ indiſcriminately all *Running Mercury's* not manifeſtly adulterated) will not keep me from returning a negative anſwer.

And though it were not over difficult

cult for me to give you the reaſons of my opinion, drawn up into method, and referr ſeverall inſtances I ſhall produce, ſome to the depuration of *Quicksilver*, ſome to the impregnation of it, ſome to the Coction, and others to two, or all theſe waies of altering it; yet I ſhall rather preſent you with them, by way of looſe obſervations, becauſe I preſume that freedome will not be unacceptable to you, as it will allow me, to give you ſome few, but uncommon notices and hints about ſuch noble ſubjects as prepar'd *Mercury's*.

1. In the *firſt* place then it may be obſerv'd, that a *Running Mercury* may be brought to differ from *common Quicksilver* by *Depuration*: for there are in moſt *Mercuries* either Recrementitious particles, or at leaſt ſome looſe adherencies, that are ſeparable from the reſt of the Body, and which being ſeperated, the *Mercury* becomes more Homogeneous or cleane than it was before this externall Depuration, (for ſo I call it to diſtinguiſh it from another

another that is internall) that is uſually made by grinding and waſhing *Mercury* very well with ſalt and Vinegar, (for which purpoſe I alſo ſometimes uſe ſpirit of Wine) which one may not unfrequently ſee ſomewhat foul'd by what it carries off from the *Mercury*, which is alſo ſometimes attempted to be purified by the more laborious way of diſtillation, which, though in ſome caſes inſufficient, (as I ſhall ſhew anon) is in ſome others very convenient; whereto ſome Artiſts add other probable meanes, tending to the ſame purpoſe. So that I do not wonder to find, that divers Philoſophicall Spagiriſts themſelves, before they proceed to more intimate preparations of *Mercury*, order it to be ſeverall times previouſly incorporated and ſublim'd with Acid *Salts* or *Sulphurs*, and then reviv'd with *Alcalies*: ſince without examining *their* grounds it may be ſaid, according to Mechanicall Principles, that by diligent commixtures the *Mercury* is divided into exceedingly minute, if not inviſible, Globules, or ſuch like parts, and by this great comminution, it

it acquires far more of ſurface than it had before, by which meanes a great multitude of ſeparable parts come to be touch'd almoſt of every ſide by the Salts or Sulphurs, to which by this meanes, when the *Quicksilver* is driven from them in the revivification, 'tis probable, that very many of them ſticke that were not ſuperficial, when all theſe Globules made up but one Mercuriall Maſs. And tis poſſible too, that the *Alcali's* employ'd to revive the *Quicksilver*, may help to tear of from it ſome of the feculent particles which the Chymiſts would deſire to have it freed from. And here let me advertiſe you upon the by, that there is no neceſſity to have recourſe to ſalt of *Tartar* or *Quicklime*, or ſuch like *Alcali's* for the reviving of *Quicksilver*, and therefore when I would with eaſe obtaine a cleane and active *Mercury* for ſome purpoſes, I do not employ Acid and then Alcalizate ſalts, but mix very well common *Cinnabar* finely powdered with a double weight, or at leaſt, an equall weight of filings of Iron, or Steel: for theſe being diſtill'd together

ther in a low Retort with a ſmart fire, the ſulphur of the *Cinnabar* will faſten upon the filings, and let the *Mercury* come over faire and vivid, and perhaps ſomewhat impregnated with a martial vertue, upon whoſe ſcore it may be better than if it had been prepared by meer Depuration.

2. And this leads me, to the mention of *another* way of diverſifying *Mercury*, which is by *Impregnation*, either Corporeall, or Spirituall (if for diſtinction ſake I may ſo call them.) But the Impregnation being a comprehenſive way, divers particular methods may, after a manner, be referr'd to it: yet becauſe the true grounds of ſuch references are ſometimes hard enough to be aſſign'd, at leaſt in few words, I ſhall allow my ſelfe without ſcrupulouſly regarding them to proceed in my free obſervations.

3. The *next* thing then upon whoſe account a *Running Mercury* may come to differ from *Common Quicksilver*, is a ſpiritual Impregnation. By *Mercury ſpiritually Impregnated*, I meane that with

with which some subtle parts of another body are so intimately associated and united, that not only the additament will pass with the *Mercury*, when it is strain'd though Leather, (though that be the means by which Artists usually separate *Gold* it selfe from the *Mercury* wherewith it has been Amalgam'd) but will also continue with it after distillation, without hindering the *Mercury* from being vivid enough. I know there are many Chymists, especially, among the more cautious, that looke upon *Quicksilver* as so Heteroclite a Minerall, that as no Body can fasten enough upon it, to alter it intrinsecally, so it will not admit any other Body to be associated with it any thing intimately, or permanently. And indeed since we find that when *Gold* it selfe, with which of all bodies whatsoever *Mercury* is beleeved to have the greatest sympathy, may yet be separated from it by straining an *Amalgame* of those two metals through Leather, which will transmit the *Quicksilver*, and retaine the *Gold*; and if such an *Amalgame* be distill'd with a competent fire,

fire, the *Mercury* will ascend, and leave all the *Gold* behind in the Retort; since *Mercury* I say, is so separable from *Gold* it selfe, it may seem improbable, that it should be more intimately associated with any other bodies: but these arguments, though specious, do not I confess convince me, who must not deny, but that the Corpuscles of some minerall Bodies may be so well commixt with *Quicksilver*, as to pass with it through the Pores of Leather, and who have found by tryall purposely made (and elsewhere related) that *Quicksilver* being in a convenient proportion Amalgam'd with *Tinn*, or with *Lead*, and distill'd with a competent fire, will manifestly bring over with it some of the associated metall, insomuch that not only I have found a notable increase in the weight of the distill'd *Quicksilver*, but it would both leave a taile, as they call it, behind it, when it moved upon a sloping glass, and (which was more) when the sluggish *Mercury* had rested a while, it would appeare covered over, with a kind of scum, made of the Emerging

Emerging Corpuſcles of the *Tin*, or *Lead*, either of which, eſpecially the former, is a metall lighter *in ſpecie* than *Quickſilver*. Hence it appeares, that *Mercury* may be ſo ſtrictly united to a not deſpicable proportion of a groſs and ponderous body, and of an ignobler kind as to carry it along with it ſelfe in diſtillation, which by this appeares not to be near ſo certain a way, as ſome learned Chymiſts think it, to try whether *Mercury* be pure in all adulterating mixtures, and to free it from them, if it had any before. But the chiefe uſe I will make of this Experiment is this, that ſince we ſee that ſometimes *Mercury* do's not refuſe even corporal Impregnations, (as for diſtinction ſake I call thoſe lately recited) it ought not to appeare incredible, that it may in ſome caſes admit ſpirituall Impregnations, and ſo intimately aſſociate with it ſelfe ſome of the finer parts of certaine metalls and mineralls, as not to part with them, though they be diſtill'd, and afterwards perhaps ſeverall times waſh'd. This brings into my mind, that I had once a diſtill'd

ſtill'd *Mercury* made by an Impregnation of common *Mercury*, a drope or Globule of which, being evaporated from a thin piece of Silver, not only ſeem'd to have ſomewhat penetrated it, but (as I expected) left upon it a rugged ſubſtance apparently lighter than the ſurface of the piece, and of a colour very neare that of *Gold*, from whoſe nature perhaps it was very remote: but that common *Mercury* may indeed be ſpiritually impregnated, I have been perſwaded by divers effects, that I have tryed of ſuch Impregnations, and I acknowledge to you, that moſt of the uncommon *Mercuries*, that I am now proceeding to tell you of, have been prepar'd after ſome ſuch manner.

4. *Another* thing, wherein a *Mercury* may differ from common *Quickſilver*, is a *facility to Amalgame with Gold*: for 'tis known to Guilders, Goldſmiths, and others, that are vers'd in ſuch Experiments, that to make Amalgams with Gold and Mercury,

cury, 'tis uſuall enough to take ſix parts of the latter to one of the former, and ſome take eight or more. Nor is ſo great a proportion of *Mercury* wont to keep them from thinking it requiſite to make both it and the *Gold* ſeparably, and conſiderably hot to facilitate their commixture, but I have divers times had ſpiritually impregnated *Mercuries* with but two parts, of which I would preſently make an Amalgame with one part of the *Calx*, or leaves of *Gold*, and that without any other externall heat, than that of the palme of my Hand. Nay ſometimes for tryall ſake, I have employed but one part of *Quickſilver* to make in the palme of my Hand a mixture, wherein the *Gold* was ſo far from appearing, that the colour of the *Quickſilver* was not ſenſibly ſo much as impair'd.

5. *Another* difference between ſome *Mercuries* and thoſe that are vulgar, is, that theſe being put to *Calx* of *Gold*, though one do at length bring them to mix, (for it is not ſo eaſily done as men are wont to preſume) yet

yet they will not diſcloſe any ſenſible heat, but the mixture, as each of the incorporated Ingredients was, will to the touch be cold: but though I know there are many learned Chymiſts that looke upon incaleſcent *Mercuries*, that is, ſuch as will grow hot upon their mixing with *Gold*, as Chymical *non-entia*, or Chymæra's, yet they are not competent Judges of the poſſibility of things. For I have more than once, or a few times, both alone, and in the preſence of ſome curious perſons, found and evinc'd, that a diſtill'd *Mercury* may be ſo animated, that a ſingle drachm of it, or perhaps a far leſs quantity, being mix'd barely with my finger, with as much, or perchance halfe as much, *Calx* of *Gold*, would preſently conceive, not only a ſenſible, but a very conſiderable heat: inſomuch that ſometimes it would prove offenſive to the palme of my Hand, wherein I made the mixture. Divers *Phænomena* of this Experiment may be ſeen in the Authors little Tract *of the incaleſcence of Quickſilver with Gold*, now extant in the *Philoſophical Tranſactions. Numb.* 122. And I re-

member that once being to convince a very eminent Chymiſt, that there were ſuch *Mercuries* as I have been ſpeaking of, I tooke a remnant of a certaine *Quickſilver*, which I intend never to make againe, (and of which for the ſake of Mankind, I reſolve not to teach the preparation) of whoſe diſpoſition to incaleſcence I had ſuch an opinion, that though we had no *Calx*, nor ſo much as filings of *Gold*, but only ſuch pieces as he could groſsly prepare with a hammer and a paire of ſiſſers, I ventured to put my Mercury to them in a glaſs Mortar, and yet notwithſtanding the thickneſs and cloſeneſs of the beaten metall, and the coldneſs of the Veſſell, the *Mercury* to the Artiſts wonder penetrated the *Gold*, and grew manifeſtly hot with it. And this faculty of our *Quickſilver* was not a tranſient and eaſily vaniſhing one, for I had already kept the *Mercury* by me, for ſeverall years. The *incaleſcent Mercuries* hitherto mentioned were animated by tedious, and laborious operations, but if I had deſired only to convince gaine-ſayers, I could have done

done it by a very much ſhorter way: for though this ſort of impregnated *Mercury's* be many degrees inferiour to the forementioned animated *Mercuries*, yet as to incaleſcence with *Gold* I know by experience a way which is indeed hard to hit, and requires a dexterous Artiſt, but which, when is ſucceeds aright, will in an hour, and perhaps a leſs time, qualify *Mercury* to grow preſently hot with *Gold*.

6. When an Animated *Mercury* is by due Impregnation qualified to Amalgame readily and intimately with *Gold*, and penetrated ſo as preſently to grow hot with it, it is not much to be admir'd, that it ſhould alſo differ from common *Mercury*, in the being able to carry up with it part of the *Gold* wherewith is was ſo ſtrictly aſſociated. I know that many learned Men, and among them divers Chymiſts themſelves, do not thinke it credible, that at leaſt Corporall *Gold* ſhould be volatilized by *Quickſilver*. And indeed that which is common may be many times diſtill'd from

Gold, without carrying up any of it; but this ought not to conclude againſt ſuch ſpiritually impregnated *Mercuries*, as I lately mention'd: for with a very ſmall quantity of one of them I have ſometimes elevated ſo much *Calx* of *Gold*, that the inſide and necke of the Retort were richly guilt by the adherent particles of that metall, which would ſometimes ſticke ſo cloſe, as not to be without difficulty ſeparated from the glaſs; and I remember too, that having with one of theſe noble *Mercuries* Amalgam'd about halfe its weight at moſt (if I miſtake not) of *Calx* of *Gold*, though it did not guild the inſide of the glaſs, yet I found as I expected, that the diſtill'd *Mercury* was manifeſtly encreas'd in weight, as well as ſomewhat chang'd in colour and conſiſtence; which Experiment may be added to thoſe, that I formerly mention'd, to prove that *Quickſilver* (duely prepar'd) may be corporally impregnated.

7. In the *Amalgames* made of one of theſe ſpiritually impregnated *Mercuries* with *Calx* of *Gold*, I have ſometimes

times obſerv'd à thing, that argues ſuch *Mercuries* to be differing from common *Quickſilver*: of whoſe *Amalgames* with *Gold* ſuch an effect has never (that I know) been taken notice of. The *Phænomenon* I meane was this, That by diſtilling one of thoſe ſubtle *Amalgames* in a Retort, a good part of the bottom of the Veſſell, which I have yet by me, was left adorned with a very lovely colour, almoſt like that of *Turrois* Stone, inclining towards the colour of *Gold*, and ſomewhat changeable, and alſo ſo cloſely faſtned to the Glaſs, that it ſeems to have penetrated into it, though this beautifull ſtain were left by but a very ſmall quantity of the *Amalgame*, and though this mixture were diſtill'd but in a moderate fire, ſince 'twas in a ſand furnace. Nor is this the only Experiment of this kind, that I would alledge, ſince I elſewhere mention an *Amalgame* of *Gold* with an animated *Mercury*, which being long decocted, when at length by an exceſſive fire unskilfully adminiſtred the veſſell was unluckily broken, left the lower part of the glaſs permanently ting'd with a

pure and tranſparent red, that ſeem'd to me to emulate that of a not common *Rubie*.

8. *Another* difference I found between ordinary *Quickſilver* and ſpiritually impregnated *Mercuries*, that will perhaps ſomewhat ſurprize you. And it is, that though one would expect that *Amalgames* made with *Mercuries* ſo penetrant and ſo diſpos'd to adhere cloſely to *Gold*, ſhould make with it *Amalgames* far more eaſy than thoſe made with ordinary *Quickſilver* to be turn'd into red Precipitate, yet I found the quite contrary upon tryall. For whereas Chymiſts are wont to mention about ſix weekes as the uſuall time, wherein *Mercury* may be precipitated even *per ſe*, that is, without additament, and allow but a ſhorter time to make this precipitation, when 'tis Amalgam'd with *Gold*, (whereby ſome of it is detain'd, and all more expos'd to the action of the fire) I have had the Curioſity to keep an animated *Mercury* Amalgam'd with about a third part of its weight of fine Gold above twice ſix weekes,

weekes, without having ſo much as a graine or two of precipitate (perhaps not halfe ſo much) that I could perceive, though the *Mercury* grew hot with the *Gold* at their being mingled, and though the mixture were purpoſely kept in a good heat capable to make *Quickſilver* circulate; nor did I content my ſelfe with one tryall, nor with one ſort of animated *Mercury*, but in above five or ſix months I obtained not one graine (that I could diſcerne) of Precipitate, though the heat was ſo ſtrong, as to carry up many parts of the Quickſilver and of the Gold with it, to the top of the glaſſes; nay in one of them (which was a ſomewhat odd caſe) the fire was ſo violent, that the *Hermetically* ſeal'd glaſſes beginning to melt, the ſpirituous matter included in it was ſo forcibly expanded, as to ſtretch the weaker ſide of the glaſs, and give it as it were a bunch, yet without breaking it, as I can ſhew you in the glaſs it ſelfe, that I have yet entire by me. Nor do ſix months make the longeſt terme, that the obſtinacy of my curioſity has made me keep *Gold*

in decoction with animated *Mercuries*, without obtaining a red powder or *Precipitate*, though in the meane time there were produc'd very pretty vegetations, and sometimes, which is far more considerable, odd changes of colours, about which it is not here necessary to entertaine you. The maine drift of this observation being to give you notice, that as far as I have yet tryed, the more subtle and richly impregnated *Mercuries* are far less apt to afford *Precipitates* with *Gold* than common *Quicksilver* is. As if that disposition to be calcin'd, (as the Chymists are pleased to speake) or turn'd into powder, required the presence of the recrementitious or more separable part of *Quicksilver*, that a Chymist would perhaps call it *Sulphur*, which was a discovery I could willingly enough have miss'd. For I confess I had some hope, as well as intention, to try whether a *Precipitate* made with *Gold* and some of these noble and richly impregnated *Mercuries* would not prove a nobler medicine than *Precipitates* made with *Gold*, and only common *Mercury*: though

though even of some of these, when dexterously prepar'd and kept their due time in decoction, experience invited me to have no slight opinion, especially, if they be exhibited in a just dose, and accompanyed with a proper additament, by which they may be kept from raising any salivation, and have their operation either altogether or almost totally determin'd downwards.

9. The *last* difference I shall observe between some distill'd *Mercuries* and common *Quicksilver*, shall be their *Inequality in point of specifick gravity*. I know you will thinke this a Paradox, but I can tell you, that I had once the opportunity to examine *Hydrostatically* a noble *Mercury*, for the impregnating whereof neither corporall *Gold* nor *Silver* was employ'd, and yet having carefully weighed this *Quicksilver* in water, according to the method I elsewhere teach, in the presence of a famous and very heedfull *Virtuoso*, I found it, as I had foretold, not only manifestly, but very considerably heavier *in Specie* (that

(that is, *bulke for bulke*) than common *Quickſilver*, though this *Mercury* had been ſeverall times diſtill'd, and by other waies depurated, which to me ſeem'd to argue, that even ſpirituall or volatile *Gold* (for no viſible *Gold* was employ'd, and no metall but *Gold* is ſo heavy as *Quickſilver*) is able to increaſe the ſpecifick gravity of *Mercury* it ſelfe, which of all the Bodies we know, is exceeded or equal'd in that quality but by one alone; and the ponderouſneſs of our lately mentioned *Mercury* ſeems to me the more wonderfull, becauſe having by the ſame method *Hydroſtatically* examin'd a *Mercury*, made after a ſtrange way, (without common *Mercury*) I found it ſcarce at all to differ in gravity from common *Quickſilver*, ſince it did not weigh full fourteen times as much as common water of the ſame bulke.

But here I ſhall obſerve to you upon the by, that 'tis not a certaine conſequence, to inferr, that the heavier the *Mercury* is, the more fixt it muſt be: for I remember that having been once ſo

ſo unadvis'd as to comply with the earneſt ſolicitations of an inquiſitive Gentleman, that afterward behaved himſelfe very ungratefully and unworthily to me, I gave him inſtructions how to make an animated *Mercury*, which I look'd upon as very much of the like nature to the ponderous one, I have been ſpeaking of, but leſs tedious, and far leſs difficult to be prepar'd, and whiles he found, he needed my renewed directions according as new difficulties occurr'd to him, he gave me from time to time an account of his progreſs, and when he was advanc'd far in the proceſs, he enform'd me, amongſt other things, that following my direction in purifying and animating his *Quickſilver*, he found it ſo alter'd and ſubtiliz'd, that he would diſtill it in leſs than halfe the time he had formerly employ'd to drive it over, with the like fire and veſſells.

This is what I thought fit to ſay at preſent, about the differences between common *Quickſilver* and prepar'd (but yet running) *Mercuries*.

And

And yet I am content to add two or three advertiſements, for which, and eſpecially for the firſt of them, you will perhaps thanke me, if ever you ſhould vigorouſly proſecute in a Spagiricall way, the more noble ſort of Mercuriall Experiments.

In the firſt place then, I ſhall obſerve to you, that whatever ſome learned Chymiſts, and others teach to the contrary, it is matter of fact, that *Mercuries* may be animated or ſpiritually impregnated by more waies than one, (not to ſay, by more than a few) ſo as to penetrate *Gold* very powerfully, and grow hot with it; and it ſeems to me very probable, upon grounds not meerly notionall, that the differing wayes that are employ'd to prepare theſe animated *Mercuries*, by impregnating them with this, or that Minerall, or metall, may much diverſify their qualities and operations, according to the reſpective natures of the bodies they are impregnated with. Nay though there ſeem ſo great a diſtance between *Quickſilver* and vegetable ſubſtances, yet

yet I have ſeen a *Mercury*, that was prepar'd by the help of Vegetables without metalls or mineralls, which was very different from common *Quickſilver*, by being more noble than it.

The ſecond thing I am to acquaint you with, is, that as divers bodies and methods may be employ'd in the preparation of noble *Mercuries*, (as I have newly obſerv'd,) ſo it ſeems very probable, that the common *Mercuries* ſo prepar'd may have differing, as well as noble qualities and uſes, not only in reſpect of *Alchymy*, but of *Medicine*; as being fitted to have potent operations, as well upon humane bodies, as the more ſtubborn ones of Metalls and Mineralls. I am not indeed at all forward to recommend the needleſs uſe of Mercuriall Medicines, of which we may too often ſee bad effects, if they be not as well prudently and cautiouſly given, as faithfully and skilfully prepar'd: but ſince we ſee that in ſpight of *Helmont*, very many learned and experienced Phyſitians allow themſelves to employ, frequently enough, even the

the vulgar preparations of common *Mercury*, ſome of which prove indeed oftentimes in ſome ſtubborn diſeaſes far more efficacious than ordinary medicines, I ſee not why we may not hope for greater and more innocent effects from a *Mercury* well purifyed and impregnated with the Sulphur and finer parts of ſuch bodies, as volatile *Gold*, or *Venus*, or *Mars*, or *Antimony* &c. And though, as I lately told you, I found ſuch animated *Mercuries* far more indiſpos'd than common *Quickſilver*, to make a Precipitate with Corporall *Gold*, yet this need not hinder, but that divers other preparations may be made, as well with impregnated, as with vulgar *Mercury*: ſuch as are *Turbith Minerall*, the white *Precipitate* that purges downwards, *Mercurius dulcis*, *Pills of Crude Mercury* made up with fit ingredients, (as in thoſe that are by ſome called the blew and the blacke Pill) and eſpecially the *Cinnabar* made by ſubliming Quickſilver and Sulphur, into a purely red ſubſtance, which though wont to be employed chiefly by Painters, ought not perhaps to be neglected by Phyſitians, ſince even in ordinary *Cinnabar* the vulgar *Mercury* is ſo bridled by the common *Sulphur*, that unleſs too frequently given without pauſes, or in an indiſcreet doſe, it has not been uſually found to ſalivate, yet does often lye not idle nor uſeleſs in the body; ſo that it may bee well worth trying, whether a noble *Cinnabar* may not be obtained by ſubſtituting animated *Mercury* for vulgar, eſpecially if inſtead of common *Sulphur* one ſhould employ that of *Antimony*, or of *Antimony* and *Vitriol*, which I have elſewhere ſhewn to make.

The third and laſt advertiſement I will give you, ſhall be, that you are not haſtily to conclude, that a *Mercury* that has been carefully depurated and impregnated, has not been well prepair'd, if you find it not readily to elevate corporall *Gold*, as it may ſeem by the paſt diſcourſe that moſt of the animated *Mercury's* I have mention'd did. For though it be true, that I have had ſome *Mercuries* fitted to penetrate *Gold* ſo far, and mix with it ſo cloſely, that

that it would quickly upon diſtillation viſibly carry up ſome of that ponderous metall with it, yet ſo much is not to be expected from all *Mercuries* that may lay claim to the title of *Animated* or *Noble*. For I have found that ſome even of theſe, may require a ſtrong decoction to incorporate them intimately with *Gold*; and I remember that once for tryalls ſake I made *Mercury*, which upon bare diſtillation would not at all colour the glaſs; I made (I ſay) this *Mercury*, by decocting or circulating it with the *Gold* for ten dayes or a fortnight, unite ſo cloſely with the metall, that it would afterwards elevate enough of it to guild the inſide of the glaſs; and by a much longer decoction I have ſometimes had the *Gold* lodg'd copiouſly in the upper part, and even in the necke of conſiderably tall Glaſs-Eggs, *Hermetically* ſeal'd, one or two of which I can yet ſhew you.

The

The V. Part.

Of the Producibleneſs of Phlegme or water.

OF the ſeverall ſubſtances that Chymiſts obtaine by the fire from mixt bodies, that which they call *Phlegme* or *Water*, and would have Men looke upon as *meer Water*, ſeparated by a preceding *Analyſis*, ſeems to the *Helmontians*, and diverſe other modern Artiſts, to bid the faireſt for the Title of *Elementary* and *Primordiall*. Wherefore it will now be fit to conſider, whether, about that alſo, we may not juſtly retaine ſome doubts, and rationally ſuſpect, that all that they call the *phlegme* of body's, was not in the forme of *Elementary* ſimple water, preexiſtent in the body, whence 'tis obtain'd: but that even

ſuch portions of matter, as many of thoſe that paſs among Chymiſts for *Phlegmes*, may be produc'd *either* by the operation of the fire, *or* by other wayes.

In order to the enquiry, it will be fit to premiſe ſomething againſt the preſum'd ſimplicity and Homogeneity of the liquors, whereto the Spagiriſts give, in common, the Name of *Phlegm*; that in caſe ſome of the produced liquors we ſpeake of ſhall be deny'd to be preciſely of an Elementary nature, it may appeare that that ought not to hinder us from allowing them the name of *Phlegm*, provided that they be not remoter from ſimplicity, than thoſe to which Chymiſts grant that Appellation.

And *firſt*, I conſider, that beſides thoſe Quality's that are common with water to diverſe other liquors confeſſedly not ſimple, as tranſparency, want of colour, apineſs to be imbibed by moſt ſorts of Vegetable and Animal Subſtances: the two Qualities, upon whoſe account Chymiſts are wont to

to call a body *Phlegme* or *Water*, are, it's appearing to them Inſipid, and its being of a Volatile and fugitive nature.

I further conſider, that not only divers of thoſe liquors that paſs for *Phlegme*, will yeild a taſte ſenſible enough to him that will hold them with attention of mind, for a competent time, in his mouth, but that the *Criterion* of liquors by the Taſte is nothing near ſo certaine as many thinke: For, not to mention, that 'tis plaine, that ſome kinds of doggs, as Setters, Spaniells, and Blood-hounds take notice of many things by their odours, that we Men have no perception of by our ſmelling, which may argue, that our Senſes may not be moved with objects that would affect them, if they were of a more delicate contexture; not to mention this (I ſay) 'tis plaine that the ſubtlety of the ſence of taſting differs among Men themſelves. And thoſe that drinke nothing but water, will often tell us of a great Diſparity betwixt common water, wherein other Men find not any.

any. And I remember, that when once I did, though but for some Months, confine my selfe to drinke water, I could distinguish the Limpid waters of differing places, almost as manifestly as I now distinguish Beeres, which after I fell againe to drinke Wine and other liquors, I ceas'd to be able to do.

The Consideration of *Quicksilver* may, methinks, let us see, that 'tis possible for a gross and fluid body, that is far from Elementary *Water*, to be insipid. For *Quicksilver* is without question a fluid, and at least in reference to some bodies, *Gold*, *Silver*, and some others, a liquor; since it sokes into their pores, and softens the bodies. The same *Quicksilver* may also serve to shew, by its disposition to fly away in the fire, that Volatility, even in conjunction with insipidness, is no certaine mark of an Elementary or simple, nor consequently of a Primordial body. And indeed since Volatility depends mainely upon the extraordinary minuteness of the particles whereof a body consists, and

and on their being incoherent, and of shapes fitted for Motion; this quality may be acquired by so many differing wayes, and be found in bodies otherwise of such differing Natures, that unless it be found associated with the other qualities proper to *Phlegme*, it will be but an unsure Argument, to prove the body that it belongs to, to be Elementary, and not to have been by composition, division, or transposition *produc'd*.

If it be true as the *Cartesians* will have it, that *water* consists of particles, that like little Eeles are long and extreamely slender, and consequently flexible; I see not any posibility, that the various action of the fire, upon the Minute parts of a body, and that which it may cause, the corpuscles of one body to have upon those of another, may produce *water*, that did not in the form of water preexist in the body that affords it: for it seems to me possible enough, that the particles whereof a corporeal Mass is made up, may have

such shapes, Sizes, & contextures, that by the various agitation which the pervading corpuscles of the fire may produce amongst them, whatever edges and points they had before, may by mutual attrition of the Corpuscles be worn of, and by the same means, so much of the substance may be worne away, that what remaines, cannot but be very flexible, and by all these qualifications become fit to make a particle of water. As a bar of *Iron* may by divers strokes of the wedge and Hammer skilfully employ'd, be divided into longe and slender parts, whose edges and points being blunted, they may be reduced into slender, and every way flexible Wires. But not to build on speculations, let us proceed to some experiments, which afford *Phænomena* that seem favourable to our *Hypothesis*.

Amongst the bodies about which Chymistry is conversant, those that seem to be the most indispos'd to be turned into *water*, are the Metalline, and Mineralls ones: so that if it can be made appear, that any of this sort can

can be changed, into an Aqueous liquor, twill make it highly probable, that Aqueous Liquors may be by Chymical operations *produced*, especially in vegetable and Animal bodies, which seem far more susceptible of such a change, than the stubborne subjects of the Mineral Kingdome. And since *Quicksilver* is by many learned Men, as well Chymists as others, lookt upon as one of the few most indestructible bodies in Nature, and by its great ponderousness, in which it exceed's all the known bodies of the world save one, is so much the more remote from such a liquor as *water*, that has not the sixteenth part of its specifick weight; If *Quicksilver* it selfe can in great part be turned into an Aqueous liquor, it will not a little favour the Doctrine proposed in these Notes; for which reason I shall subjoyn the ensuing story.

Relating to a very ingenious and sober Physitian of my Acquaintance what had befaln me in distilling *Mercury*, from whence I once obtain'd a *water* without additament, without

being able to make the like Experiment afterwards ſucceed, he aſſured me that he and a friend of his, had ſome years paſt provided a very large *Dutch* Retort of good Earth, furniſhed with a Pipe of about a foot long, to caſt in the *Mercury* at, and that having by little and little conveyed through that pipe a pound of *Quickſilver* into the candent Retort, they obtained four ounces of *Water*, and loſt in ſpite of their care two ounces of matter (whatever it were,) the remaining part of the pound having been elevated in the forme of *Mercury*. And when I ſuggeſted, that perhaps the *Water* that came over was afforded by the aqueous particles of the Earthen Retort it ſelfe, he replyed, that, to prevent their being impoſed on, they had been carefull not to put on the Receiver, till the Retort had been made throughly glowing hot, and that this liquor was far from common *Water*, he thought to be paſt doubt, by that which follows. For I having acquainted him with an odd tryall or two, I had made with Mercuriall *Water*, and asked him, whe-

whether he found the like effects from his, he told me, that his friend and he poured both their diſtilled *Mercury* and their *Water* into a kind of *China* cup, and though it were in *June*, left it open in a Garret for two or three dayes, upon a Preſumption his friend had that this Mercuriall *Water* thus ordered would turne a good part of the *Quickſilver* into it's own nature, and ſo multiply it ſelfe upon it. But when they came to viſit their Cup againe, they were much ſurprized to find their *Water* all gone, and that the greateſt part thereof was turn'd againe into *Mercury*, which they concluded from this, that they miſs'd upon the ballance but about halfe an ounce of the whole matter; which (halfe ounce) they ſuppoſed to have been loſt by evaporation; the other three ounces and a halfe being found in the encreaſed weight of the Mercury.

The mention I have made of *Quickſilver*, puts me in mind of an Argument *ad hominem*, that may deſerve to be conſidered, by the chiefe ſect of

of modern Chymiſts, the *Helmontians*; for if it be true which their maſter teaches, that by his Liquor *Alkaheſt*, not only *Quicksilver*, but all other tangible bodies, may be reduc'd into inſipid *Water*, juſt like Rain Water, I may be allowed to infer, that *Water* may be *produc'd*, ſince ſalt and Sulphur themſelves may be turned into *Water*. I know the *Helmontians* may anſwer, that this is not ſo much a production, as a reduction, ſince all things conſiſting originally of *water*, the *Alkaheſt* does but deprive it of the diſguiſes, that ſeminal Principles put it into, to make it appear, under the form of *Gold*, *Quicksilver*, *Plants*, *Animals* &c. But this Anſwer may be elſewhere further examined: for the preſent, it may perhaps be ſufficient to reply, that even by this Anſwer 'tis granted to appear by Experiment, that *water* has been copiouſly produc'd out of Mineral bodies, but it has not yet been made appear, that thoſe bodies were produc'd out of *water*.

But this is not all, nor perhaps the Prin-

Principall thing I have to ſay in favour of the opinion pleaded for in theſe Notes. For ſuppoſing bodies by being reduc'd, by the *Alkaheſt* and the fire, into an inſipid Liquor, were really reduc'd into *water*, yet the *Helmontians* would not fully ſatisfy me. For *Helmont* relates, that by abſtracting his immortal Liquor from ſtones, or ſuch kinds of bodies, he turns them into ſalt equiponderant to the Concrete; which Salt by further operations he reduces, as he ſuppoſes, into Elementary water. Since then he ſtops not at ſalt, but goes to a further tranſmutation, and concludes, that a Stone doth not conſiſt of ſalt, becauſe that ſalt may, by further operations, be turned into inſipid *water*; he muſt give me leave, on the ſame ground to argue, that inſipid *water* is not the firſt matter of bodies, ſince by a further operation of the fire, that liquor it ſelfe may be, at leaſt in great part, turned into *Earth*. For I elſewhere relate ſome Experiments of my own and a friends, in which cleare *water*, divers times very ſlowly diſtilled out of clear glaſs bodies, left every time

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a terreſtriall powder at the bottom: as if (in caſe *water* be ſo *Homogeneous* a ſubſtance as is ſuppoſed,) the whole body of the *water* might, by reiterated Diſtillations, without violence of the fire, be reduced into *Earth*; whereof I remember in the laſt tryall of mine, I had enough to cover the bottom of a large Cucurbit, out of which the Diſtillations had been made.

And on this occaſion, I ſhall add a Tryall, which ſeems to argue, that without the help of often repeated diſtillations in tall Cucurbites, cleare *water* it ſelfe may, by the operation of the fire, be chang'd into another Body.

We tooke then very pure and limpid *water*, which had by our *Pneumatick* Engine been carefully freed from the Aeriall particles, that are wont to be harboured in the Pores of that liquor: This in a new bolt-head of ſuch a ſize, that the matter might have roome to play and circulate, we ſeal'd up *Hermetically*, and placing

placing the veſſell in a digeſtive Furnace, we left it there above a yeare, and obſerv'd, as we expected, that after it had continued for a good while, there began to forme themſelves in the water little concretions heavier than it, which in proceſs of time encreaſed in magnitude, and, as we thought, in number, making a kind of *Terra foliata*, that conſiſted of a multitude of little thin filmes or ſcales, (like thoſe of the ſmaller ſort of Fiſhes) which, when the glaſs was ſhaken in an enlightned place, were copiouſly diſpers'd through the body of the Liquor, and appear'd variouſly and vividly colour'd, being ſome of them almoſt as big, as ſpangles, and more glittering; and when the agitation ceas'd, they preſently fell to the bottom, which they cover'd in the forme of a *Terra Foliata*; by their ſubſidence manifeſting themſelves to be notably heavier *in ſpecie* than the *water* they had been form'd of. And the longer the glaſs was kept in the digeſtive Furnace, the more of this fine Terreſtriall ſubſtance was produc'd: And leaſt the effect ſhould be aſcribed

aſcribed to the abſtraction of the *Aire* from the *water*, handled as is before related, I ſhall add, that we produc'd the like ſubſtance, though, as it ſeem'd, not ſo copiouſly, after the like manner, in *Water*, that had not at all been freed from *Aire*.

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The VI. Part.

Of the Producibleneſs of Earth.

OF all the ſubſtances obtainable from mixt bodies, that which to Perſons prepoſſes'd with *Helmontian* opinions may ſeem the moſt ſimple, elementary, and unchangeable, is, that which they call *Earth* or *Terra damnata*: becauſe there is ſuppos'd to be no doubt, but that the calcining or incinerating violence of the fire muſt not only have driven away the Mercurial and other volatile parts, but muſt alſo have quite burnt out the Sulphurs, which oftentimes are more fixt than the reſt; as the water on the other ſide muſt have diſſolv'd away all the *Alcali* or fixt ſalt.

This Ratiocination I confeſs, is very ſpecious and probable, but yet not ſo ſatisfactory, but that a Sceptick may retaine not irrationall doubts about

bout the cogency of it, upon ſuch conſiderations as I am now going to propoſe.

And I will begin with conſidering, that, whereas the things wherein this ſuppos'd ſimplicity, and unchangeableneſs of the Earthy part of mixt Bodies, is founded, are theſe Three: its not diſſolving in water; its not affecting the Taſte; and its not having flowne away from the incinerated body, that afforded it; it may with probability be doubted, whether any of theſe or all of them put together, do neceſſarily evince what Chymiſts pretend they do.

And in the *firſt* place according to the different conſtitutions of certain ſorts of bodies, I thinke it fit to make a diſtinction between the dry and heavy parts, that remaine after a Body has been expos'd to the violence of the fire, and if need be, freed from its ſalt as much as it can be, by the affuſion of water. For 'tis evident, that in ſome Bodies, eſpecially of a Metalline nature, the fire, that makes that

that which they call calcination, do's not operate as it do's in the burning of Vegetables. For, beſides that ſometimes almoſt (and ſometimes more than almoſt) the whole weight of a minerall is to be found in that which they call it's *Calx*, and is manifeſt in the Calcination of *Lead* and *Tinn per ſe* (if skilfully perform'd,) the *Calx* is in great part reducible ſometimes into a body of the ſame nature with that which afforded it, and ſometimes into ſome other Body, very far from being Elementary: as is manifeſt *partly* in the reduction of *Minium*, (which is *Calx of Lead* made *per ſe*) which, as to the greateſt part of it, we have more than once, by the bare way of ordering the fire, reduc'd in a very ſhort time, and without additaments, into malleable Lead; and *partly* in the *Calces* or (as they alſo ſpeake) Aſhes of Antimony, which by bare fuſion are eaſily reduc'd into glaſs, whence we have ſometimes obtain'd an Antimonial *Regulus*. So that 'tis manifeſt, that there is a great deal of difference, *between* the Aſhes (taking that wotd in a large ſence) of Metalls, and of

ſome Mineralls, where almoſt the whole Body is by the fire converted into a dry and heavy powder, *and* the Aſhes of incinerated Vegetables, who uſually leave but a little quantity of *Earth* behind them, in compariſon of the matter which the violence of the fire hath driven away.

But ſetting aſide the above-mention'd Metalline *Calces*, which without queſtion remaine compounded Bodies, if metalls themſelves be ſo; and to forbeare examining, whether they be not further compounded with Corpuſcles of the fire, or fuel, that are embodyed with them: I conſider, that the Qualities which make *other* Aſhes paſs for Elementary *Earth*, may be produc'd in portions of matter that are not ſimple, either by compoſition or change of texture.

I have elſewhere occaſion to take notice of Bodies, which though when they are ſingle, they will eaſily diſſolve in water, yet the reſult of them will not: And you may find inſtances of this kind, among the *Magiſteries*, as Chymiſts

Chymiſts call them, made of ſeverall Bodies, by precipitating their ſolutions (made in acid liquors) with oyl of *Tartar per deliquium*.

From oyle of Vitriol and ſpirit of Wine, though both moſt readily diſſoluble in water, we have by bare digeſtion and diſtillation, obtained a pretty quantity of a ſubſtance, that we found not to diſſolve in water, and which ſeemed to be inſipid and fixt enough.

There are Stones, ſome more and ſome leſs pretious which though I could by the help of the fire deprive of their colour, and bring to a white powder, yet it did not appeare to me, that they were really calcin'd, or would in water yeild any ſalt: ſo that if theſe Stones be compounded bodies, as Spagiriſts tell us they are, we ſee that there may be other Corpuſcles beſides metalline ones, which though reduc'd by the help of the fire to a white powder inſipid and not diſſoluble in water, are yet remote enough from an Elementary nature.

But I need ſeek no further, for inſtances of this kind, ſince Spagiriſts themſelves teach us, that the Aſhes of Wood may by the Violence of the fire, be turn'd into glaſs; which being a body compos'd of the Earthy and Saline part of the Aſhes (for they tell us, that *Earth* ſeparated from the Salt will never be vitrifyed) muſt be according to their own confeſſion a compounded Body: which being at laſt made by the utmoſt violence of the fire, muſt be fix'd, indiſſoluble in water, and conſequently inſipid. And without taking this Vitrification upon the Chymiſts authority, 'tis manifeſt, that in glaſs made the common way, there is a great deal of *Borellia*, *Sal Alcali*, or other Lixiviate Salt mixt with the Sand: as is evident, not only becauſe Artificers find the ſalt needfull to diſſolve the Sand, and bring it to fuſion, but becauſe the Glaſs uſes to weigh very much more, ſometimes (as an Ingenious Maſter of a Glaſs-Houſe anſwered me) thirty, or forty pound in an hundred, than the Sand that was put in.

I ſhall add, that, ſince Chymiſts aſcribe all *Odours* to Sulphur, I may reaſonably conclude againſt them, that in ſpight of all the violent fire, which is required to the making common glaſs, there is ſtore of Sulphur, as well as ſalt in it. For I have often tryed that by barely rubbing two large pieces of glaſs, one againſt another, there would quickly be produc'd a ſtrong offenſive ſmell. And yet Glaſs which thus appeares to be not only a Compounded, but a Decompounded Body, ſince the Sand or *Cugali* (as the *Venetian* Glaſsmen call their Pebbles) or other Stones being themſelves mixt Bodies, are further compounded with the Salts that diſſolve them: *Glaſs*, I ſay, is a Body that manifeſtly poſſeſſes all theſe three qualities, which Chymiſts require in their *Earth*, being taſteleſs, indiſſoluble in the Water, and fixed in the fire. And if Aſhes alone be (as Chymiſts teach us they are) capable of vitrification (and indeed an inquiſitive Owner of a Glaſs-Houſe anſwered me, that once, if he much miſremembred not, made, but not eaſily

ſily, glaſs of Aſhes alone without Sand;) how are we ſure but that in common Aſhes, freed the common way, from their fixt ſalt, that which is called the ſimple *Earth*, may not be a body compounded of two or more ſubſtances, which by their coalition, and new Texture produc'd by the action of the fire, have been brought to a kind of Vitrification, or otherwiſe have acquired the few obvious Qualities. that Chymiſts are wont to thinke ſufficient to give a Production of the fire, the name of *Earth*.

Tis obvious to obſerve, that divers Bodies, when they come to be of ſenſible bulke, will ſinke in Liquors, in which their Corpuſcles would freely ſwim, if ſo many of them did not ſticke together. As of Salt and Sugar, the Lumps, and even the graines, whiles they remaine ſuch, will fall to the bottom of Water, in which when they are diſpers'd into minute and inviſible Corpuſcles, they will eaſily ſwim. And I have obſerv'd,

obſerv'd, that in ſtopt glaſſes ſome Salts, and other Bodies, that for many Months remain'd undiſtinguiſh'd in the Liquors that harbour'd them, would in tract of time, have Conventions made of their Particles, that would then ſubſide, and be no more carry'd up and down by the particles of the Liquor. And I ſee no impoſſibility, that ſomewhat of this kind may happen to the particles, whereof water conſiſts: for if ſome of theſe, by frequent occurſions and Attritions come to apply themſelves to one another, ſo as to have a fuller, and more immediate contact than formerly, and to be intangled among themſelves, and perhaps alſo to exclude ſome very thin and ſubtile Aire, that may be ſuſpected to lurke about them, and contribute to their ſuſtentation; if I ſay, this Union or ſtrict Adheſion of Aqueous Corpuſcles, ſhall happen to be made, the Aggregates or Cluſters, though as to ſenſe, but very ſmall, may be too great and unweildy to be any longer, parts of water, but may ſubſide in that Liquor; and if their Union or Adheſion be ſtrict e-

enough, they will upon the ſame account be unfit to be carryed up in the forme of Vapours, and exhalations by Heat, and ſo may be like *Earth*, fix'd in the Fire, as well as not diſſoluble in water.

I have ſometimes alſo had a ſuſpition, that the production of an Earthy ſubſtance in water, may be furthered by the particles of fire, that are employ'd to make it circulate; and that of thoſe Igneous particles, which, as I am apt to think, pervade the glaſs, ſome of the groſſer, or rather the leſs ſubtile, may in their paſſage faſten themſelves to ſome aqueous particles, fitted to adhere to them, and may with theſe begin to make ſome inviſible Concretions, to which afterwards other congruous particles may little by little ſticke in their paſſage, and ſo at length compoſe ſenſible Aggregates of powder: which may be illuſtrated by what happens in the precipitation of *Quick-ſilver* without addition, where the Mercurial particles being aſſociated by, and probably with ſome of thoſe of

of the fire, begin to forme Concretions, at firſt very minute, which afterwards encreaſe more and more, by the acceſſion of other adhering particles, till all the *Mercury*, or the greateſt part of it be reduc'd, from a fluid Body to a red powder. And perhaps it may countenance my Conjecture, about the production of an *Earthy* ſubſtance, by a briske concurrence of the particles of fire, if I add, that though I have kept high rectifyed ſpirit of Wine for above a year together *Hermetically* ſeal'd, and for the moſt part of that time in a Digeſtive Furnace, without finding any *Earthy* Reſidence, yet, when I ordered a Bolt-head, that, though it were *Hermetically* ſeal'd, the *Alcool* of Wine that was put into it might be boiled without breaking the Glaſs, I found that in a ſhort time this liquor would afford a not inconſiderable quantity of ſuch a ſubſiding Talcky ſubſtance, as I obtain'd from the water formerly mention'd. But theſe things I need propoſe, but as illuſtrations that may ſomewhat help you, to conceive how Water may be turn'd into *Earth*. For, whe-

whether it be by theſe, or any other waies, that the thing is performed, yet ſince the Experiment formerly recited, that Water by frequent Cohabations may be more and more turn'd into *Earth*, argues the matter of fact, our not being able to explicate the manner, does not hinder the thing from being true, nor the Argument we build on it from being good: ſince even Water, to which by ſome operations of the fire and the *Alkaheſt*, 'tis pleaded that Bodies are ultimately reduced, may it ſelfe by a further and very ſimple operation of the fire be reduced into *Earth*.

I have ſomewhere mentioned, for I remember not in what Paper I have obſerved, *Salt-Petre* diſtill'd with Clay, to loſe much more of its weight, than can be ſuppos'd to have aſcended in the forme either of *Spirit* or *Phlegme*. And now to make this Experiment more ſhort and eaſy, I ſhall add, that I lately made it in a Crucible, (inſtead of a Retort) wherein a double weight of finely powdered Tobacco-Pipe Clay, very well

well mixt with pulverized Chryſtalls of *Nitre*, were kept three houres, in a violent fire, and then the mixture being taken out, the remaining fixt ſalt was carefully extracted, but amounted to very little in compariſon of what *Nitre* was wont to yeeld, when calcin'd with Charcoal: and this ſcant proportion of fixt ſalt did not proceed chiefly, from a very copious Avolation of Nitrous ſubſtance, appear'd probable by this, that the *Caput Mortuum* was much more ponderous, than was to be expected, upon the ſcore of the Tobacco-Pipe Clay, that was firſt employ'd, and the *Alcali* that was extracted; ſo that the new weight acquired by the Clay, ſeem'd manifeſtly to proceed, from the acceſſion of a portion of the *Salt-Petre*, that by this operation was turned into *Earth*. Inſomuch, that of ſix drachmes that four ounces of Clay had acquir'd, in weight, after the Crucible was taken out, not ſo many graines could even by boyling water be obtain'd from the whole *Caput Mortuum*; which when firſt taken out of the Crucible, was almoſt quite inſipid.

That

That Earth may be *de novo* produced, may likewiſe be probably argued from the Experiment, I formerly related about the deſtruction of the ſalt of *Tartar*, by igniting it and putting it into fair Water: for there remained after the numerous filtrations, and if I miſremember not, after every one of them, a ſubſtance, in the filter, which, for ought appears, may be as well called *Earth* as that which was ſeparated from the calcined *Tartar*, the firſt time it was put in the water, to divide the ſalt from the *Earth*. For in our Experiment as well as in the common operation, I come from mentioning, the way of proceeding is the ſame, and in both their remaines in the filter a ſubſtance, which by its ſtaying there, ſhews it was not diſſoluble in the water, and which before it came thither, ſhewed, by its enduring a violent fire, that it was alſo fixt as *Earth* ought to be. Nor would it much move me, if it ſhould be found, that this factitious *Earth* may have ſome ſuch operation upon ſome particular Body, as is not thought to belong to true Elementary *Earth*.

For ſince it is obtained by a Chymical *Analyſis*, if it have thoſe quality's that in the general eſtimations of naturaliſts, make up the notion of what they call *Earth*: I think that ought to ſuffice us, at leaſt till the Chymiſts give us ſome more accurate notion of genuine *Earth*, and ſhew us ſuch a thing, and teach us a better way of *Analyſis*, to obtaine it.

For in many body's that are, without ſcruple, lookt upon as *Earth*, I obſerve quality's that do belong to the received notion of Elementary *Earth*. This I ſay, becauſe I ſee not why ſuch a Texture as will ſuffice, to make a portion of matter indiſſoluble in water, fixt in the fire, and inſipid upon the tongue; may not alſo make it fitt to operate actively upon ſome Body's, and modify the operations of ſome others, that act upon it. And if our *Earth* from ſalt of *Tartar*, be rejected as ſpurious, they ought to confeſs the inſufficiency their common way of ſeparating a true *Earth* from the Body's they Analize: for it ſeems Calcination and ſolution in water, and filtration, which make up

their uſuall method, will not ſuffice t
make our *Earth* of *Tartar* paſs fo
true; though it appear not to be ne
ſo remote from an Elementary natur
as ſome other Body's that are obtai
ned from *Earth* by the vulgar *Analy*
ſis. Of which I ſhall at the cloſe o
theſe notes give an Inſtance, in we
dulcify'd *Quick-lime*, which accordin
to the Doctrine of the Chymiſts, ough
to be an Elementary *Earth*; and ye
ſeems not more ſo, (if it be ſo much,
as our *Earth* from ſalt of *Tartar*. An
for the preſent, I ſhall add, that th
Caput Mortuum of *Vitriol* remainin
after it had long endured a violent fir
though it were diligently freed fro
ſaltneſs, by reiterated Ablutions wit
hot water, was yet far from bein
an Elementary *Earth*, as appeare
not only by its deep purpliſh colou
and its ponderouſneſs, far exceedin
that of *Earth*, but by a tryal th
I purpoſely made to examine it.

Upon this occaſion I remember
that a Learned man of my acquain
tance, who viſited the Mines of *Hun*
gary (and dealt much in *Hungaria*
Vitri

Vitriol, affirmed to me, when I told him I conceived the *Caput Mortuum* of it to retaine much of the Metalline Nature, that he had upon a certain occaſion out of the *Colchothar* of a certaine ſort of *Hungarian* Vitriol, not only received a pretty deal of good Copper, but ſeparated from that Copper, a pretty portion of ſilver, and ſome grains of true Gold.

Before I put a Period to there Notes about *Earth*, though my Argument do not need nor require that I ſhould do it, yet upon this faire occaſion, I ſhall here take leave to doubt, whether ſuch an *Elementary Earth*, as the Schooles tell us of, do yet appeare to be more than a Notional thing. For to what I have already ſaid concerning the *Earths* ſuppoſed to be produc'd by Chymical *Analyſes*, I ſhall now add, that I have not yet ſeen it proved, that *Nature* does any more then *Art*, afford us a true *Elementary Earth*; at leaſt I can ſay, that ſome, which ſeem to be of the more ſimple ſort, I found upon examination to have Qualities not aſcrib'd

scrib'd to pure *Earth*. For though *Tobacco-pipe Clay* by reason of it's fixity, whiteness, and Insipidness, and it's lying oftentimes deep enough beneath the surface of the ground, may, as probably as almost any other Native *Earth* we know, be look't upon as *Elementary*, yet *Tobacco-pipes* well baked may sometimes be made to strike fire: and I have more than once tryed, that by briskly rubbing two peices of a new Tobacco-pipe, one against another, they would in a Minute or two of an Houre grow warme, and being immediately smelt to, manifestly afford a ranke odour, between Sulphureous and bituminous, almost like that which proceeds from Pebbles or Flints, when they are likewise rub'd hard against one another. As if Tobacco-pipe Clay were not a true *Earth*, but a fine white Sand, consisting of Graines too small to be distinctly taken notice of, like those of other Sand. On which occasion I shall add, that I found by a Hydrostaticall Tryall, that it's specifick gravity was but little differing from that of Pebbles, its probable in weight to

to water of the same Bulke being as two, and a quarter to one. A Tobacco-pipe may also be somewhat melted by a very vehement fire, (for a less will scarce serve the turne) as may be argued from this, that it may by such a fire be brought to bend.

Porcellane, or the matter whereof *China* dishes are made, is not, as some Travellers and Learned Men have fondly imagin'd, a composition that requires to be buryed under ground, for I know not how many yeares, to ripen it into *Porcellane*: but as some late Authors informe us, and as I have been assured by a Person, that went purposely to that place in *China*, that is so famous for the making of *Porcellane* vessells, it is a pure sort of Clay, but yet this I find not to be *Elementary Earth*. For besides that I have observed, that a Violent fire will make it somewhat melt; I find that with steel, it will easily enough strike fire almost like a flint. The like I have observed in *Porcellane* very artificially imitated

with a ſort of *Engliſh* clay. And I found too, that the matter even of dark colour'd Juggs of the better ſort, and well baked, would with a Steel afford ſparkes of fire. I forgot to tell you when I was ſpeaking of fine *Porcellane*, that I found its ſpecifick gravity to be very near the ſame with that of Flints, and Tobacco-Pipe Clay. But I remember I went once to viſit a Grove or Pit, where at the depth of divers Yards, they were wont to digg up a certaine white Earth, which diſtill'd by an acquaintance of mine afforded a Liquor, that was put into my hand to try, and which I found to be very rich in a Volatile Salt, that taſted and ſmelt much like ſpirit of Urine, or Harts horne, and had almoſt the ſame effects in changing the colours of ſome Body's, and precipitating of others. I remember too, that I found by the operation of a *Menſtruum* or two upon *Tripoli*, that, as white and pure a Virgine *Earth* as it ſeem'd, yet it was not *Elementary*: & on the other ſide a Maſter of ſome *Engliſh* Mines having preſented me, among other Mineralls, which he knew

knew not what to make of a very white ſubſtance, whereof he had ſtore, which he thought an *Earth*, and which was judged by an Excellent Artificer, much converſant with *Tripoli*, to be finer even than that *Earth*, I gueſs'd it upon Examination to be a kinde of *Talcke*, whoſe leaves were exceeding fine and minute. The Reſult of theſe relations may be, not only that we may yet retaine our doubts, whether the Aſſertors of *Elementary Earth* can ſhew us any Native ſubſtance, that deſerves that name: but alſo, whether thoſe things that remaine after Chymical *Analyſes*, though they have all the Qualities that are judged ſufficient to denominate a portion of matter *Earth*, may not yet either be compounded Body's or be endowed with Qualities, which belonge not to ſimple *Earth*. To explaine and confirme which, I ſhall give an inſtance in ſome *Quick-lime*, that I purpoſely examin'd. For though it had been, by frequent ablutions in warm water, carefully dulcifyed, and ſo was as well inſipid, as fixt, and indiſſoluble in water: yet I found, I could

readily diſſolve it in divers *Menſtrum's*, and even in ſpirit of Vinegar, whereas true *Elementary Earth* ought to be as well indiſſoluble in ſuch liquors, as in water.

If I had not been to deal with Chymiſts, but Ariſtotelians, I might have ſav'd my ſelf the labour of ſolicitouſly endeavouring to prove, that Earth and water may each of them be produc'd from Body's of a differing nature from it. For though the Peripateticks will not allow *the whole Elements* to have been produc'd, becauſe they looke upon them as integrant parts of the world, which *Ariſtotle* laboriouſly (though not ſolidly) maintaines to be eternal: Yet the *Portions of the Elements*, they will have to be interchangably tranſmutable. So that what was once water may be Earth, and Earth may by intermediate alterations, be turned into water.

But thoſe I have to do with, being the vulgar Chymiſts, who will have the material principles or ſimple ingredients

ingredients of mixt Bodies, coevall with the World, and uncapable of being either deſtroy'd or produc'd; it was not allowable for me to proceed upon the *Ariſtotelian Hypotheſis*, of the tranſmutableneſs of what they call Elements, eſpecially becauſe, that though I do admit it, as 'tis, according to my opinion, a part of a more general truth; yet I do not think, they have well prov'd it by their Arguments: which ſince I my ſelf do not like, I think 'twere diſingenious to preſs them upon others. And without having recourſe to their Doctrine, there will occur ſome other particulars, that may be added to thoſe already mentioned, to countenance the producibleneſs of the Principles of mixt bodyes, in ſome other papers that are to follow theſe Notes. Though in ſtrictneſs I was not oblig'd to ſay ſo much, as I have already ſaid, ſince pretending to call in queſtion no more than the *three Hypoſtatical Principles of the Chymiſts*, I might eaſily have excus'd my ſelfe, for having let alone the production of *Water* and *Earth*: ſince the generality of Chymiſts reckon not

not thoſe Bodys amongſt their *Hypoſtatical Principles*; but looke upon them, as recepticles, or, as others would have them, Recrements of theſe, or, as on ſome other account, related to them. But I was not willing to omitt *Water* and *Earth*, becauſe ſome of the more learned of the modern *Spagyriſts* have adopted them, into the Number of the *Principles* of mixt bodies, and becauſe I finde by experience that in Chymical *Analyſes*, they are at leaſt as often to be met with, as ſome of the *Principles* confeſſedly Hypoſtatical. But what has been delivered about *Earth* and *Water*, having much added to the bulke of theſe Notes: 'tis time I ſhould put a period to this part of them, in reference to which I hope it will be conſidered, that I do not pretend that every ſimple experiment by me alleg'd, do's ſufficiently prove, that the body obtain'd by it, was in the ſtricteſt ſence *produc'd*. For if the ſeveral experiments, and other proofes do in conjunction, and as it were in a body, make up a good Argument, that the ingredients they relate to, may be produc'd;

produc'd; 'tis as much as will, I hope, be expected, from theſe Notes, which having been written by way of Appendix to the *Sceptical Chymiſt*, may be allow'd, as well as that book, to employ *ſome* Proofs, not altogether cogent, and may be judg'd not improper, though ſome of the Arguments propos'd in them to ſhow that *Chymical Principles* are not all ingenerable and indeſtructible ſhould be but meerly probable. And yet this I ſhall venture to intimate, that vulgar Chymiſts and *Ariſtotelians* may, not perchance, find it ſo eaſy a thing, as 'tis like many of them will imagine, confute divers paſſages of the foregoing Tract, ſince probably their objections will ſuppoſe ſome thing or other, which though taken for granted among them, and perhaps by ſeveral other learned Men, I do not admitt as true, or think demonſtrable, but rather queſtionable upon very rational grounds. And though perhaps I ſhould not have brought in ſome of the Experiments mentioned in the preceeding Notes, if I had not had a mind to throw together what I thought might

might contribute to ſo uſefull a thing, as a *Natural Hiſtory of Chymical Principles*; on which others, if not I, may hereafter ground a Theory of them; yet this may alſo deſerve to be conſidered, that if *any* of the foregoing Experiments, though never ſo few, do really prove, (as 'tis like ſome of them will be judg'd to do) that *any one* of the Chymical Principles may be, *de novo, produc'd*; that alone will ſuffice deſtroy the *Univerſality* and *intireneſs* of their *Hypotheſis*; and beſides give cauſe to ſuſpect, that by further induſtry, the Producibleneſs of other Principles alſo, may be diſcovered.

FINIS.