

Some considerations touching the usefulness of experimental naturall philosophy. Propos'd in familiar discourses to a friend, by way of invitation to the study of it / [Anon].

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NATURAL
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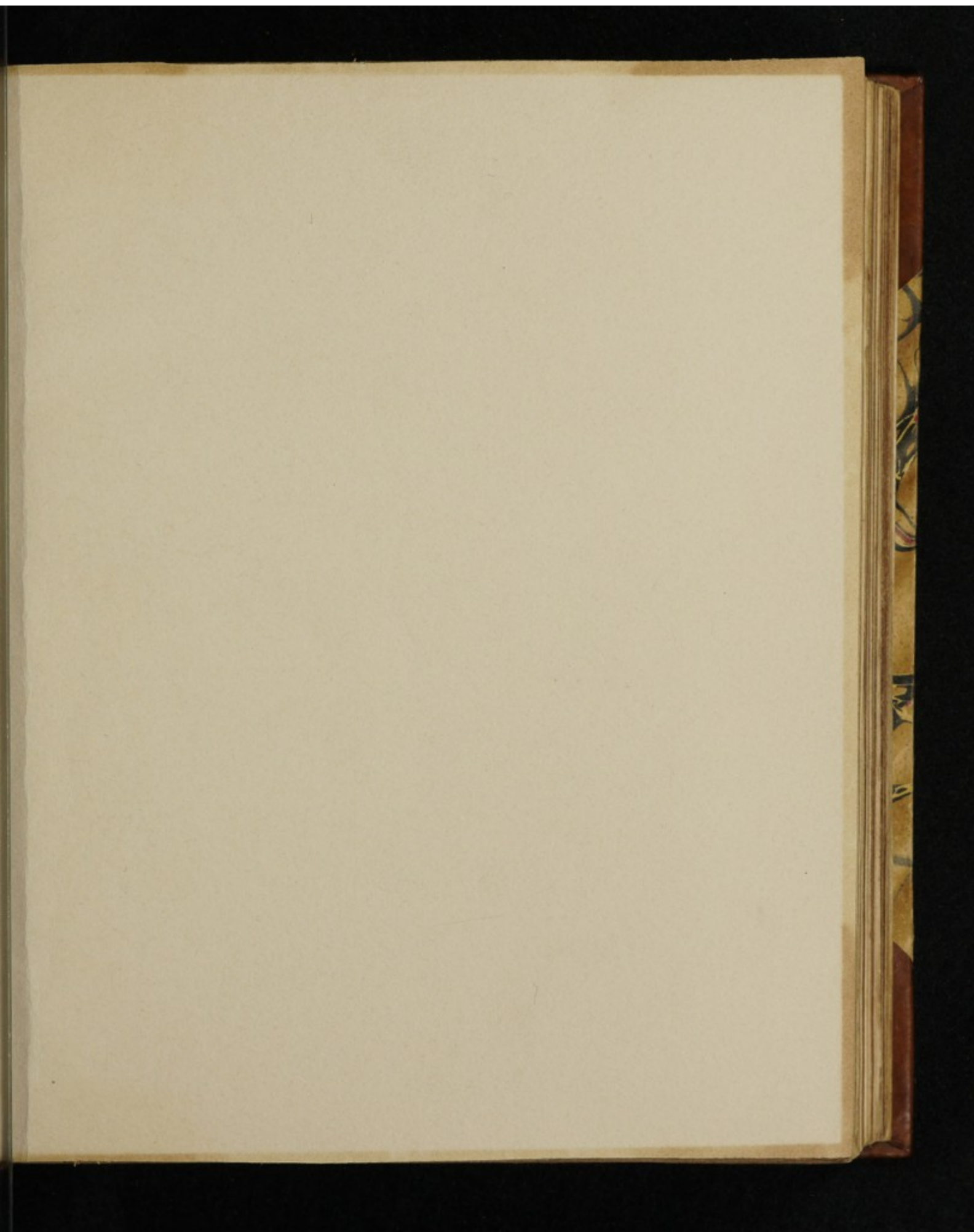
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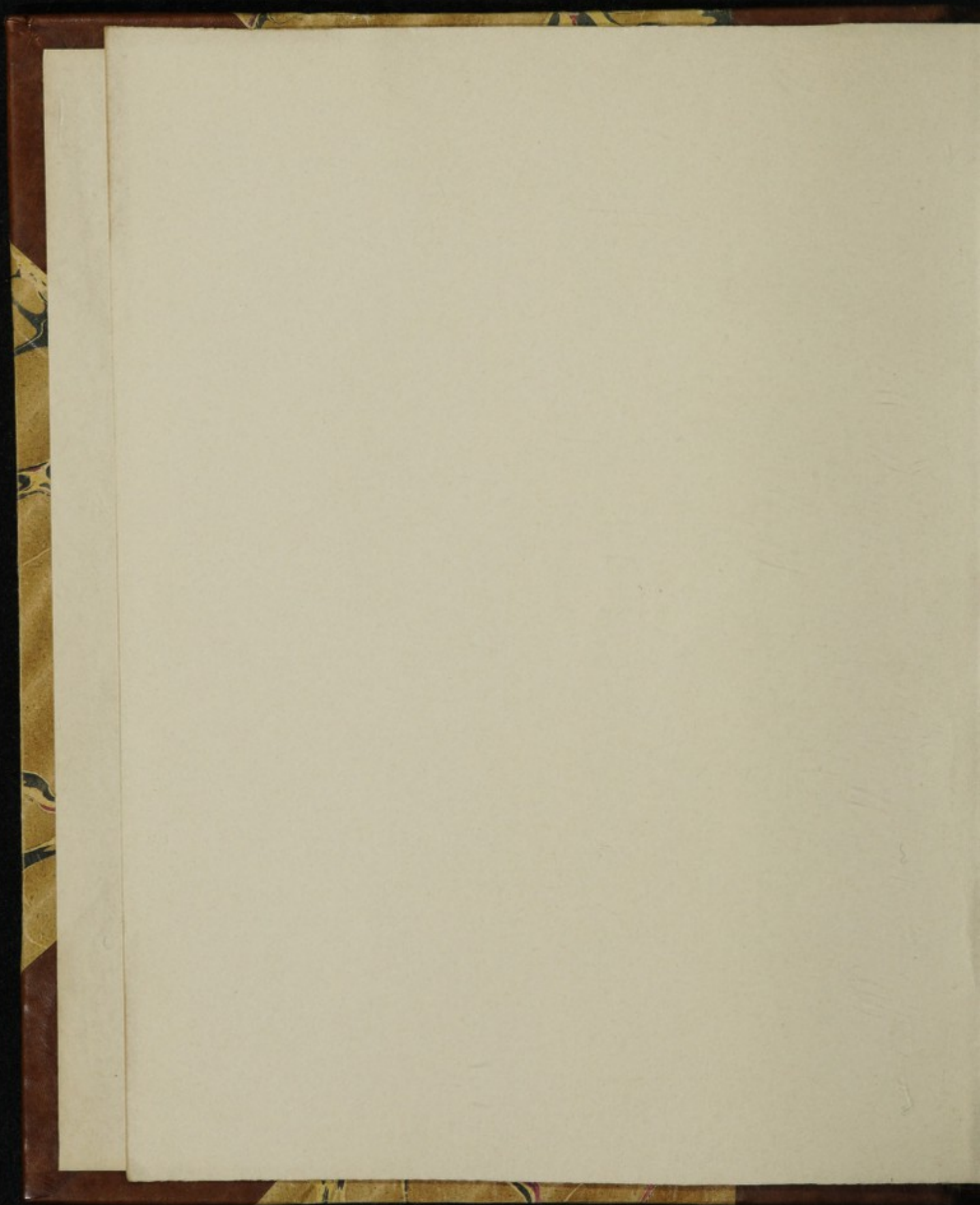


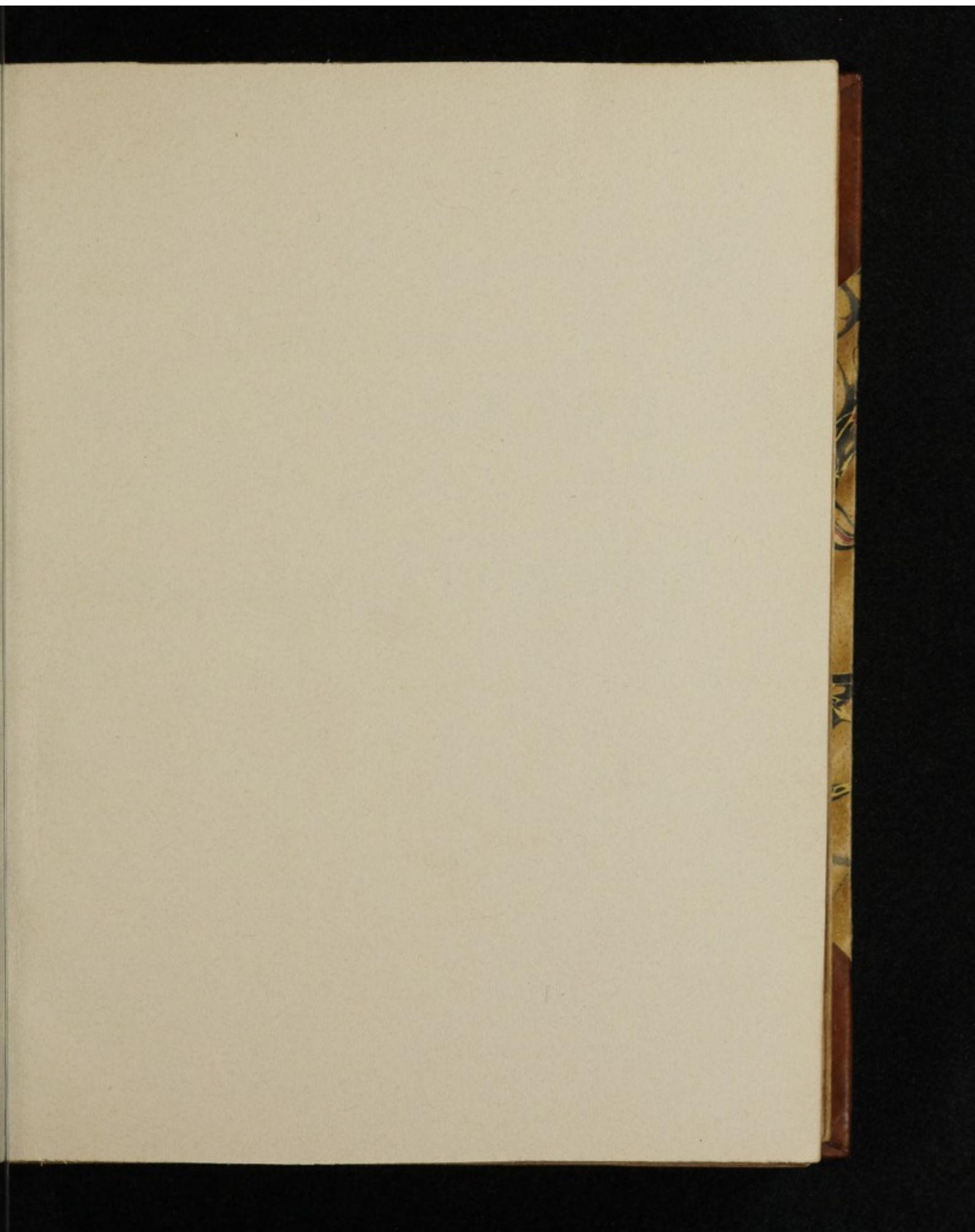


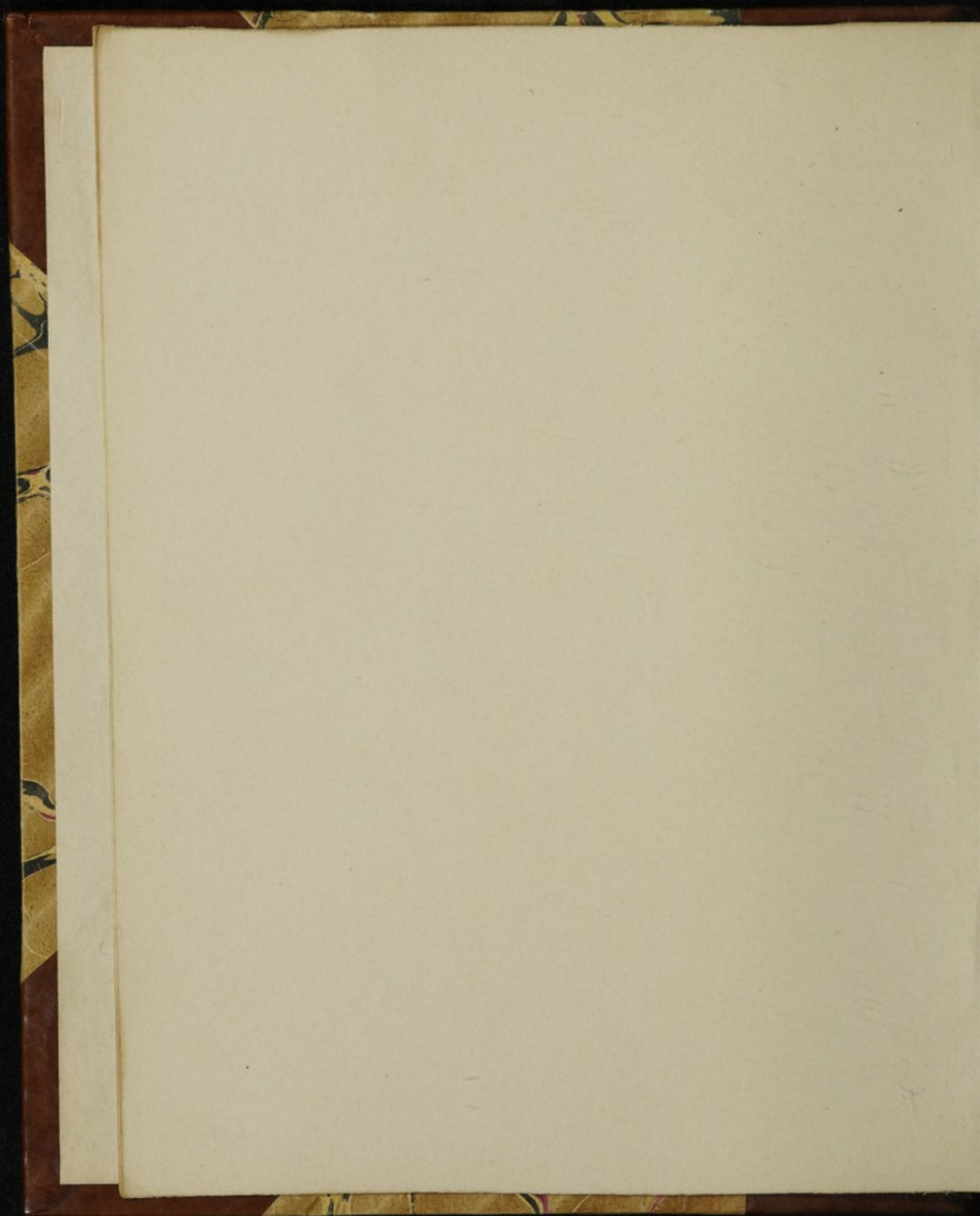


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OF THE
USEFULNESSE
OF
Experimental Philosophy.

OF THE
VOLUME
OF
Experimental Philosophy.

SOME
CONSIDERATIONS
touching the
USEFULNESSE
OF EXPERIMENTAL
Naturall Philosophy,

Propos'd in Familiar Discourses to a Friend, by
way of *Invitation* to the Study of it.



OXFORD
Printed by HEN: HALL Printer to the University, for
RIC: DAVIS. Anno Domini 1663.

SOME
CONSIDERATIONS
touching the
VSEFULNESS
OF EXPERIMENTAL
Natural Philosophy

Proposed as a Familiar Discourse to a Young
Way of Instruction to the Study of a



OXFORD
Printed by Henry Aldrich, Printer to the University
Richard D. ...



The PUBLISHER to the Reader.

IT is, Courteous Reader, part of the Satyr of Petronius against the Vice of his own Time. *Priscis temporibus, cum adhuc nuda Virtus placeret, vigeabant Artes ingenuæ, summumque certamen inter homines erat, ne quid profuturum seculis diu lateret. Democritus omnium Herbarum succos expressit, & ne lapidum virgultorumque vis lateret, atatem inter Experimenta consumpsit.* Other Examples of the like Industry he brings, and then concludes against the Laziness and Luxury of his own Age. *At Nos, faith He, ne paratas quidem Artes audemus cognoscere, sed accusatores Antiquitatis vitia tantum docemus & discimus.* It was for want of a Democritus or two that he casts this hard Censure upon his own Time. For, not-

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withstanding all his Harangue in Commendation of some Ages which were antient to his Own, It is evident out of History, that there was never at once any great Number, who seriously and in earnest for the Benefit of Mankind applyed themselves to these severe Scrutinyes of Natural Bodyes. It is true that now and then, in all Centuries from the Beginning of the World, there have appear'd some Persons of a Nature more refin'd, as if indeed (according to that Phancy of the Old Poets) some *Prometheus* had made them either of another Metall, or of another Temper, from the Vulgar, utterly above all Mixture with, or Embasement by the common Fashions of this World; who did make it the End of their Lives, by Severing and Mixing, Making and Marring, and multiplying Variety of Experiments on all Bodies, to discover their hidden Vertues, & so to enlarge the Power & Empire of Man. But these were ever very few and singular. Even in that so much celebrated Time of *Democritus* these Studies were so rare, that his usual Exercise of the Anatomy of Beasts was look'd upon, as that which made the Soundness of his Mind questionable, even as a Spice of Madness in him: and probably much more might the Vulgar of his Age have been amused, had they

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they seen him torturing Minerals and Metals in the more toilsome Anatomy of Fire.

Now if it be a dishonourable Crimination to an Age, that it hath brought out no Persons who make it their great Endeavour *Ne quid profuturum seculis lateat*: and if the Discovery of one or two persons of this Kind beenough to expiate for, and take off the Dishonour of the Proletarian Laziness and Luxury of the Rest, I think I may justly esteem that the exhibiting to the World the History of the Studies of the Honourable Author of this Piece may serve to be the Apology and Defence of our Age against such Censures as that wherewith the newly cited *Satyrist* stained his own Time.

And this was one great Reason that hath made me very forward to promote the Publication of This, and diverse other Writings of the same Noble Author. For were there only Tokens of Endeavour in Them, the proof of This Endeavour (even without Attainment) ought to wipe off all Imputations of this nature. But this Motive (though I do account that by exhibiting this Expiation I do somewhat oblige the Age, whose Honour is thereby defended, yet) was far from being the most great and forcible. For the Excellence of the Works themselves,

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Selves, even as soon as they fell from the pen of the Author, did long since in all Equity set an *Imprimatur* on them.

*Nec sumunt aut ponunt secures
Arbitrio popularis Auræ.*

Epicurus, when he was casting up the account of his life, upon the very Day of his Death, mentions a very great pleasure that he even then took in two Parts of his former Studies: And these were his *Rationes*, and his *Inventa*; Points well argued, and things happily found out. The two very same particulars are principally conspicuous in this ensuing Piece. There are good Conclusions against the Enemies of the Being and Providence of God in the First Part, and in the Second there be Notices of divers *Inventa* profitable to the Use of Man. By the one sound Notions are proposed to the Readers apprehension from the Contemplation of God's Creation and Government of the World, and thereby good Matter is suggested to his Affections for the Advancement of his Devotion; by the Other, there are divers things deliver'd, which may tend to enlarge Man's power of doing Good: By them, in the whole, both our Honour to God, and our Charity to our Neighbors may

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may be assisted: in which two the Substantial part of all the most Noble, not only Human but Christian Vertues, both Speculative and Practical, are certainly contained.

I must not omit, that an Argument of this Nature, at this Time, may justly be commended for its Seasonableness, when divers Persons, who know not the way of *Experimental Philosophy*, and are loath now to give themselves the trouble of learning it, have been making some attempts, very unthankfully, to traduce both It, and its Promoters.

These Considerations passed with me for Reasons, and had upon me this force and Prevalence, that as soon as I had the Authors leave, I durst not forbear the committing of them to the Press, notwithstanding his Many arguments, which were plausible enough to the Contrary: as, namely, that much of the *First Part* was written when he was of so immature Years, that should I be particular concerning his Age then, to any person who hath read the Piece, the Paucity of such Instances might justly make me despair of begetting Credit to my Relation. Another Objection was, That, though his Method did of necessity lead him to it, yet it might be look'd upon as unbecoming for Him to

The Publisher to the Reader.

meddle with the Physicians Art, of which he never did (nor could, by reason of his Native Honour) make any Profession. But these Oppositions being raised upon points of Curiosity in Ceremony and outward *Decorum*, were of little weight, when the forementioned Noble Offices of Charity and doing good were in the other Scale.

The greater Question was. Suppose them to be publisht, But why now? Why so soon? Should not rather the Edition have been delay'd, untill it might have come out together with *The second Section of the second Part*? (which discovers the Use that may be made of Experimental Learning, to advance the Empire of Man over other Creatures) or untill the Common Preface, and some other little Tracts, all written long since, and intended to accompany this, might be revised by the Author, or at least untill the Author might have had leisure to have made some more new & full Animadversions to the Receipts & Processes contain'd in the Appendix? The Consideration which answer'd this Objection was, That this Piece, as now printed alone, would make (as you see it doth) a very competent Book, which would have by it Self the perfection, if not of the Whole yet of a more principal part; and of that part, which to
Professors

The Publisher to the Reader.

Professors or Candidates of Learning is most desirable. And then the Author's Avocations and other Studies being so many, that we could prefix no certain time for the complement of the mention'd remaining parts, I was loath to hazard the Preservation of These by deferring the Impression; since I know there is no Security of the continuance of those Writings which are reposed only in single, or at most in few written Copies. I remember, the Author had once lost for a good while one of these very Essays which are now here Printed, and put beyond that Danger for the future. Besides other Casual accidents, the very Contingency of Humane life, and the chance of a Man's papers after Death, (For to them the Question of King Solomon is most proper and pertinent, *Who knows whether then they may happen to fall into the hands of a Wise man or a Fool?*) were of force enough to perswade me to secure these, when it was in my power, unto the Common Use. Would not Printing in all probability have preserv'd unto Us that Universal History of Vegetables from the Cedar of *Libanus* unto the Mols that groweth upon the Wall, written by that Wise and Learned King, and the loss of which we now in vain lament? Would not Printing have sav'd that Excellent Book

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of *Democritus*, w^{ch} he inscribed his *ΧΕΙΡΟΚΜΗΤΑ* or EXPERIMENTS of his own personal Tryal, so utterly lost, that the Name of the piece is not mention'd among the Catalogue of his Writings in *Laertius*? And may not the Printing of this Piece be a meanes of the preservation (besides the Notional part) of divers very useful *ΧΕΙΡΟΚΜΗΤΑ* of the Honourable Author, who hath been ever unwearied in the Tryal of all probable Experiments, that may increase the Light or advance the Profit of Mankind?

But before I leave the Reader, I must give him this single Advertisment, that the Passages included within the *Paratheses* or *Crotchets*, as the Press styles them, that is, between any two such Marks as these [] were inserted long since the writing of these Essays, upon the Relection of some parts of the Book before He sent it to me: Which I therefore did so distinguish, and do intimate, that there may appear no inconsistency in our Author, and the Reader may not marvel to find somethings very Recent in a Book written several Years agoe. Farewell.

RO: SHARROCK.

The



The Author's
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ESSAYS.



That the Title of the following Treatise might not raise in the Reader an Expectation of more then he will find in the Book, I think my self oblig'd to inform him, That, though it come not forth before, divers parts were sent to the Press in 1660, or 1661, and this present Year 1663, yet the very Last Essay of it was written divers Years before. Since when those Papers were left, sometimes in the hands of Friends, and sometimes in distant places where I could not come at them: which I mention, that the Reader may neither wonder nor blame Me, if he now meet with some things in them that have already been published by others, or are more vulgarly known then my way of mentioning them implies. For it may, this notwithstanding, very well be, that when I writ them, nobody had yet lighted on some of them, and that others of them did then but begin to be taken

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*taken notice of. And as for the Five first Essays, which treat of The Usefulness of Natural Philosophy to the Mind of Man, though by my addressing them all the way to the Gentleman I call Pyrophilus, they may seem to have been Originally written to the same Person, and about the same time with the Essays, that make up the Second Part; yet indeed a great Portion of the First part was written, as I remember, 10 or 12 years ago, (when I was scarce above 21 or 22 years old) to another Friend, to whom the Considerations that serv'd to confirm Piety, and excite Devotion, were far more acceptable than those that were more purely Physiologicall: so that having, whether through lazinesse, or want of leisure contented my self to substitute the name of Pyrophilus for that of my other Friend (who was not unwilling I should do so) in a Discourse written when I was so Young, I would not have the Reader think, that I do now so approve of all those Youthful Discourses (which I therefore suffer to pass abroad without a Name) as to think all the Tenets they propos'd to be irrefragable Truths, or all the Reasonings they contain, to be Demonstrative; & that I would at present have my Judgment estimated according to their Cogency. But yet I do without much Reluctancy comply with those Friends, who would by no means consent, that the Five first Essays of this Treatise should not come forth with the Rest; partly because not
writing*

About the following Essays.

writing all things for all Readers, I hold it not unfit to publish something to gratify those, who desire with me to be both excited and assisted to admire and praise the Great and Wise Author of all things; partly because the Treatise would seem maim'd and incomplete, if the latter Essays should come abroad without the Rest; and partly too because Learned Men have been pleas'd to assure me, that those Essays are not destitute of Notions and Ratiocinations, that are not altogether vulgar or contemptible. However those Readers, that either cannot relish, or at least desire not any thing, but what is merely Physiologicall, may, thus advertis'd, passe by the former part of this Treatise, and content themselves to read over the Latter, though they who shall take the Pains to read Both, will not perhaps think their Labour lost: Since I have taken Care to leave even the former Part as little disfurnisht with Experiments and useful Notions, as, the Argument consider'd, I conveniently could. And since also for the Paucity of such things in the First Part, I have endeavour'd to make amends in the Second, which is almost wholly Physiological; concerning which nevertheless I shall admonish the Reader. And indeed the whole Tenets that make up the following Book, are by no means to be look'd upon as Published for an accurate Treatise of the Usefulness of true Physiology, but as Familiar Writings, that want only the formality of

Salve

The Author's Advertisement

Salve and Vale to passe for Physiological and Medical Epistles; consisting of such loose Observations, as I thought might be this way preserv'd, and did not so properly belong to my other Writings as they seem'd fitted for the use, and whereto I have applyed them; namely, that being drawn up together into one Treatise, their Union might enable them to make the greater Impression, and might (somewhat at least) recommend that sort of Learning to a Beginner. And one thing that must be especially comprehended in this Admonition is, that the Particulars I have mentioned, to shew of what use Chymical Experiments may be to a Physitian, are not, possibly, the chiefest that even I could set down, if I were not restrained by some justifiable Considerations; especially 'till I see what Entertainment, the things I now venture abroad, will meet with there: Some of those I reserve, appearing such to me, that I confesse I do not slight them enough to be fond of obtruding them upon the Publick, if I thought they would not be welcome to it. And I do so little desire to have, what I have written, look'd upon as the most that can be said, to shew the Usefulness of Experimental Philosophy, that I scruple not to acknowledg there are things which incline me to suspect, that some in the world, though not particularly known to me, may have Arcana, to which most of the Processes I reserve, as well as all that is commonly known in Chymistry, may prove little more then Trifles.

Mr. BOYLE
Of EXPERIMENTALL PHILOSOPHIE.

A

MR. B. O. Y. L. E.
OF EXETER

OF THE
VSEFULNESSE
OF
Naturall **P**hilosophy.

The First Part.

Of its Vsefulness in reference to
the Minde of Man.

ESSAY I.

OF THE
VSEFULNESSE
OF
Natural Philosophy

The First Part.

Of its Vsefulness in reference to
the Minds of Men.

ESSAY I.



Of the USEFULNESSE of
 EXPERIMENTALL PHILOSOPHY,
 Principally as it Relates to the
 MIND of MAN.



THE NATURAL PHILOSOPHY wont to be taught in most Schools, being little other then a Systeme of the Opinions of *Aristotle*, and some few other Writers, is not, I confesse, *Pyrophilus*, very difficult to be Learned; as being attainable by the perusall of a few of the more Current Authors. But, *Pyrophilus*, that EXPERIMENTAL PHILOSOPHY, which you will find Treated of in the following Essayes, is a Study, if duely prosecuted, so difficult, so chargable, and so toilsome, that I think it requisite, before I propose any particular Subjects to your Enquiries, to possesse you with a just value of true and solid Physiologie; and to convince you, That by endeavouring to addi^ct you to it, I invite you not to mispend your time or trouble on a Science unable to merit and requite it. In order, *Pyrophilus*, to the giving you this satisfaction, Give me leave to mind you, that it was a saying of *Pythagoras*,
 B worthy

worthy so celebrated a Philosopher, That there are two things which most *ennoble* Man, and make him resemble the Gods; *To know the Truth, and To do Good.* For, *Pyrophilus*, that Diviner part of Man, the Soule, which alone is capable of wearing the Glorious Image of its Author, being endowed with two chief Faculties, the Understanding and the Will; the former is blest and perfectionated by Knowledg, and the latter's Loveliest and most improving property is Goodnesse. A due Reflection upon this excellent Sentence of him to whom Philosophers owe that modest name, should, me thinks, *Pyrophilus*, very much endear to us the Study of Naturall Philosophy. For there is no Humane Science that does more gratifie and enrich the Understanding with variety of choice and acceptable Truths; nor scarce any that does more enable a willing mind to exercise a Goodnesse beneficiall to others.

To manifest these truths more distinctly, *Pyrophilus*, and yet without exceeding that Brevity my Avocations and the bounds of an Essay exact of me, I shall, among the numerous advantages accruing to Men from the Study of the Book of Nature, content my selfe to instance only in a Couple, that relate more properly to the *Improving of Mens Understandings*, and to mention a few of those many, by which it *encreases their Power.*

The two chiefe advantages which a reall acquaintance with Nature brings to our Minds, are, First, by instructing our Understandings and gratifying our Curiosities; and next, by exciting and cherishing our Devotion.

And for the first of these, since, as *Aristotle* teacheth, and was taught himself by Common Experience, *all Men are Naturally desirous to Know*: that Propensity cannot but be powerfully engaged to the Works of Nature, which being incessantly present to our senses, do continually sollicite our Curiosities: Of whose potent inclining us to the Contemplation of Natures Wonders, it is not perhaps the inconsiderablest Instance, That though the Naturall Philosophy hitherto taught in most Schools,

Schools, hath been so Litigious in its Theorie, and so barren as to its Productions; yet it hath found numbers of Zealous and Learned Cultivators, whom sure nothing but Mens inbred fondnesse for the Object it converses with, and the end it pretends to, could so passionately devote to it.

And since that (as the same *Aristotle* taught by his Master *Plato* well observes) Admiration is the Parent of Philosophy, by engaging us to enquire into the Causes of the things at which we marvail; we cannot but be powerfully invited to the Contemplation of Nature, by living and conversing among Wonders, some of which are obvious and conspicuous enough to amaze even ordinary Beholders; and others admirable and abstruse enough to astonish the most inquisitive Spectators.

The bare prospect of this magnificent Fabrick of the Universe, furnished and adorned with such strange variety of curious and usefull Creatures, would, suffice to transport us both with Wonder and Joy, if their Commonnesse did not hinder their Operations. Of which Truth Mr *Stepkins*, the famous Oculist, did not long since supply us with a memorable Instance: For (as both himsele and an Illustrious Person that was present at the Cure informed me) a Maid of about Eighteen yeares of Age, having by a couple of Cataracts, that she brought with her into the World, lived absolutely blind from the moment of her Birth, being brought to the free Use of her Eyes, was so ravish'd at the surprizing spectacle of so many and various Objects, as presented themselves to her unacquainted Sight, that almost every thing she saw transported her with such admiration and delight, that she was in danger to loose the eyes of her Mind by those of her Body, and expound that Mystical Arabian Proverb, which advises, *To shut the Windowes, that the House may be Light.*

But if the bare beholding of this admirable Structure is capable of pleasing men so highly, how much satisfaction, *Py-*

pyrophilus, may it be supposed to afford to an Intelligent Spectator, who is able both to understand and to relish the admirable Architecture and skilfull contrivance of it: For the Book of Nature is to an ordinary Gazer, and a Naturalist, like a rare Book of Hieroglyphicks to a Child, and a Philosopher: the one is sufficiently pleas'd with the Odneffe and Variety of the Curious Pictures that adorne it; whereas the other is not only delighted with those outward objects that gratifie his sense, but receives a much higher satisfaction in admiring the knowledg of the Author, and in finding out and enriching himselfe with those abstruse and vailed Truths dexterously hinted in them.

Yes, *Pyrophilus*, as the Understanding is the highest faculty in Man, so its Pleasures are the highest he can naturally receive. And therefore I cannot much wonder that the famous *Archimedes* lighting in a Bath upon an Expedient to resolve a perplexing difficultie in Naturall Philosophy, should leap out of the Bath, and run unclothed like a mad-man, crying nothing but *Ευρηκα, Ευρηκα, I have found it, I have found it.* Nor do I so much admire as deplore the fatally venturous Curiosity of the Elder *Pliny*, who, as the Younger relates, could not be deterr'd by the formidable-nesse of the destructive flames vomited by *Vesuvius*, from devouring by their Light to read the Nature of such Vulcanian Hills; but in spight of all the dissuasions of his Friends, and the affrighting eruptions of that hideous Place, he resolved that Flaming Wonder should rather kill him, then escape him; and thereupon approach'd so neer that he lost his Life to satisfy his Curiosity, and fell (if I may so speak) a Martyr to Physiologie. For we daily see Alchymists hazard their Lives on Minerall Experiments in Furnaces, where though the fires are not so vast and fierce, as those that *Pliny* went to consider; yet the (dangerous when not pernicious) Fumes do sometimes prove as fatall.

One would think, *Pyrophilus*, that the conversing with dead and stinking Carcases (that are not onely hideous objects in themselves, but made more ghastly by the putting us in mind that our selves must be such) should be not onely a very melancholy, but a very hated imployment. And yet, *Pyrophilus*, there are Anatomists who dote upon it; and I confess its Instructiveness has not onely so reconciled me to it, but so enamor'd me of it, that I have often spent hours much less delightfully, not onely in Courts, but even in Libraries, then in tracing in those forsaken Mansions, the inimitable Workmanship of the Omniscient Architect.

The curious Works of famous Artificers, are wont to invite the Visits, and excite the wonder of the generality of inquisitive Persons. And I remember, that in my Travels, I have often taken no small pains to obtain the pleasure of gazing upon some Masterpiece of Art: But now, I confess, I could with more delight look upon a skilful Dissection, then the famous Clock at *Strasburg*. And, methinks, *Aristotle* discourses very Philosophically in that place, where passing from the consideration of the sublimist productions of Nature, to justifie his diligence in recording the more homely Circumstances of the History of Animals, he thus discourses:

Restat (saith he) *ut de animanti natura differamus, nihil pro viribus omittentes vel vilius vel nobilius. Nam & in iis quæ hoc in genere minùs grata nostro occurrunt sensui, Natura parens & author omniũ miras excitat voluptates hominibus, qui intelligunt causas & ingenuè Philosophantur. Absurdum enim nulla ratione probandum est, si imagines quidem rerum naturalium non sine delectatione propter inspectamus, quòd ingenium contemplamur quod illas condiderit, id est, artem pingendi aut fingendi; rerum autem ipsarum natura ingenio miræque solertia constitutam contemplationem non magis prosequamur atque exosculamur, modo causas perspicere valeamus: It remains* (saith he) *that we discourse of the natures of Animals, being circumspect*

Arist: de Part: Anim: lib. 1. c. 5.

to omit none, either of the nobler or inferior sort: For even from those Creatures which less please our sense, does the universal Parent, Nature, afford incredible contentments to such Persons, as understand their causes, and Philophize ingenuously. Since it were absurd and inconsistent to reason, if we should behold the Portraitures of Natural things with delectation, because we observe the accuratness wherewith they are designed, namely, the skill of Painture or Sculpture; and not much more affect and pursue the contemplation of things themselves, contrived by the exquisite Artifice and Sagacity of Nature, provided we be able to understand their causes. And the better to make out to you, Pyrophilus, the delightfulness of the study of Natural Philosophy, let me observe to you, That those pleasing Truths it teacheth us, do highly gratifie our intellectual Faculties, without displeasing any of them: for they are none of those Criminal Pleasures, which injur'd and incensed Conscience does very much allay, even in the Fruition, and turns into Torments after it. Nor are the Enquiries I am recommending of that trifling and unserviceable sort of Employments, which though Conscience condemns not as unlawful for a Christian, Reason disapproves as not worthy of a Philosopher; and wherewith to be much delighted, argues a weakness; as to be pleased with Babies and Whistles, supposes unripe and weak Intellectuals: But the contemplation of Nature, is an Employment, which both the Possessors of the sublimest Reason, and those of the severest Virtue, have not onely allowed, but cultivated. The Learned Author of the Book *De Mundo*, ascrib'd to Aristotle, begins it with this *Elogium* of Natural Philosophy: *Mihi quidem saepe (says he) divina quaedam res, Alexander, admirationeque digna visa est Philosophia; precipue vero in ea parte in qua sola ipsa sublimè sese tollens ad contemplandas rerum naturas, magno illic studio contendit existentem in eis veritatem pernoscere.* Philosophy (saith he) O Alexander, hath oftentimes seem'd to me a Divine and Admirable Thing; but chiefly

chiefly, that part of it, which aspires to contemplate the Natures of things, imploying its utmost power in searching out the truth contained in them. The reasonableness of which Commendation, he handsomly enough prosecutes in the subsequent Discourse: To which I shall refer you, that I may proceed to minde you, that *Pythagoras, Democritus, Plato*, and divers others of those whose Wisdom made after-ages reverence Antiquity, did not onely esteem the Truths of Nature worth studying for, but thought them too worth Travelling for as far as those Eastern Regions, whose Wise-men were then cry'd up for the best Expositors of the obscure Book of Nature. And that severe Teacher, and perswasive Recommender of the strictest Virtue, *Seneca* (whose eminent Wisdom made him invited to govern Him that was to govern the World, and who so often and so excellently presses the husbanding of our time) does not onely in several Passages of his Writings praise a contemplation of Nature, but Writes himself seven Books of Natural Questions, and addressees them to that very *Lucilius*, whom in his Epistles he takes such pains to make compleatly Virtuous; and in his Preface, after he had said according to his manner, loftily, *Equidem tunc Natura rerum gratias ago, cum illam non ab hac parte video, quæ publica est, sed cum secretiora ejus intravi, cum disco quæ Universi Materia sit, quis Author, aut Custos, &c.* Then do I pay my acknowledgements to Nature, when I behold her not on the out-side, which is obvious to publick view, but am enter'd into her more secret Recesses; when I understand what the Matter of the Universe is, who its Author, and Preserver, &c. He concludes in the same strain, *Nisi ad hac admitterer, non fuerat opera pretium nasci: Had I been debarr'd from these things, it would not have been worth coming into the World.* And to adde what he excellently says in another Treatise, *Ad hac quarenda natus* (says he, having spoken of Enquiries concerning the Universe) *estima quàm non multùm acceperit temporis, etiam si illud totum sibi vindicet, cui licet*

*Seneca in Pref.
lib. I. Nat:
Quest.*

Sen: de Otio
Sap: c. 32.

licet nihil facilitate eripi, nihil negligentia patiatur excidere; licet horas suas avarissime servet, & usque in ultima etatis humana terminos procedat, nec quicquid illi ex eo quod Natura constituit fortuna concutiat; tamen homo ad immortalium cognitionem nimis mortalis est. Ergo secundum Naturam vivo, si totum me illi dedi, si illius Admirator Cultorq; sum. Natura autem ntrumq; facere me voluit & agere, & contemplationi vacare: Being born designedly for searching out these things, consider that the portion of time allotted to Man, is not great, if this study should ingross it all; since though he should preserve his hours with the greatest frugality all his life-time, not suffering any to be stolen from him, or slide away negligently, and never be disturbed by Accidents of Fortune in the Employment Nature has appointed him, yet is he too Mortal to attain the knowledge of Immortal Things. Wherefore, I live agreeably to Nature, when I give up my self wholly to Her, and am Her Admirer and Adorer. Moreover, Nature hath designed me to act, and imploy my self in Contemplation. How far Religion is from dis-approving the Study of Physiology, I shall have occasion to manifest ere long, when we shall come to shew, That it is an act of Piety to offer up for the Creatures the Sacrifice of Praise to the Creator; For, as anciently among the Jews, by virtue of an Aaronical Extraction, Men were born with a Right to Priesthood; so Reason is a Natural Dignity, and Knowledge a Privilege, that can confer a Priesthood without Unction or Imposition of Hands. And as for Reason, that is so far from making us judge that Employment unworthy of Rational Creatures, that those Philosophers (as Aristotle, Epicurus, Democritus, &c.) that have improv'd Reason to the greatest height, have the most seriously and industriously imploy'd it to investigate the Truths, and promote the study of Natural Philosophy.

And indeed, that noble Faculty call'd Reason, being conscious of the great progress it may enable us to make in the knowledge

knowledge of Natures Mysteries, if it were industriously imploy'd in the study of them, cannot, but like a great Commander, think it self disobliged by not being considerably employ'd. And certainly we are wanting to our selves, and are guilty of little less then our own Degradation, that being by Gods peculiar vouchsafement, endowed with those noble Faculties of Understanding, and Discoursing, and plac'd amidst a numberless variety of Objects, that incessantly invite our Contemplations, can content our selves to behold so many Instructive Creatures which make up this vast Univerſe, whose noblest Part we are design'd to be, with no more, or but little more discerning Eyes then those less favored Animals, to whom Nature hath denyed the Prerogative of Reason, as we deny our selves the use of it. *Aristotle* well observes, that among Animals, Man alone is of an erected Stature; and adds, That it is because his Nature hath something in it of Divine:

Officium autem Divini (infers he) *est intelligere atque Sapere*: *De Part. Anim.*

The Qualifications of a Divine Being, are Understanding and Wisdom. *lib. 4. c. 10.*

And it cannot but mis-become the dignity of such a Creature to live Ignorant or Unstudious of the Laws and Constitutions of that great Commonwealth (as divers of the Antients have not improperly stiled the World) whereof he is the eminentest part: And were we not lulled asleep by Custom or Sensuality, it could not but Trouble, as well as it Injures a reasonable Soul to Ignore the Structure and Contrivance of that admirably Organiz'd Body in which she lives, and to whose intervention she owes the Knowledge she hath of other Creatures.

'Tis true indeed, that even the generality of Men, without making it their design, know somewhat more of the Works of Nature, then Creatures destitute of Reason can, by the advantage of that Superior Faculty, which cannot but even unurg'd, and of its own accord make some, though but slight, reflections on the Information of the Senses: But if those Impressions be onely receiv'd and not improv'd, but rather neg-

lected; and if we (contenting our selves with the superficial account given us of things by their obvious Appearances and Qualities) are beholding for that we know, to our Nature, not our Industry, we faultily loose both one of the noblest Employments, and one of the highest Satisfactions of our rational Faculty: And he that is this way wanting to himself, seems to live in this magnificent Structure, call'd the Universe, not unlike a Spider in a Palace; who taking notice onely of those Objects that obtrude themselves upon her Senses, lives ignorant of all the other Rooms of the House, save that wherein she lurks, and discerning nothing either of the Architecture of the stately Building, or of the Proportion of the Parts of it in relation to each other, and to the intire Structure, makes it her whole business, by intrapping of Flies to continue an useless Life; or exercise her self to spin Cob-webs, which though consisting of very subtle Threds, are unserviceable for any other then her own trifling uses. And that the contemplation of the World, especially the higher Region of it, was design'd for Mans Employment by Natures Self, even the Heathen Poet (perhaps instructed by *Aristotle*) could observe, who Sings,

*Pronaq; cum spectent Animalia cætera terram,
Os homini sublime dedit, cælumq; tueri
Fussit, & erectos ad sidera tollere vultus.*

*Wise Nature, framing Brutes with downward looks,
Man with a lofty Aspect did indue,
And bad him Heaven with its bright Glories view.*

I might annex, *Pyrophilus*, the Story *Josephus* tells us in the beginning of his *Jewish Antiquities*, that 'twas the holy *Seth* and his Posterity (who are in *Genesis* stil'd the Sons of God) that were the Inventers of Astronomy, whose more Fundamental Observations (to perpetuate them to Man-kinde, and sever

sever them from the foretold destructions by Fire and Water) they engraved upon two Pillars, the one of Brick, the other of Stone; the latter of which our Historian reports to have been extant in *Syria* in his time. And it is an almost uncontroll'd tradition, that the Patriarch, whom God vouchsafes to stile *his Friend*, was the first Teacher of Astronomy and Philosophy to the *Egyptians*, from whom, long afterwards, the *Grecians* learn'd them. *Berosus* himself records him to have been skill'd in the Science of the Stars, as he is cited by *Josephus*, (*Ant. lib. 1. c. 8.*) who a little after speaking of *Abraham* and the *Egyptians*, expressly affirms, that *Numerorum scientiam & siderum benignè illis communicavit: Nam ante Abrahami ad se adventum, Ægyptii rudes erant hujusmodi disciplinarum; quæ à Chaldeis ad Ægyptios profecta, hinc ad Græcos tandem pervenerunt.*

Isaiah 41. 8.
James 1. 23.

But, *Pyrophilus*, to put it out of question that the sublimest reason needs not make the Possessor of it think the studie of Physiologie an Imployment below him, that Unequall'd *Solomon*, who was pronounced the Wisest of men by their omniscient Author, did not onely Justifie the Study of Naturall Philosophy by addicting himselfe to it, but ennobled it by teaching it, and purposely composing of it those matchlesse Records of Nature, from which I remember some Jewish Authors relate *Aristotle* to have borrowed diverse; which (if it be true) may well be supposed to be the choicest pieces that adorn'd his Philosophie, and which Providence perhaps depriv'd the World of, upon such a score as it did the Jewes of the Body of *Moses*, lest men should Idolize it; or as some Rabbies are pleased to informe us, lest vicious men should venture upon all kinds of Intemperance, out of Confidence of finding out by the help of those excellent Writings the Cure of all the Distempers their dissolutenesse should produce.

And, *Pyrophilus*, yet a little further to discover to you, the Delightfulness of the Contemplations of Natures works, Give me leave to mind you of their almost unimaginable Variety,

riety, as of a Propertie, that should methinks not faintly recommend Naturall Philosophy, to curious and active Intellectuals.

For most other Sciences, at least as they are wont to be taught, are so narrow and so circumscrib'd, that he who has read one of the best and recentest Systems of them, shall find little in the other Books publisht on those subjects, but disguis'd repetitions; and a diligent Scholar may in no long time learn as much as the Professors themselves can teach him. But the objects of Naturall Philosophy, being as many as the Laws and Works of Nature are, so various and so numberlesse, that if a Man had the Age of *Methuselah* to spend, he might sooner want time then matter, for his Contemplations: And so pregnant is each of that vast multitude of Creatures, that make up the Naturalists Theme, with usefull matter to employ Mens studie, that I dare say, that the whole life of a Philosopher spent in that alone, would be too short to give a full and perfect account of the Natural Properties and Uses of any one of severall Minerals, Plants, or Animals, that I could name. 'Tis an almost incredible variety of Vegetables, that the teeming Earth, impregnated by Gods *Producat Terra*, does in several Regions produce. Botanists have a pretty while since, reckon'd up near 6000 Subjects of the Vegetable Kingdom; since when, divers other not-described Plants have been observed by Herbarists; the chief of which will, I hope, be shortly communicated to the World, by that Curious and Diligent Botanist my Industrious Acquaintance, Dr. *How*, to whom I not long since presented a peculiar and excellent kinde of Pepper, whose Shell tastes not unlike Cinnamon, and smells so like Cloves, that with the Odor I have deceived many, which he confest to be new even to him; it having been lately gathered in *Jamaica* (where it abounds) and presented me by the inquisitive Commander of the English Forces there. And yet, *Pyrophilus*, this great variety of Simples could not deter either Ancient or Modern Inquirers from Writing

Writing entire Treatises of some particular Ones. So *Pliny* tells us, ^a That *Themison* the Physitian publisht a Volume (for so he call'd it) of that vulgar and despised Herb called *Plantain*: ^{a Plin. lib. 25. cap. 8.} So the same ^b Author tells us, That *Amphilohcus* writ a Volume *De Medica Herba, & Cytisa*; and King ^c *Juba* another, of a sort of *Nymphaea* by him found on Mount *Atlas*. ^{b Id. lib. 18. cap. 26. c Id. lib. 25. cap. 7.} And in our Times, not to mention those many Books that have been written by Physitians, Of the Structure of Mans Body, and *De Usu Partium*: *Carolus Rosenbergius* writ some Years since an entire Book of *Roses*, which he calls his *Rhodologia*: *Martinus Blochwitzius* since published another Book of *Elder*, under the Title of *Anatomia Sambuci*. Among the Chymists, *Angelus Sala* publisht in distinct Treatises, his *Vitriologia*, *Tartarologia*, *Saccharologia*: *Untzerus* also writ peculiar Tracts, *De Mercurio*, *De Sulphure*, *De Sale*. And *Paracelsus* himself vouchsafed distinct Treatises to *Hypericon*, *Perficaria*, *Helleborus*, and some other particular Plants. *Basilius Valentinus* (one of the most Knowing and Candid Chymical Writers) publisht long since an excellent Treatise of *Antimony*, inscrib'd *Currus Triumphalis Antimonii*; but though in his other he hath also taught us divers other things concerning it, yet he left so much undiscovered in *Antimony*, that *Angelus Sala* was thereby emboldned to publish his *Anatomia Antimonii*. And *Hamerus Poppius* (if that be his true name) *Johannis Tholdius*, and the experienced *Alexander van Suchten*, thought fit to write entire Treatises of that same Mineral; by which if they seem to Eclipse the diligence of *Basilius*, at least they bore witness to his Judgement: for modestly inviting his Readers to make further enquiries into the Nature and Preparations of that abstruse Mineral, He gives this account of his leaving many things unmention'd, *That the shortness of Life makes it impossible for one man thoroughly to learn Antimony, in which every day something of new is discovered.* And I remember, that having lately given a Chymist, upon his request, some Directions for drawing, not an imaginary Mer-

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cury of Antimony, as those which are wont to be taught by Chymists, but a real fluid Quick-silver; he some days since brought me about an Ounce of it (which you may command when you please) as the first Fruits of Directions, differing enough from those which I have hitherto met with in Authors. A peculiar way likewise of separating from Antimony, not such a Substance as those which are as improperly as vulgarly call'd Antimonial Sulphurs, but a really combustible Body, which looks and burns so like common Brimstone, that it is not easily distinguishable from it, we shall elsewhere, God willing, *Pyrophilus*, teach you. And I remember, that whereas according to the way mentioned by *Basilus* in his *Curus Triumphalis*, and both generally transcrib'd by Authors, and formerly practis'd by our selves, the Tincture of the Glass of Antimony is very tedious to make, being to be drawn with Spirit of Vinegar, I once made a *Menstruum* to draw it more expeditiously, which having not hitherto met with in any of the Authors I have read, I shall not conceal from you: Taking then an arbitrary quantity of the best French Verdegreece, and distilling it orderly in a strong naked Fire, I found the extorted Liquor to extract (even in an ordinary digesting heat) from powdred Antimonial Glass, a Blood-red Tincture in three or four hours; and my curiosity leading me to abstract the *Menstruum* from the tinging Powder, and put it again upon pulveris'd Glass, I found it again highly Tincted in a very few hours. And prosecuting the Experiment, I found that by drawing off the *Menstruum*, and digesting Spirit of Wine upon the remaining Calx, I could soon obtain a red Tincture, or Solution, From which some Chymists, if I should tell them what I have now told you, would perhaps expect no ordinary Medicine. But this, I suppose, you will think less strange, then that with a Liquor easily separated, by a way which I may elsewhere teach you, from an obvious Vegetable, of which you may safely eat a whole Pound at a time, I have drawn a deep red Tincture, even from crude Antimony, and that in not many hours, and without heat.

And

And to these Experiments of Antimony, I might (partly from the communication of my Friends, and partly from some tryals of my own) adde divers other undivulg'd Experiments relating to that Mineral; if it were not now more seasonable, reserving them for other Papers, to minde you, That the Learned *Kircherus* hath enrich'd us with a great Volume *in Folio*, of Light and Shadows; and another *in Quarto*, of the Load stone: and yet none of these have so exhausted the Subjects they have treated of, but that an after-Enquirer may be able to recruit their Observations with many new ones, perhaps more numerous or more considerable then the former: As after our Learned Country-man *Gilbertus* had written a Volume of the Load-stone, the Jesuit *Cabeus* was not by that deterr'd from writing another of the same Subject: And though since *Cabeus*, the Ingenious *Kircherus* have so largely prosecuted it in his Voluminous *Ars Magnetica*, yet he has not reap'd his Field so clean, but that a careful Gleaner may still finde Ears enough to make some Sheaves. And what I have lately try'd or seen, makes me think it very possible to recruit those many of *Kircherus*, with some further Magnetical Experiments unmention'd in his Book. And I have, the very day I writ this, made in that admirable Stone a not-inconsiderable Experiment, not extant (that I remember) there: For taking an oblong Load-stone, and heating it red-hot, I found the attractive Facultie in not many minutes, either altogether abolish'd, or at least so impaired and weakned, that I was scarce, if at all, able to discern it. But this hath been observed, though not so faithfully related, by more then one; wherefore I shall adde, That by refrigerating this red-hot Load-stone either North or South, I found that I could give its Extreame a Polarity (if I may so speak) which they would readily display upon an excited Needle freely plac'd in *Æquilibrium*: And not onely so, but I could by refrigerating the same end sometime North & sometime South, in a very short time change the Poles of the Load-stone at pleasure, making that which was a quarter of

an hour before the North-pole, become the South; and on the contrary, the formerly Southern Pole become the Northern: And this change was wrought on the Load-stone, not onely by cooling it directly North and South, but by cooling it perpendicularly; that end of it which was contiguous to the Ground, growing the Northern Pole, and so (according to the Laws Magnetical) drawing to it the South end of the Needle; and that which was remotest from it, the contrary one: As if indeed the Terrestrial Globe, were, as some Magnetick Philosophers have suppos'd it, but a Great *Magnes*, since its Effluviūms are able, in some Cases, to impart a Magnetick Faculty to the Load-stone it self. Some other Experiments of this nature, not extant in *Kircherus*, we may have elsewhere fit opportunity to mention. And indeed, that Enigmatical Mineral (if I may so call it) the Load-stone, is a subject so fertile in Rarities, that I hear, he himself is Re-printing that accurate Treatise, with new and large Additions.

Nor are the smallest and most despicable productions of Nature so barren, but that they are capable both to invite our Speculations, and to recompense them. *Pliny* in the eleventh Book of his Natural History, where he treats of Insects, is a little after the entrance, transported with an unwonted admiration of the Workmanship of Nature in them: *Nusquam alibi* (says he) *spectatiore Natura rerum artificio*: In nothing elsewhere (saith he) is the workmanship of Nature more remarkable then in the contexture of these little Creatures. And after a Wonder, not unworthy a Philosopher, he concludes, *Rerum Natura nusquam magis quam in minimis tota est*: Nature in her whole Power is never more wholly seen then in her smallest Works. To which *Epiphonema* he adds this Sober and Philosophical Admonition, *Quapropter, queso ne hac legentes, quoniam ex his spernunt multa, etiam relata fastidio damnent, cum in contemplatione Natura nihil possit videri supervacaneum*: Wherefore I would request the Perusers of these Discourses, that al-
though

though the subjects we treat of are contemptible in their eyes, they would not therefore disdain the relations we shall make of them; since nothing ought to seem superfluous in the contemplation of Nature. I remember that it is from the consideration of so despicable a part as the skin of the Sole of the Foot, that Galen takes occasion to magnifie the Wisdom of God in those excellent terms that we shall have occasion to mention hereafter. And, as he says rarely well, though some Creatures seem made of much courser Stuff then others, yet even in the vilest the Makers Art Shines through the despicableness of the Matter. For Idiots admire in things the Beauty of their Materials, but Artists that of the Workmanship: To which, after a great deal of Philosophical Discourse, he adds, *Neque oculo nec cerebro deterius est pes constructus, si utraq; pars ad actiones, cuius gratia fuit facta, se habeat optimè; neque cerebrum sine pede se probe haberet, neque pes sine cerebro: Eget enim, opinor, illud vehiculo, hic autem sensu: Nor is the Foot worse contriv'd then the Brain or Eye, provided each part be duly dispos'd for performance of the actions to which it was design'd: Since the Brain could not conveniently want the Foot, nor the Foot the Brain. For, I conceive, that one stands in need of a support for local motion, and the other of a source from whence to derive the faculties of Feeling. To which we may annex that Judicious reasoning of Aristotle, who descending from the Contemplation of the sublimer Works of Nature, to treat of the Parts of Animals, thus endeavors to keep his Readers from thinking that the Object of it must render that Enquiry despicable: *Restat* (says he) *ut de animante Natura differamus*: And having set down those Words which you have not long since read in connection to these, he thus prosecutes his Discourse: *Quamobrem, viliorum animalium disputationem perpensionemque fastidio quodam puerili sprevisse, molestèq; tulisse dignum nequaquam est: Cum nullares sit Naturæ, in qua non mirandum aliquod habeatur. Et quod Heraclitum ferunt dixisse ad eos, qui cum alloqui eum vellent, quod fortè in Casa furnaria quadam*
D caloris*

caloris gratia sedentem vidissent, accedere temperarunt, ingredi enim eos fidenter jussit, Quoniam, inquit, ne huic quidem loco Dii desunt immortales; Hoc idem in indaganda quoque natura animantium faciendum est. Aggredi enim quaque sine ullo pudore debemus; cum in omnibus Natura rumen, & honestum pulchrumque insit Ingenium; Wherefore it is altogether unseemly to reject with a kind of Childish nicetie, or be offended at the Discourse and Speculation of inferior Animals; Since there is nothing in all Nature, but contains in it somewhat worthy of Admiration. And as it is recorded of Heraclitus, that seeing some persons desirous to speak with him, refuse to approach towards him, because they beheld him warming himselfe in a miserable Cottage, he bad them come in without scruple, since here also (said he) are the Immortall Gods present: So in like manner ought we to be highly perswaded of the Dignity of Animals, when we make Enquiries into their Natures. Which we ought in no wise to be asham'd of; since the mighty Power and laudable Wisdome of Nature is conspicuous in all things. Nay Paracelsus himselfe, as haughty as he was, was Philosopher enough not to disdain to write a Book *De Mysteriis Vermium*; wherein, though according to His manner he have set down many extravagances, he is more Candid in the Delivery of severall Remedies (which Experience hath recently taught us to be more effectuell then probable) then in most other of his Writings: And in that Treatise he justly reprehends the Laziness and Pride of those Physitians, who not only neglect and scorn Enquiries of Nature themselves: but when the fruits of such Enquiries are presented them by others, instead of a gratefull acceptance, receive them with contempt and derision. To which a while after he adds, what is most true, *That God hath Created nothing so Vile, Despicable, Abject, or Filthy in the World, that may not make for the Health and Use of Man.* And certainly whatever God himselfe has been pleased to think worthy his Making, its Fellow-creature, Man, should not think unworthy of his Knowing. Nor is it a disparagement

disparagement to a Humane Notion, to represent a Creature, which has the Honour to have been framed according to a Divine *Idea*: and therefore the Wifest of Men in His Naturall History, scruples not to write as well of abject *Reptil's*, as of *Lions, Eagles, Elephants*, and other Noble Animals: and did not only Treat of the tall Cedars of *Lebanon*, but that despicable Plant (whatever it be that is designed by the Hebrew *Ezob*) which growes out of the Wall. For my part, If I durst think my Actions fit to be Examples, I should tell you, that I have been so farre from that effeminate squeamishnesse, that one of the *Philosophicall Treatises*, for which I have been gathering Experiments, is of the Nature and Use of Dungs. And though my condition does (God be praised) enable me to make Experiments by others Hands; Yet have I not been so nice as to decline dissecting *Dogs, Wolves, Fishes*, and even *Rats and Mice*, with my own Hands. Nor when I am in my Laboratory do I scruple with them naked to handle Lute and Charcoale.

I should here, *Pyrophilus*, cease to entertain you with Discourses of the pleasantness of Natural Philosophy, but that I remember I have not yet told you, that the Study of Physiologie is not only Delightful, as it teaches us to Know Nature, but also as it teaches us in many Cases to Master and Command her. For the true Naturalist (as we shall see hereafter) does not only Know many things, which other men Ignore, but can Performe many things that other men cannot Doe; being enabled by his skill not barely to understand several Wonders of Nature, but also partly to imitate, and partly to multiply and improve them. And how Naturally we affect the Exercise of this Power over the Creatures may appear in the Delight Children take to do many things (which we may have occasion to mention elsewhere) that seem to proceed from an Innate Propensity to please themselves in imitating or changing the Productions of Nature.

And sure 'tis a great Honour that the Indulgent Creator

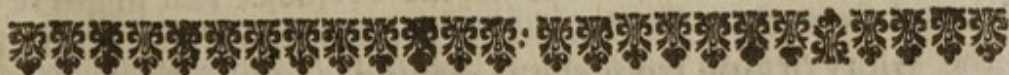
vouchsafes to Naturalists, that though he gives them not the power to produce one Atome of Matter, yet he allows them the power to introduce so many Formes (which Philosophers teach to be nobler then Matter) and work such changes among the Creatures, that if *Adam* were now alive, and should Survey that great Variety of Man's Productions, that is to be found in the shops of Artificers, the Laboratories of Chymists, and other well-furnished Magazines of Art, he would admire to see what a new world, as it were, or set of Things has been added to the Primitive Creatures by the Industry of His Posterity.

And though it be very true, that Man is but the Minister of Nature, and can but duely apply Agents to Patients (The rest of the Work being done by the applied Bodies themselves) yet by His skill in making those Applications, he is able to performe such things as do not only give him a Power to Master Creatures otherwise much stronger then himselfe; but may enable one man to do such wonders, as another man shall think he cannot sufficiently admire. As the poor Indians lookt upon the Spaniards as more then Men, because the knowledg they had of the Properties of Nitre, Sulphur and Charcoale duely mixt, enabled them to Thunder and Lighten so fatally, when they pleased. And this Empire of Man, as a Naturalist, over the Creatures, may perchance be to a Philosophical Soul preserved by reason untainted with Vulgar Opinions, of a much more satisfactory kind of Power or Sovereignty then that for which ambitious Mortals are wont so bloodily to contend. For oftentimes this Latter, being commonly but the Gift of Nature or Present of Fortune, and but too often the Acquist of Crimes, does no more argue any true worth or noble superiority in the possessor of it, then it argues one Brasse Counter to be of a better Mettal then its Fellowes, in that it is chosen out to stand in the Account for many Thousand Pounds more then any of them. Whereas the Dominion that Physiologie gives
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the Prosperous Studier of it (besides that it is wont to be innocently acquired, by being the Effect of his Knowledg) is a Power that becomes Man as Man. And to an ingenious spirit, the Wonders he performs bring perchance a higher satisfaction, as they are Proofes of his Knowledg, then as they are Productions of his Power, or even bring Accessions to his Store.



ESSAY II.





ESSAY II.

O F T H E S A M E.

THe next Advantage, *Pyrophilus*, that we mention'd the Knowledg of Nature to bring to the Minds of Men, is, That it therein excites and cherishes Devotion; Which when I say, *Pyroph.* I forget not that there are severall Divines (and some of them Eminent ones) that out of a Holy Jealousie (as they think) for Religion, labour to deterre men from addicting themselves to serious and thorough Enquiries into Nature, as from a Study unsafe for a Christian, and likely to end in Atheisme, by making it possible for Men (that I may propose to you their Objection as much to its Advantage as I can) to give themselves such an Account of all the Wonders of Nature, by the single Knowledg of Second Causes, as may bring them to disbelieve the Necessitie of a First. And certainly, *Pyrophilus*, if this Apprehension were well grounded, I should think the threatened Evill so considerable, that instead of inviting you to the Study of Naturall Philosophy, I should very earnestly Labour to Disswade you from it. For I, that had much rather have Men not Philosophers then not Christians, should be better content to see you ignore the Mysteries of Nature then deny the Author of it. But though the Zeale of their Intentions keep Me from harbouring any unfavourable Opinion of the Persons of these Men, yet the Prejudice that might redound from their Doctrine (if generally received) both to the Glory of God from the Creatures, and to the Empire of Man over them, forbids Me to leave their Opinion unanswered

swer'd; though I am Sorry that the Necessity of Vindicating the Study I recommend to You from so Heinous a Crime as they have accus'd it of, will compel me to Theologize in a Philosophical Discours: Which that I may do, with as much Brevity as the Weight and Exigency of my Subject will permit, I shall Content my selfe onely in the Explication of my own Thoughts, to hint to you the grounds of Answering what is alledg'd against them.

And First, *Pyrophilus*, I must premise, That though it may be a Presumption in Man, (who to use a Scripture Expression, *Is but of Yesterday, and knows Nothing, because his Dayes upon the Earth are but as a shadow*) precisely and pre- Job 8.9. remptorily to define all the Ends and Aimes of the Omniscent God in His Great Work of the Creation; Yet, perhaps, it will be no great venture to suppose that at least in the Creating of the Sublunary World, and the more Conspicuous Stars, two of God's Principal Ends were, the Manifestation of His own Glory, and the Good of Men. For the Prov. 16.4. First of these; *The Lord hath made all things for himselfe*, saies the Preacher; *For of Him, and through Him, and to Him, are all things*, saies the Apostle. And, *Thou hast Created all things; and for Thy Pleasure they are and were Created*, Rom. 11.36. say the Twenty foure Prostrate Elders (Representatives, perhaps, of the whole Church of both Testaments, propagated by the Twelve Patriarchs, and the like number of Apostles) to their Creatour, which Truth, were it requisite, might be further confirmed by several other Texts, which to decline needlesse prolixity, I here forbear to insist on. Consonantly to this we hear the Psalmist Proclaiming that *The Heavens Declare the Glory of God, and the Firmament sheweth his Handy-Works*. To which purpose we may also observe, Psal. 19.1. that though Man were not Created till the close of the Sixth Day (the Resident's Arrival being Obligingly Suspended till the Palace was made ready to entertain Him) yet that none of God's works might want Intelligent Spectators and Admirers

Iob 38. 5, 7.

Sen. de Otio Sap.
Cap. 32.

misers, the Angels were Created the First Day, as Divines generally infer from the Words of God in *Job*; *Where wast thou when I laid the Foundations of the Earth?* and a little after; *When the Morning Stars sang together, and all the Sons of God shouted for Joy.* Where by the *Morning Stars* and *Sons of God* are suppos'd to be meant the newly Created Angels; one of whose earliest exercises was, it seems, to applaud the Creation, and take thence occasion to sing Hymnes to the Almighty Author of it. I should not, *Pyrophilus*, adde any thing further on this subject, but that having since the writing of these thoughts met with a Discourse of *Seneca's*, very consonant to some of them, I suppose it may tend to your delight as well as to their advantage, if I present you some of the Truths you have seen in my courser Language, drest up in his finer and happier Expressions. *Curiosum nobis (saith he) natura ingenium dedit, & artis sibi pulchritudinisque conscia, spectatores nos tantis rerum spectaculis genuit, peritura fructum sui, si tam magna, tam clara tam subtiliter ducta, tam nitida & non uno genere formosa solitudini ostenderet; Ut scias illam spectari voluisse, non tantum aspici, vide quem locum nobis dedit; nec erexit tantummodo hominem, sed etiam ad contemplationem Vie facturum; ut ab ortu sidera in occasum labentia prosequi posset & vultum suum circumferre cum toto, Sublime illi fecit caput, & collo flexibili imposuit. Deinde sena per diem, sena per noctem signa produxit; nullam non partem sui explicuit, ut per hac quae obtulerat ejus oculis cupiditatem faceret etiam ceterorum: nec enim omnia nec tanta visimus quanta sunt, sed acies nostra aperit sibi investigando viam, & fundamenta veri jacit, ut inquisitio transeat ex apertis in obscura, & aliquid ipso Mundo inveniat Antiquius.* And least you might be offended at his mentioning of Nature, and silence of God, give me leave to informe you, that about the close of the Chapter immediately preceding that, whence the Passage you come from Reading is transcrib'd, having spoken of the Enquiries of Philosophers into the Nature of the Universe, he adds, *Hac qui contemplatur,*

contemplatur, quid Deo præstat? ne tanta ejus Opera sine teste sint.

And to proceed to that which we have formerly assign'd for the Second End of the Creation; That much of this Visible World was made for the use of Man, may appear, not only from the time of his Creation (already taken notice of) and by the Commission given to the first Progenitors of Mankind, to *replenish the Earth, and subdue it, and to have Dominion over the Fish of the Sea, and over the Fowls of the Air, and over all the Earth, and over every living thing that creepeth or moveth on the Earth:* But also by God's making those noble and vast Luminaries, and other Bodies that adorn'd the Skie to give light upon the Earth, though inferiour to them in Dimensions, and to *divide between the Day and between the Night, and to be for Signes, and for Seasons, and for Daies, and for Years.* To this agrees that Passage in the Prophet, *Thus saith the Lord that Created the Heavens, God himselfe that form'd the Earth, and made it, He hath established it, He Created it not in Vaine, He formed it to be Inhabited, &c.* And the Inspired Poet speaks of Man's Dignity in very comprehensive Termes, *For thou (saies he to his Maker) hast made him little lower then the Angels, and hast Crowned him with Glory and Honour; Thou madest him to have Dominion over the Works of thy Hands, thou hast put all things under his Feet.*

The same truth may be confirm'd by divers other Texts, which it might here prove tedious to insist on. And therefore I shall rather observe, that consonantly thereunto, God was pleased to consider man so much more then the Creatures made for him, that he made the Sun it selfe at one time to stand still, and at another time to goe back, and divers times made the parts of the Universe forget their Nature, or Act contrary to it; And ha's (in summe) vouchsafed to alter by Miracles the Course of Nature, for the instruction or reliefe of Man (As when the Fire suspended its destructive Opera-

1 King. 6. 5, 6.

2 Pet. 3. 3, 5, 6,
7, 8, 10.

Lev. 13. 54, 55.

tion, whilst the three resolute Jewes with their Protectour walk'd unharm'd in the mid'st of those flames that destroy'd the Kindlers; and as the heavy Iron emerg'd up to the swimming piece of wood, miraculously by *Elisha* made Magneticall.) And you may also, *Pyrophilus*, take notice, that when *Adam* had transgressed, immediatly the ground was cursed for his sake. And as it is not unusual in Humane Justice to raze the very houses of Regicides and resembling Traitors; So when the provocations of *Sodom* swell'd high enough to reach Heaven, God did not only Destroy the Inhabitants from the Face of the Earth, but for the Inhabitants Sins destroy'd the very Face of the Earth. So when in *Noah's* time a Deluge of Impiety call'd for a Deluge of Waters, God looking upon the living Creatures as made for the Use of Man, stuck not to Destroy them with him, and for him; but involv'd in his Ruine all those Animals that were not necessary to the perpetuation of the Species, and the Sacrifice due for *Noah's* preservation. And so when (in the Last daies) the Earth shall be replenish'd with those *Scoffers* mention'd by *St Peter*, who will walk after their own Lusts, and deride the Expectation of God's foretold coming to Judg and Punish the Ungodly, their Impiety shall be as well punish't as silenc't by the unexpected Flames (perhaps hastned by that very impiety) that shall either Destroy or Transfigure the World. For as by the Law of *Moses*, the Leprous Garment which could not be recover'd by being washt in Water, was to be burnt in the Fire, so the World which the Deluge could not Cleanse, a generall Conflagration must Destroy.

Nor is reason it selfe backward to countenance what we teach. For it is no great presumption to conceive, that the rest of the Creatures were made for Man, since He alone of the Visible World is able to enjoy, use, and relish many of the other Creatures, and to discern the Omniscience, Almightyesse and Goodnesse of their Author in them, and returne Him praises for them. 'Tis not for themselves that the
Rubies

Rubies flame, other Jewels sparkle, the Bezar-stone is Antidotal; nor is it for their own advantage that fruitfull trees spend and exhaust themselves in Annual profusions. The Light which he diffuses through the World is uselesse to the Sun himselfe, whose inanimate being makes him incapable of delighting in his own splendor; which he receives but to convey it to the Earth, and other by him illuminated Globes: whence probably the Hebrewes call'd him *Shemesh*, which Grammarians derive from the Roote *Shemash* signifying in the Chaldean Tongue, *to serve*, or *minister to*; the Sun being the great Minister of Nature, and Servant general of the Universe. And as Animals alone among the Creatures seem to have a proper sense of, and complacency in, their own Being; So Man alone among Animals is endow'd with Reason, at least such a pitch of it, as by which he can discern God's Creatures to be the Gifts of God, and referre them to their Creator's Glory. This truth I find not only embrac'd by Christians, but assented to even by Jewes and Heathens; Among the Jewes my Learned Acquaintance, *Manasseh Ben Israel*, professedly labours to prove it by Scripture and Tradition (though in some of his Arguments he might appear more a Philosopher, if he would have appear'd lesse a Rabbi) and among other passages I remember he alledges that, wherein the Wise man saies (as our Translators English it) *That the Righteous is an everlasting Foundation*; which he renders, *Fustus est columna Mundi*, *The Just Man is the Pillar of the World*. And indeed if the Context did not somewhat disfavour the Interpretation, the Hebrew words [*tzaddik yesôd olâm*] would well enough bear the sense assigned them. Congruously whereunto, I remember that when *Noah* (who is call'd in Scripture a Righteous man, and *ἡγεμὼν δικαιοσύνης*, a Herald, or Proclaimer of Righteousnesse) offer'd up that noble Sacrifice of all the sorts of clean Beasts and Fowles, as a Thank-offering for the Reprieve of the World, God is said to have *smelled a Savour of Rest*, and to have resolved in his

In Probl. de
Creat.

Prov. 10. 25.
Gen. 6. 9.

Pet. 2. 15.

Gen. 8. 21, 22.

2do De Ira
cap. 27.De Ira Dei
cap. 13.De Benef. cap.
23.2do De Nat.
Deor.

Heart never to Curse the ground for Man's sake, but to continue the vicissitudes of Summer, and Winter, Day, and Night, &c, as long as the Earth shall remain. And among the Philosophers themselves, the Truth we are now manifesting, has not been altogether ignor'd. For though *Seneca* somewhere, more wittily then truly, saies, *Non causa mundo sumus hyemem astatemque referendi; suas ista leges habent, quibus divina exercentur. Nimis nos suspicimus, si digni nobis videmur, propter quos tanta moveantur:* Yet *Laëtantius* (not to mention other Authors) tels us that the *Stoicks* generally believed the World to have been made for man. *Vera est* (saies he) *sententia Stoicorum, qui ajunt nostra causa Mundum fuisse constructum. Omnia enim quibus constat, quaque generat ex se Mundus, ad utilitatem hominis accommodata sunt.* And *Seneca* himselve speaks elsewhere almost as if he had read and believed the beginning of *Genesis*; *Dii* (saies he) *non per negligentiam nos genuere, quibus tam multa genuerant: Cogitavit enim nos ante Natura quam fecit.*

Nor were the *Stoicks* the only Philosophers to whom the Contemplation of the Universe discover'd this End of it. For to instance now in *Cicero* only; *Quorum igitur causâ* (saies that great Orator) *effectum esse mundum? Eorum scilicet Animantium, quæ ratione utuntur: Hi sunt Dii et Homines, quibus profecto nihil est melius.*

Having thus premised, *Pyrophilus*, that two of God's principal aimes in the Creation, were the manifestation of his own Glorious Attributes, and the Welfare of his noblest Visible Creature, Man; It will not be perhaps difficult for You to discern, that those who labour to deterre men from sedulous Enquiries into Nature, do, (though I grant, designelessly) take a course which tends to defeat God of both those mention'd Ends.

For to speak first to the Last of them; that man's external fruition of the Creatures, and the Delight and Accommodation which they may afford him, must be highly prejudic'd and

and impair'd by his ignorance of that Natural Philosophy, wherein his Dominion over the Creatures chiefly consists, what we shall say hereafter concerning the usefulness of the Knowledge of Nature to humane Life, will sufficiently evince. But such an Animal fruition (if I may so call it) of the Works of Nature, affords not Man all the good that God design'd him in them. For Religion being not only the great Duty of Man, but the grand Instrument of his future Happiness, which consists in an Union with and Fruition of God, during that endless Term that shall succeed the expiration of his transitory Life on Earth; what ever increases or cherishes his Religion deserves to be lookt on as a great contributor to his Happiness. And we may therefore venture to affirm that the knowledge of the Creatures does less advantage Man, as it enables him to Master them; then as it Assists him, by admiring and serving him, to become Acceptable to their Author. And what ever our distrustful Adversaries are pleas'd to surmise to the contrary, certainly God intended that his Creatures should afford not only Necessaries, and Accommodations to our Animal part, but Instructions to our Intellectual. The World is wont to be stil'd not unfitly by Divines, *The Christians Inn*; but perchance it may be altogether as properly call'd *his Ship*: for whereas both Appellations suppose him a Traveller, the Inn, though it refresh him in his Journey, does not further him in it, but rather retard his progress by detaining him in one place; whereas a Ship not only serves the Passenger for an Inn when he is weary, but helps to convey him towards his Journey's End. And according to this Notion, to suppose that God hath placed in the World innumerable things to feed Man, and delight him, and none to instruct him, were a conceit little less injurious to God, then it were to a wise Merchant, that sends Persons, he loves, to a farre Country, to think that he would furnish their Cabinets with plenty of Provisions, soft Beds, fine Pictures, and all other accommodations for their Voyage, but send them to

Sea disprovided of *Sea-Charts* and Mariners Compasses, and other requisite helps to steer their Course by, to the desired Harbour.

And indeed so farre is God from being unwilling, that we should Prye into his Works, that, by divers Dispensations he imposes on us little lesse then a necessity of studying them. For first he begins the Book of Scripture with the Description of the Book of Nature; of which he not only gives us a general account, to informe us that he made the World; since for that end the very first Verse in the Bible might have suffic'd: But he vouchsafes us by retails the Narrative of each Day's Proceedings, and in the two first Chapters of *Genesis*, is pleas'd to give nobler hints of Natural Philosophy, then men are yet perhaps aware of. Though that in most other places of the Scripture, where the Works of Nature are mentioned but incidently, or in order to other purposes, they are spoken of rather in a Popular then Accurate manner, I dare not peremptorily deny, being unwilling to interesse the reputation of Holy Writ (design'd to teach us rather Divinity then Philosophy) in the doubtful contentions of Naturalists, about such matters as may (though the History of the Creation cannot) be known by the meer Light of Natural Reason. We may next observe, that God has made some knowledg of his Created Book, both conducive to the beliefe, and necessary to the Understanding, of his Written one: Our Saviour making it one cause of the Sadduces great Error about the Resurrection, that they *knew not the Power of God*. And the Scripture being so full of Allusions to, and comparisons borrowed from the properties of the Creatures, that there are many Texts not clearly Intelligible without some knowledg of them; as may appear even by the first Gospel (The Promise that the Seed of the Woman should Bruise the Serpents Head, and have his Heele bruised by that subtle Creature) preached to fallen Man in Paradise, and by the representation of the Worlds Four great Monarchies, and the *Genius* of each
of

of them, under the Notion of Four Beasts, in *Daniels* prophetick Vision : and that often repeated Precept of our great Master to his Disciples, is coucht in an expression alluding to the properties of Animals: For where he commands them to be Wise as Serpents, and Harmlesse as Doves, he does not only recommend to them a Serpentine warinesse in declining dangers, but seems also to prescribe not alone an inoffensiveness towards others (the conspicuousnesse of which quality in Pigeons have made them, though erroneously, be supposed to have no Gall) But also as harmlesse a way of escaping the dangers they are actually ingaged in, as that of Doves, who being pursued by Birds of Prey, endeavour to save themselves not by fight but, only by flight.

And indeed so many of the Texts in Scripture are not to be competently illustrated, without some knowledg of the properties of the Creatures related to in them, that I wonder not, that *Levinus Lemnius*, *Frantzius*, *Rueus*, and other Learned Men have thought it requisite to publish entire Treatises, some of the Animals, others of the Stones, and others of the other Works of Nature mentioned in Scripture: Only I could wish that they had been as wary in their Writings, as commendable for their Intentions, and had not sometimes admitted doubtful or fabulous accounts into Comments upon that Book, whose Prerogative it is to teach nothing but Truth.

Nor ought their Labors to deterre others from cultivating the same Theme; For as (such is Gods condescention to Humane weaknesse) most of the Texts, to whose Exposition Physiologie is necessary, may be explicated by the knowledg of the external, or at least more easily observed qualities of the Creatures; So, that there are divers not to be fully understood without the Assistance, of more penetrating indagations of the Abstrusities of Nature and the more unobvious properties of things, an Intelligent and Philosophical peruser will readily discern.

Now

Now if you should put me upon telling you, *Pyrophilus*, what those Attributes of God are, which I so often mention to be visibly display'd in the Fabrick of the World, I can readily answer you, that though many of Gods Attributes are legible in his Creatures, yet those that are most conspicuous there, are his Power, his Wisdome, and his Goodnesse, in which the World, as well as the Bible, though in a differing, and in some points a darker way, is designed to instruct us, which that you may not think to be affirm'd *gratis*, we must insist a while on each of the Three.

And first, How boundlesse a power, or rather what an Almightyesse is eminently displayed in Gods making out of Nothing all Things, and without Materials or Instruments constructing this Immense Frabrick of the World, whose Vastnesse is such, that even what may be prov'd of it, can scarcely be conceived, and after a Mathematical Demonstration, its Greatnesse is distrusted? Which yet is, I confesse, a wonder lesse to be admir'd then the Power expressed by God in so immense a Work, which neverthelesse some moderne Philosophers (whose opinions I find some Cabalists to countenance) suppose to be not the only Production of Gods Omnipotence. Not to mention *Elephants*, or *Whales*, some of which an Hyperbolist would not scruple to call moving Mountains and Floting Islands; and to passe by those stupendous Hills, and those Seas, where the Light looses it selfe, as Objects which their neernesse only represents so Bulky; let us hasten to consider, that whereas the Terrestrial Globe we Men inhabit, contains, besides all those vast Kingdomes the Unions of some of which constituted the Worlds foure celebrated Monarchies, those spacious (since detected) American Regions, that have been deservedly stiled *The New World*: And that whereas the Common Account makes the circuit of this Terrestrial Globe to be no lesse then 22600 *Italian miles*, consisting each of 1000 Geometrical Paces (which number the more recent account of the accurate *Gassendus* makes amount

amount to 26255 Miles of the same measure) whereas, I say, this Globe of Earth and Water seems to us so vast, Astronomers teach us, that it is but a Point in comparison of the Immensity of Heaven; which they not irrationally prove by the Parallaxis (or Circular difference betwixt the place of a Star, suppos'd to be taken by two Observations, the one made at the Centre, and the other on the surface of the Earth) which *Gassendus* confesseth to be undiscernable in the fixt Stars: as if the Terrestrial Globe were so meer a Point, that it were not material, whether a fixt Star be look'd upon from the Centre, or from the surface of the Earth. This may lessen our wonder at the *Ptolomeans*, making the Sun (which seems not half a Foot over) to be above a hundred sixty and six times bigger then the Earth; and distant from it One thousand one hundred sixty and five Semi-Diameters of the Earth, each of which contains, according to the afore-mentioned computation of *Gassendus*, 4177 Miles; and at their supposing the fixt Stars (whose distance the same Author, as a *Ptolomean*, supput's to be 19000 Semi-Diameters of the Earth) so great, that they conclude each of the fixt or smallest Magnitude to be no less then 18 times greater then the whole Earth, & each Star of the First or Chief Magnitude to exceed the Terrestrial Globe 108 times. And as for the *Copernicans* (that growing Sext of Astronomers) they, as their *Hypothesis* requires, suppose the vastness of the Firmament to be exceedingly greater then the Ancients believed it. For *Philippus Lansbergius*, who ventur'd to assign Distances and Dimensions to the Planets and Fixt Stars (which *Copernicus* forbore to do) supposes as well as his Master, that the Great Orb it self (as the *Copernicans* call that in which they esteem the Earth to move about the Sun) though its Semi-Diameter be suppos'd to be 1500 times as great as that of the Earth, is but as a Point in comparison of the Firmament or Sphere of the Fixt Stars; which he supposes to be distant from the Earth no less then 28000 Semi-Diameters of the Great Orb, that is, 42000000 of Semi-

F Diameters

Gassend. Inst.
Astr. lib. 2. c. 13.

Gassend. lib. 3.
cap. 11.

diameters of the Earth; or according to the former Computation of common Miles 175434000000, which is a Distance vastly exceeding that which the *Ptolomaans* ventur'd to assign, and such as even imagination it self can hardly reach to. I confess indeed, that I am not so well satisfied with the exactness (nor perhaps with the Grounds) of these kinde of Computations, by reason of the Difficulty I have met with in making exact Celestial Observations with either Telescopes, or other Instruments, sufficiently witness'd, by the great disparity remarkable betwixt the Computations of the best Artists themselves. But on the other side I am not sure, but that even the *Copernicans* ascribe not too great a distance to some of the Fixt Stars; since (for ought we yet know) those of the sixth Magnitude, and those which our Telescopes discover (though our bare Eyes cannot) are not really less then those of the first Magnitude, but onely appear so by reason of their greater Distance from our Eyes; as some Fixt Stars seem no bigger then *Venus* and *Mercury*, which are much lesser then the Earth. And therefore upon such Considerations, and because the modestest Computation allows the Firmament to be great enough to make the Earth but a Point in comparison of it; it will be safe enough, as well as just, to conclude with the Psalmist, *Great is the Lord, and greatly to be praised; and his greatness is unsearchable.*

The next Attribute of God that shines forth in his Creatures, is his Wisdom; which to an intelligent Considerer appears very manifestly express'd in the World, whether you contemplate it as an Aggregate or System of all Natural Bodies, or consider the Creatures it is made up of, both in their particular and distinct Natures, and in Relation to each other, and the Universe which they constitute. In some of these the Wisdom of God is so conspicuous, and written in such large Characters, that it is legible even to a vulgar Reader: But in many others the Lineaments and Traces of it are so delicate and slender, or so wrapt up and cover'd with Corporeity, that

it requires an attentive and intelligent Peruser. So numberless a multitude, and so great a variety of Birds, Beasts, Fishes, Reptiles, Herbs, Shrubs, Trees, Stones, Metals, Minerals, Stars, &c. and every one of them plentifully furnish'd and endow'd with all the Qualifications requisite to the Attainment of the respective Ends of its Creation, are productions of a Wisdom too limitless not to be peculiar to God: To insist on any one of them in particular (besides that it would too much swell this Discourse) might appear injurious to the rest; which do all of them deserve that extensive Exclamation of the Psalmist, *How manifold are thy works, O Lord; in Wisdom hast thou made them all.* And therefore I shall content my self to observe in general, That as highly as some Naturalists are pleased to value their own knowledge, it can at best attain but to understand and applaud, not emulate the Productions of God. For as a Novice, when the curioslest Watch the rarest Artist can make, is taken in pieces and set before him, may easily enough discern the Workmanship and Contrivance of it to be excellent; but had he not been shown it, could never have of himself devised so skilful and rare a piece of Work: So, for instance, an Anatomist, though when by many and dexterous Dissections of humane Bodies, and by the help of Mechanical Principles and Rules (without a competent skill wherein, a Man can scarce be an Accomplish'd and Philosophical Anatomist) he has learn'd the Structure, Use and Harmony of the parts of the Body, he is able to discern that matchless Engine to be admirably contriv'd, in order to the exercise of all the Motions and Functions whereto it was design'd: And yet this Artist, had he never contemplated a humane Body, could never have imagin'd or devis'd an Engine of no greater Bulk, any thing near so fitted to perform all that variety of Actions we daily see perform'd either in or by a humane Body. Thus the Circular motion of the Blood, and structure of the Valves of the Heart and Veins (The consideration whereof, as himself told me, first hinted the Circulation to our Famous *Harvey*) though

Psalm. 104. 24.

now Modern Experiments have for the main (the *Modus* seeming not yet so fully explicated) convinc'd us of them, we acknowledge them to be very expedient, and can admire Gods Wisdom in contriving them: Yet those many Learned Anatomists, that have for many succeeding Ages preceded both Dr *Harvey*, and *Columbus*, *Casalpinus*, *Padre Paulo*, and Mr *Warner* (for each of these four last are suppos'd by some to have had some notion of the Circulation) by all their diligent contemplation of humane Bodies, never dream'd (for ought appears) of so advantageous an use of the Valves of the Heart, nor that nimble Circular motion of the Blood, of which our modern Circulators think they discern such excellent Use, not to say, Necessity.

PROV. 13. 19, 10

And though it be true, that the greater Works of God do as well declare his great Wisdom as his Power, according to that of the Inspired Philosopher; *The Lord by Wisdom hath founded the Earth, by Understanding hath he establish'd the Heavens. By his Knowledge the depths are broken up, and the Clouds drop down the Dew*: Yet does not his Wisdom appear less in lesser Creatures; for there is none of them so little, but it would deserve a great deal of our Wonder, did we attentively enough consider it. And as *Apelles* (in the Story) was discover'd by the skilful *Protagoras*, by so neat and slender a Line, that *Protagoras*, by being scarce able to discern it, discern'd it to have been drawn by *Apelles*: So God, in these little Creatures, oftentimes draws traces of Omniscience, too delicate to be liable to be ascrib'd to any other Cause. I have seen Elephants, and admir'd them less then the structure of a dissected Mole, which hath better Eyes then those, that will not see a designation in the dimness of its Eyes (made onely to see the Light, not other Objects by the help of it) and the unwonted posture of its Feet, given it not to run on the Ground, but to dig it self a way under Ground. And, as despicable as their Littleness makes the Vulgar apt to think some Creatures, I must confess my wonder dwells not so much on Natures Clocks

Clocks (if I may so speak) as on her Watches, and is more exercis'd in the coyness of the sensitive Plant, and the Magnetical Properties of a small and abject Load-stone, then the bulk of the tallest Oakes, or those vast Rocks, made famous by Shipwracks. I have pass'd the *Alpes*, and have seen as much to admire at in an Ant-hill, and have so much wondred at the Industry of those little Creatures themselves that inhabited it, that I have ceas'd to wonder at their having given a Theme to *Solomon's* Contemplation. Those vast Exotick Animals which the Multitude flocks to see, and which Men give Money to be allow'd to gaze on, have had many of them lesse of my Admiration, then the little Catterpillar (as Learned Naturalists esteem it) to which we are beholden for Silk. For (not to mention all the Observables crouded by Nature in that little Worm) I thought it very well deserv'd my wonder (when not long since I kept some of them purposely to try Experiments) how this curious Spinster, after he had buryed himself alive in the precious Tomb he had wrought for himself out of his own Bowels, did cast off his former Skin and Legs, and, in shew, his former Nature, appearing for divers days but an almost movelesse Magot; till at length, divesting this second Tegument also (in which Nest, Phenix-like, he had been regenerated out of his own Remains) he came forth (if I may so speak) out of this attiring Room under another form, with Wings, Eyes, and Leggs, &c. to act a new part upon the Stage of the World; which (having spent some days without feeding (that I could observe) in providing for the propagation of his Species) he forsakes and dies. And I the rather mention the Silk-Worm, because that there have been of late divers subtle Speculators, who would fain perswade us, That Animals do nothing out of Instinct, or, if you please, innate or seminal Impressions; but Spin, build Nests, and perform all the other Actions for which they are admir'd, barely by Imitation of what they have seen done by others of the same Kinde. But in the Silk-Worm
(at

(at least here in *England*) this plausible Opinion will not hold: For the Silk-worms I kept, were not hatch'd but in the Spring, out of Eggs laid some Days in the Sun; and the Worms that laid those Eggs, being every one of them dead the Winter before, it was impossible these new Silk-Worms, when they first began to spin their scarce imaginable fine Web, and inclose themselves in Oval Balls of a very Artificial Figure and Texture, should have wrought thus by Imitation; there not having been for many Moneths before, in the place where they were hatch'd (nor perhaps in the whole Country) any Silk-Worms alive which they might imitate. But I must leave these curious Spinsters to their Work, and proceed to tell you, That Seas and Mountains, with the other Hyperboles of Nature (if I may so term them) proclaim indeed Gods Power, but do not perhaps more manifest his Wisdom, then the contrivance of some living Engines, and (if I may so call them) Breathing Atoms, that are so small that they are almost all Workmanship; so that, as before, in the Psalmists Expression we truly said of Gods Greatness, *That it was unsearchable*; we may now as truly say of his Wisdom in the Prophets Words, and in the same Text where he represents him as the Creator of the ends of the Earth, *That there is no searching of his Understanding.*

Isa. 40. 28.

And if I durst, *Pyrophilus*, make this part of this Essay of a length too disproportionate to the rest, I could easily, as well as willingly, represent to you divers things which might serve to Illustrate the πολυποικιλῆ σοφία τοῦ Θεοῦ, *manifold Wisdom of God* (as St. Paul speaks on another occasion) But though I dare not expatiate on this Subject, yet neither dare I altogether conceal from you, that I have sometimes admired to see what scarce imaginable variety of living Engines his Plastick skill (if I may so speak) has been able to produce, (especially in the Waters) without scarce any other resemblance betwixt them, then that they are each of them excellent in its own Kinde, and compleatly furnish'd according to the exigency of its

Eph. 3. 10.

its Nature. And that which much encreases this Wonder, is the disproportion of those living Engines, wherein the great [Yotzêr hakkôl] Former of all things (as the Scripture justly Jer. 10. 16. calls God) has been pleas'd to display an almost equally skilful

Contrivance. Amongst Terrestrial Animals we have the Elephant, of whose stupendious vastness such strange things are related, even by eminent Writers, that I know not well how either to dis-believe them, or give credit to them: And therefore we shall content our selves to mention that which is left on Record by the accurate *Gassendus* in the Life of *Peireskius*; For this matchless Gentleman having caus'd an Elephant, in the Year 1631, to be weigh'd in a Scale, purposely provided, he was found to weigh, of the Roman Pounds (consisting of twelve Ounces apiece) very near Five thousand: And yet surely that this Elephant was very far from being one of the largest of that sort of Beasts, he that shall consider the bigness and length of some of their Teeth, as they are commonly call'd, which are to be seen at divers places, both in *England* and elsewhere, and is not resolv'd not to believe the consonant Relations of Eastern Travellers (among whom *Linschoten* tells us there have been some Teeth found to weigh Two hundred pounds apiece, each pound consisting of twenty four Ounces) may be easily perswaded. On the other side let us reflect upon the smalness of some Terrestrial Animals; and not to mention that little white Creature bred in Wax, which *Aristotle* calls 'Azzei, and speaks of as suppos'd to be the least of all living Creatures whatsoever: Let us consider those little Mites that are bred in mouldy Cheese; for divers of these scarce amount to the weight of a Grain, and every Pound containing Five thousand seven hundred and sixty Grains; supposing each Mite did weigh a whole Grain, yet that formerly mention'd small Elephant would exceed him near 28800000 times. And yet though a Mite seem but a moving Atome, and unless there be divers together, is not easily discern'd by the unassist-ed Eye; yet in an excellent Microscope I have, you know,

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*Gassend. in Vit.
Peireskii, lib. 4.*

several times both seen and shewn to others, even in a gloomy Day, and a disadvantageous Place, not onely the Limbs of this little Animal, but the very Hair growing upon his Legs. Now let us but consider how strangely skilful and delicate a Workmanship must be employ'd to contrive into so narrow a compass, the several Parts Internal and External, requisite to make up this little Animal; how many must goe to the texture of the Eyes, and other Organs of Sense; how many to the Snout (which he has, not unlike a Hog) and the several parts of it; how many to the Stomach and Guts, and the other Inward Parts addicted to the digestion of Aliment, and exclusion of Excrements; and to be short, how unimaginably subtle must be the Animal Spirits running too and fro in Nerves suitable in such little Legs: And if, as we have observ'd them to multiply by Eggs, the little Creatures be hatch'd in those little Eggs, after the manner of divers other Oviparous Animals, how much smaller then a hatched Mite must be a Mite upon the Animation of its delineated Parts? since in Hens Eggs we have sometimes seen the Chick manifestly alive, and its Limbs clearly delineated, whilst yet it took up so small a portion of the Egge, that both the White and the Yolk (betwixt which it is generated, and not of the *Chalaza* or *Tredle*, as *Aquapendente* and other Moderns teach) seem'd to be sometimes yet intire, as well as involv'd in their peculiar Membranes. But it is not so conspicuous in gradient Animals (if I may so speak) as in swimming ones; How vastly disproportionate Masses of Matter the wise *Former of all things* can fashion into living Engines. For Whales are much more stupendious Creatures then Elephants: And not to mention what *Hartenius* (*apud Johnsonum*) tells us of twenty sorts of Whales, whereof the eighteenth Species, which he calls *Nordhwal*, is by him related to be Ninety Ells long; but what Ells he means, I know not: Nor to mention those less incredible Accounts which are given of the vastness of Whales by our English Navigators, who are wont to Fish for them; I shall onely set down

down what is related by one of the eminentest Modern *Lyncean* Philosophers, because he speaks as an Eye-witness, when he tells us, That in the Year 1624, there was cast upon a place near *Santa Severa*, about 30 Miles from *Rome*, a dead Whale of 91 Palms in length, and 50 in thickness: He adds, That its Mouth was 16 Palms long, and 10 high; in which, being opened and kept gaping; a Man on Horse-back might finde competent room; this Mouth being used to harbor a Tongue of twenty Palms (which may make out fifteen Foot) in length. The same inquisitive Writer adds, That four Years before, near the Island of *Corfica*, not far from the Coast of *Italy*, another Whale was cast, One hundred Foot long; which being a Female, was found to be big with a Cub of thirty Foot long, 1500 pound weight. But that which will let you see, *Pyrophilus*, the disproportion betwixt these kinde of Fishes and common Elephants, is, that which the same Author adds, That the Lard onely, or Fat (as he speaks *Carnea pinguedo*) of this corpulent Creature, weigh'd One hundred and thirty five thousand pound, that is, above Twenty seven times the weight of the whole Elephant, which was caus'd to be weigh'd by *Peireskius*. And though the Omnipotent Creator be able to make swimming Creatures of such prodigious bigness, that the Ocean it self may seem to be but a proportionate Pond for such Fishes; yet is the same Omniscent Continuer, as able to make a swimming Engine more slender then a Cheese mite, and so little, that a small part of a Grain may out-weigh divers of them. For, *Pyrophilus*, I must here acquaint you with a strange Observation, which I have been inform'd to have been some while since made in *Italy* by *Panarola* a Famous Physitian in *Rome*, who is said, by the help of an excellent Microscope, to have discern'd in Vinegar small Living Creatures, which he takes to be Worms. The mention of so unlikely an Experiment, made me engage some excellent Philosophers and Mathematicians to assist me in examining it: But though our Microscopes exceeded the best that were

Jo: Faber *Lynceus* in his Exposition of some Passages of p. 568.

brought us over from *Rome*, yet all our diligence and attention did but make them conclude that *Panarola's* Eyes had been deluded. Notwithstanding which, causing a somewhat hollow bottom of pure Crystalline Glasse to be fitted to my Microscope, I prosecuted the Enquiry my self; and at length was so lucky, as not onely to discover these little Creatures with a Microscope, but by holding the Liquor in a Crystal Viol, almost upon the strong Flame of a Candle, to discover multitudes of them with my naked Eyes, as weak as they are. But though I have already convinc'd those that formerly derided such Observations, as not to be made with the best Microscope, yet the great weakness of my Sight has not permitted me to perfect my Observations concerning these Creatures. And therefore reserving the more particular mention of this odde Observation till another time, I shall now onely tell you as much as is pertinent to our present purpose; namely, That having with a certain parcel of strong White-wine Vinegar (for 'tis not in every Vinegar that they are constantly to be found) fill'd up to the top thin Viols with long and slender Necks; and having likewise with the same Liquor fill'd other small Crystalline Viols, though short-neck'd, and held them betwixt my Eye and the Sun, or a Window open towards it, or very near a great Candle, I have often in these Glasses, especially in their slender Necks, after having a while fix'd my Eye on them (attention being in this case very necessary) admirably observ'd great numbers (and sometimes as it were Shoals) of living Creatures, which seem'd to be rather Fishes then Worms; for they swim freely up and down the Liquor, and often hover about the top of it, with a wrigling motion, like that of Eels, to which likewise their long and slender shape resembles them. And though these swimming Creatures be not all exactly of a size, yet some of them seem'd slenderer then any sort of living ones, that hath hitherto been taken notice of by the unassisted Eye: And I remember, that having look'd in a good Microscope upon one of them, and a Cheese-

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mite much about the same time, the Fish appear'd so slender, that we judg'd it not much thicker then one of the Legs of the Mite : So that considering what a vast deal of matter the great Creator can manage and fashion into a Whale, and in how little room he can contrive all the parts requisite to constitute a Fish, we may justly say to him in the Psalmists Language, *There is none like unto thee (O Lord) neither are there any works like unto thy works.* Psalm. 86. 8.

The last of the three Properties of God, which we mentioned him to have manifested in the Creation, is his Goodness; Of which all his Creatures do in their due measure partake, partly by their having a Being vouchsafed them, and partly by their being preserved in it as long as their subordination to higher purposes, and to more powerful creatures do permit, by that supporting Influence of God which keeps them from relapsing into their first Nothing; according to that memorable Passage, where *Nehemiah* having mentioned God as *the Creatour of the Heavens, the Earth, the Seas, and all the Creatures belonging to them*, He calls Him the Preserver, or (as the Original has it) *The enlivener of them all.* And as for Animals, who are more capable of enjoying, though not most of them of discerning His bounty, His Goodness to them is more conspicuous. For besides that in Scripture he is called *The Preserver both of Man and Beast*, and accordingly is said to *give food even to the young Ravens that cry*, and to have after the *Flood* remembered not only *Noah*, but *every living thing that was with him in the Ark*, His Goodness to them is apparent by the plentiful and easily attainable provision he makes according to the exigence of their several Natures. For that innumerable swarm of various Birds, Beasts, Fishes, Reptiles, and other Animals that People the Terrestrial Globe, and the contiguous parts of the World, and by his endowing each of them, with all the Qualifications requisite to the perpetuation of their Species, and the preservation of their Lives, as far forth as is consistent with his Ends

Nehem. 9. 6.

Gen. 8. 1.

in their Creation. But most resplendent does the Goodnesse of God appear towards his Favourite Creature, Man, whom having vouchsaf'd to ennoble with his own Image, he makes most of the Creatures of the world visible to us, pay homage to him, and in some manner or degree do him service: God's liberality at once bestowing on him all those Creatures by endowing him with a Reason enabling him to make use of them; so that even those Creatures which he is not able to subdue by his Power, he is able to make serviceable to him by his Knowledg; as those vast Globes of Light, which are so farre above him, that their Immensity and Brightnesse can scarce render them visible to him, are by man's Mathematicks forced to give him an account of all their Motions, and waiting upon his Dials keep time for him; and even the defects of such works of Nature, are by man's skill made serviceable to him, as the Eclipses of the Moon serve Geographers notably in that difficult and useful worke of finding Longitudes. The Stars serve for Candles to give man light; and the Celestial Orbs are his Candlesticks. He breaths the Aire, the Fire warmes him, and serves him not only in his Kitchin, but to master most other Bodies in his furnaces. The Clouds water his Land, the Earth supports him and his Buildings, the Sea and winds convey him and his Floating-houses to the remotest parts of the World, and enable him to possesse every where almost all that Nature or Art has provided for him any where. The Earth produces him an innumerable multitude of Beasts to feed, cloath, and carrie him; of Flowers and Jewels to delight and adorne him; of Fruits, to sustaine and refresh him; of Stones and Timber, to lodg him; of Simples, to cure him; and in summe, the whole sublunary World is but his Magazine. And it seems the grand businesse of restless Nature so to constitute and manage his Productions, as to furnish him with Necessaries, Accommodations, and Pleasures.

Of such a Number of Plants, Animals, Metals, Minerals, &c. that people and enrich the Terrestriall Globe, perhaps there is not any one, of which Man might not make an excellent use, had he but an insight into its Nature: nor are the most abject and despicable therefore the least useful. There is not any Stone, no not the sparkling Diamond it self, to whom Man is so much beholden, as he is to the dark & unpromising Load-stone, without which the New-World probably had never been detected, and many Regions of the Old World would have little or no commerce with each other. Nor have the *Lion*, the *Eagle*, and the *Whale*, joyned all together (though reputed the Chief of Birds, Beasts, and Fishes) been so serviceable to Man, as that despicable Insect, *The Silkworm*. And if we impartially consider the Lucriferosness (if I may speak in my Lord of *S^t Albans* Stile) of the properties of Things, and their Medical Virtues, we shall finde, That we trample upon many things, for which we should have cause to kneel, and offer God Praises, if we knew all their Qualities and Uses: But of this subject we may elsewhere purposely treat.

To which I must onely adde, *Pyrophilus*; That you will injure Nature, if you suppose, either that all the Concretes, endowed with excellent Properties, have long since been notorious, or that all the Medicinal Virtues of Simples, commonly us'd, are already known; or that all those Concretes are destitute of considerable Properties, to whom none have been yet ascrib'd by eminent Authors. For almost every day either discloses new Creatures, or makes new Discoveries of the usefulness of things; almost each of which hath yet a kinde of *Terra incognita*, or undetected part in it: How many new Concretes, rich in Medicinal vertues, does the New World present the Inquisitive Physitians of the Old? *Notatu dignum* (says the Ingenious *Piso*, in his newly publish'd *Medicina Brasileensis*, lib. 1.) *quod eximia tot arbores, frutices, & innumera herba, figura, foliis & fructibus a veteris orbis Vegetabilibus, paucis*

exceptis, dissimillimæ appareant. Idem de avibus, animantibus & piscibus deprehenditur, ut & insectis alatis, atque alis destitutis; quæ ineffabili colorum pulchritudine & portentosa multitudine generantur, partim nota nobis, partim incognita. And of the known *American* Simples, How many latent Virtues does experience from time to time discover? And (to mention now no others) the Febrifugal property of that *Peruvian* Tree, called by the Natives *Gannanaperide*, whose Bark, call'd commonly *China Febris*, has been at *Rome*, and freshly also at *London*, found so wonderfully effectual against those stubborn Diseases, *Quartain Agues*; and though a Learned Author endeavors to depreciate it, by alledging, That it is wont rather to suspend the Fits, then truly cure the Disease, which after awhile will return again; yet, besides that, it may be often very beneficial to a weakned Patient, to have his Fits put off, the Physitiā thereby also gaining Opportunities to imploy strengthning and preventing Remedies: Besides this, I say, if you will credit that great Person, Sir *Kenelm Digby*, it is rather the Patients or Doctors fault, then the Medicines, if the Disease return. For having purposely consulted him about this Objection against the Use of the *Cortex Febrifugus*, he solemnly assur'd me, That of betwixt Twenty and Thirty Persons, that he had himself cur'd of *Quartanes* by this Remedy; not so many as Two fell into a Relapse.

And now I am upon the more freshly discover'd Virtues of *American* Drugs, I might acquaint you with the admirable Properties, not onely in Diseases, but even in Wounds of a certain Mineral, which (though careful examination of it has not yet taught me to what Species of Stones to reduce it) you cannot but have heard mention'd with wonder, under the name of Sir *Walter Raleigh's* Stone; which my Father, *ὁ μακαρίτης*, enjoy'd, and did strange things with for many years, and by his Will bequeathed (as the highest Legacy he could leave him) to his dearest Friend, the most Learned and Famous *B^r Usher, Primate of Ireland*: But of this Stone, the merit of the subject

ject makes me reserve what I have to say, to a Discourse, wherein I may be allowed to say more to it then now I dare: and therefore I shall proceed to tell you, that 'tis not in the Simples of the New World onely, that new Medicinal properties may be discover'd; for even those which daily obtrude themselves upon our careless Eyes, or are trampled under our regardlesse Feet, may possesse Virtues, to which the major part of Botanists are mere Strangers. To which purpose, I remember that I have often gather'd a little short-liv'd and despicable Plant, with which alone (slightly infus'd in Beer) I lately knew a yong Kinsman of Sir *Kenelm Digby's*, in few Days, and without pain, as both Himself, his Mother, and his Physitian assur'd me, cur'd of that stubborn and seldom vanquish'd Disease of the Kings Evil, against which it doth Wonders; and yet having consulted not onely some of the famousst and recentest Herbals, both English and Latine, about this, but also enquired of two or three eminent Herbarists, I could finde neither any such Virtue, nor almost any at all, ascrib'd by Authors to that excellent Plant.

And whereas Gods bounty to Man in the Creatures, seems a little clouded and streightned by his permitting some Poisonous Plants and Venomous Animals to have a Being in Nature, to that it may be reply'd, First, That many Poisonous Bodies contain their own Antidotes; insomuch that the diligent *Piso*, who hath had great opportunities to examine the Effects of both, ventures to say, treating of the Poisons and Antidotes to be met with in *Brasil*, *Equidem vix dixeris, Venena an Alexiteria plura sint pronata*: and a little lower, *Sic folia, flores, & fructus herbarum Tangaraca & Fuquerii, venena Brasiliae facile prima, propriam suam unaquaq, radicem oppositum habet Antidotum*: and a little after, *Barbari viperarum pinguedinem & capita, tum & integra Insecta quae vulnera intulerint, ex arte parata, audacter & felici cum successu venenatis istibus applicant; adeoque per ipsos effectus comprobare nituntur in omni veneno contineri suum Antidotum*: And next, that
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the noxiousness of many (and therefore not improbably of all of them) is not so incorrigible, but that by Mans Art and Chymical Preparations, they may be made, not onely innocent and harmless, but useful too. This Truth, *Pyrophilus*, Antimony and Quick-silver, and some other noxious Bodies (which Men have learn'd to make Medicinal) have already taught our Modern Physitians; who prescribe, even in their Dispensatories, divers Medicines made out of those churlish Minerals, to which, in the ensuing Discourses, you will find divers others (perhaps not inferior) added. That *Opium* is reckon'd by Physitians among Poisons, I need not tell you; and yet such powerful Remedies may be made with it for many desperate Cases, especially in hot Countries, that the good it may doe, so much exceeds the harm, that Physitians would be sorry there were none of it in the World. The Oyl of Scorpions is not onely Antidotal against their Stings, but is witnessed, by experience, to be very useful to bring away the descending Stone of the Kidneys, and to remedy divers other Mischiefs, besides those that Scorpions can doe. And to these I shall need but to adde one instance more, because of the noblenesse of that single one, and that is the Root *Mandihoca*, so common all over the *West Indies*: for Nature is so far from having been a Step-mother to Man in making that Plant abound so much in those Countries, though in its crude simplicity (as the *Helmontians* speak) it be confessedly a rank Poison, that she hath scarce in any one Plant been so bountiful to the *Americans*. For by a slight and easie preparation, which we shall hereafter mention, it affords many populous Nations almost all the Bread they eat, and some of them a good part of their Drink; the Root freed by a strong Press from the noxious Juice, and dry'd, affording them that *Cassavie* Meal, whereof they make their Bread; which by the taste and colour I could not discern to be other then good. Nor is this the onely use this Poisonous Plant affords them: For the above-commended *Piso* gives us this short, but comprehensive

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Character of it; *Ex Mandihoca radice maximo scatente veneno, optimum Alimentum non solum, sed & Antidotum concinnatur.* (lib. 3^o) But concerning the use that may be made of Poisonous Creatures, we elsewhere professedly discourse: And shall therefore now proceed to observe to you here, that I have not yet mention'd to you the instance which most manifests the greatness of the Good which God intended Man in the Creatures: For, not content to have provided him all that was requisite either to Support or Accommodate him here, he hath been pleas'd to contrive the World so, that (if Man be not wanting to himself) it may afford him not onely Necessaries and Delights, but Instructions too; For each Page in the great Volume of Nature is full of real Hieroglyphicks, where (by an inverted way of Expression) Things stand for Words, and their Qualities for Letters. The Psalmist observes, *That the Heavens declare the glory of God:* And indeed, they celebrate his Praises, though with a soundless Voice, yet with so loud a one (and which gives us the Moral of *Plato's* exploded notion of the Musick of the Spheres) to our intellectual Ears, that he scruples not to affirm, that *There is no Speech nor Language where their voice is not heard* (or as *Junius* and *Tremellius* render it, without violence to the Hebrew Text, *There is no Speech nor Words; yet without these their Voice is understood*) and that *their Line is gone throughout all the earth;* that is (as the Learned *Diodati* expounds it) their Writing in gross and plain Draughts, and their Words to the end of the World: Their Language having so escap'd the confusion of Tongues, that these Natural and Immortal Preachers give all Nations occasion to say of them, as the Assembly at Pentecost did of the Inspir'd Apostles, *We do hear them speak in our Tongues the wonderful Works of God.* Psal. 19. 1. AAs 2. 11.]

Nor can we without listning to these Sermons, derive the entire(perhaps not the chiefest)Benefit design'd us in the Creatures: For sure, that God, who hath compos'd us both of Body and Soul, hath not confin'd the uses of so many admirable

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nable Creatures, and so much inimitable Workmanship to that ignoble part of Man which coupleth him to the Beasts, with the neglect of that Diviner Portion, which allies him to the Angels; vouchsafing to the Lord of the Creatures, in the fruition of this his Palace, no higher Prerogative then he is pleas'd to allow to the Brutes, that serve but to compleat the variety requisite for its embellishment. Of this Opinion I lately found that excellent Writer, *S^t Austine*, to have been before me: For, *Non debes uti oculis* (says he) *ut pecus, tantum ut videas, quæ addas ventri, non menti: utere, ut homo, intende Cælum, & intende Facta, & quare Factorem; aspice quæ vides, & quare quem non vides, crede in eum quem non vides, propter ista quæ vides. Nolite fieri sicut equus & mulus, &c.*

D. Aug. Hom.
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Nor can the Creatures onely inform Man of Gods Being and Attributes (as we have already seen) but also instruct him in his own Duties: For we may say of the World, as *S^t Austin* did of the Sacraments, that it is *Verbum visibile*. And certainly, God hath never so confin'd himself to instruct Men by Words or Types, as not to reserve himself the liberty of doing it by things: Witness his appointing the Rainbow to Preach his Goodness to all Nations, and fortifie the Faith of Mankind against the fear of a second Deluge. 'Tis something to high a saying for an Heathen, that of *Plato*, where he teaches, *That the World is Gods Epistle, written to Mankind*. For by *Solomon* God sends the *Sluggard to school to the Ant*, to learn a provident Industry: Christ commands his Disciples to *learn of Serpents and Pigeons* prudence and inoffensiveness: The same Divine Teacher enjoyns his Apostles to *consider the Lilies*, or (as some would have it) *the Tulips of the Field*, and to learn thence that difficult Virtue of a distrustless relyance upon God: And *S^t Paul* seems almost angry with the *Corinthians*, That their Faith, in so abstruse Mysteries as that of the Resurrection, was not inform'd and strengthened, by considering the meliorating death of Corn committed to the Earth: And the Royal Poet learns Humili-

1 Cor. 15. 36,
37.

ty, by the Contemplation of the most elevated parts of Nature; *When I consider* (says he) *the Heavens, the work of thy Fingers, the Moon and Stars which thou hast ordained, What is Man, that thou visitest him?* Psalm. 8. 3, 4. Thus you may see that God intended the World should serve Man, not onely for a Palace to live in, and to gaze on, but for a School of Virtue; to which his Philanthropy reserves such inestimable Rewards, that the Creatures can, on no account, be so beneficial to Man, as by promoting his Piety, by a competent degree of which, Gods goodness hath made no less then Eternal Felicity attainable.



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ESSAY





ESSAY III.

Containing a Continuation of the Former.

HAVING thus, *Pyrophilus*, endeavored to evince, that the Opinion that would deter Men from the scrutiny of Nature, is not a little prejudicial to Mans Interests, and does very much lessen the Advantages he may derive from the Creatures, both in relation to his accommodation in this Life, and his Felicity in the next: Let us proceed to consider, whether the Doctrine we oppose do not likewise tend, in its own nature (though not in the Intentions of its Patrons) to defeat God of much of that Glory which Man both ought and might ascribe to him, both for himself and the rest of the Creatures. How unlikely is it that we should be able to offer to God that Glory, Praise, and Admiration, he both expects and merits from such a contemplation of the Creatures, as though it be requisite to the true knowledge of their Nature and Properties, is yet supposed either pernicious, or at least dangerous, You, *Pyrophilus*, or any other impartial Person may easily determine.

For the Works of God are not like the Tricks of Juglers, or the Pageants that entertain Princes, where concealment is requisite to wonder; but the knowledge of the Works of God proportions our admiration of them, they participating and disclosing so much of the inexhausted Perfections of their Author, that the further we contemplate them, the more Foot-steps and Impressions we discover of the Perfections of their Creator; and our utmost Science can but give us a juster
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Habb. 2. 2.

veneration of his Omniscience. And as when some Country Fellow looks upon a curious Watch, though he may be hugely taken with the rich Enamel of the Case, and perhaps with some pretty Landskip that adorns the Dial-plate; yet will not his Ignorance permit him so advantageous a Notion of the exquisite Makers skill, as that little Engine will form in some curious Artist, who besides that obvious Workmanship that first entertains the Eye, considers the exactness, and knows the use of every Wheel, takes notice of their proportion, contrivance, and adaptation altogether, and of the hidden Springs that move them all: So in the World, though every Peruser may read the existence of a Deity, and be in his degree affected with what he sees, yet is he utterly unable to discern there those subtler Characters and Flourishes of Omniscience, which true Philosophers are sharp-sighted enough to discern. The existence of God is indeed so legibly written on the Creatures, that (as the Scripture speaks in another sense) *He may run that reads it*; that is, even a perfunctory Beholder, that makes it not his business, may perceive it. But that this God has manifested in these Creatures a Power, a Wisdom, and a Goodness worthy of himself, needs an attentive and diligent Surveyor to discover. How different notions of Gods Wisdom do the Eggs of Hens produce in the ordinary Eaters of them, and in curious Naturalists, who carefully watch and diligently observe from time to time the admirable progress of Nature in the Formation of a Chick, from the first change appearing in the *Cicatricula* (or little whitish speck discernable in the Coat of the Eggs Yolk) to the breaking of the Egg-shell by the perfectly hatched Bird, and on Natures exquisite method in the order and fashioning of the parts, make such Philosophical reflections as you may meet with (not to mention what *Aristotle* and *Fabricius ab Aquapendente*, have observed on that subject) in the Ingenious Treatise of Generation, which our accurate and justly Famous Anatomist, Dr *Highmore*, has been pleased to Dedicate to me; and in the excellent Exercises,

tions, *De Ovo*, of that great Promoter of Anatomical Knowledge, Dr *Harvey*. And whereas it may be alledg'd, That the Attributes of God, which are not taught us, but after much speculation of the World, are things of which no Man but an Atheist doubts; to this it may be reply'd, That besides that, it ill becomes the sense we ought to have of our weakness to despise any helps vouchsaf'd us of God to assist us to know or serve him; besides this, I say, God loving, as he deserves, to be honor'd in all our Faculties, and consequently to be glorifi'd and acknowledg'd by the acts of Reason, as well as by those of Faith, there must be sure found a great disparity betwixt that general, confus'd, and lazy Idea we commonly have of his Power and Wisdom, and the distinct, rational, and affecting notions of those Attributes which are form'd by an attentive inspection of those Creatures in which they are most legible, and which were made chiefly for that very end. The Queen of *Sheba* had heard in her own Country a very advantageous Fame of the Wisdom of *Solomon*; but when the curiosity of a personal Visit made her an Eye-witness of those particular both exquisite Structures, and almost Divinely prudent Conducts and Contrivances wherein that Wisdom did inimitably display it self, she then brake forth into Pathetick and Venerating Exclamations, that acknowledg'd how much juster and improved a Character (of his Wisdom) her Eyes had now given her, then formerly her Ears had done.

Very like a Philosopher, methinks, does the Great *Mercurius Trismegistus* (if we grant him to be the Author of the Books ascribed to him) speak, when he tells his Son, *There can be no Religion more true or just, then to know the things that are, and to acknowledge thanks for all things to him that made them; which thing I shall not cease to do: (he continues) Be Pious and Religious, O my Son! for he that does so is the best and highest Philosopher; and without Philosophy it is impossible ever to attain to the height and exactness of Piety and Religion. And 'twas perhaps, Pyrophilus, to ingage us to an industrious*

*Merc. Trism.
lib. I.
Englified by
Dr. Everard.*

industrious indagation of the Creatures, that God made Man so indigent, and furnish'd him with such a multiplicity of Desires; so that whereas other Creatures are content with those few obvious and easily attainable necessities, that Nature has almost every where provided for them; In Man alone, every sense has store of greedy Appetites, for the most part of Superfluities and Dainties, that to relieve his numerous Wants, or satisfy his more numerous Desires, He might be oblig'd with an inquisitive Industry to Range, Anatomize, and Ransack Nature, and by that concern'd survey come to a more exquisite Admiration of the Omniscient Author. To illustrate this subject yet a little further, *Pyrophilus*, give me leave to observe to you, That Philosophers of almost all Religions have been, by the contemplation of the World, mov'd to consider it under the notion of a Temple: *Ne adoremus* (says *Plutarch*) *Elementa, Cælum, Solem, Lunam, &c. specula sunt hæc, in quibus artem illius singularem intueamur, qui mundum condidit, & adornavit; nec est aliud Mundus quam Templum ejus*: Let us not venerate the Elements, the Heaven, the Sun, the Moon, &c. these are but Miroirs, wherein we may behold his excellent Art, who fram'd and adorn'd the World; nor is the World any thing else but his Temple: *Homines* (says *Cicero*) *tuentur illum Globum, quem in Templo hoc medium vides, qui terra dicitur*: Men abide upon that Globe which you see in the middle of this Temple, and is called the Earth; which *Macrobius* handsomely thus expounds: *Quicquid humano aspectui subjicitur, Templum ejus vocavit qui solâ mente concipitur, ut qui hæc veneratur ut templa, cultum tamen maximum debeat Conditori, sciâtq; quisquis in usum Templi hujus inducitur, ritu sibi vivendum sacerdotis*: All that humane view reaches, he terms his Temple, who is apprehended by the minde alone; to the end that who so reverences these things as Temples, might render the greatest worship to the Maker; and every one that is brought to converse in this Temple, might know himself oblig'd to live like a Priest.

And

And the Lofty *Seneca* (to mention now no other Hea-
 thens) in divers passages of his excellent Writings, styles the
 World a Temple; and I remember in his Treatise, *De Bene-*
ficiis, he avers in terms not unworthy his Mind or his Subject,
Totum mundum Deorum esse immortalium Templum, solum Sen. li. 7. cap. 7.
quidem amplitudine illorum ac magnificentia dignum. That
 the whole World is the Temple of the immortal Gods, being alone
 worthy of their Grandeur and Magnificence. The assent of
 the Jewish Philosophers, to this Notion, you may be pleased
 to receive from their Eloquent *Philo*, who not only gives Philo Jud. de
 the World the Name of Temple, but gives us this account Monarchia.
 of that appellation; *Templum Dei supremum & verè tale*
existimare totum hunc mundum, qui sacrarium quidem habet,
purissimam rerum naturæ partem, Cælum; ornamenta, stellas;
sacerdotes, ministros potentie ejus, Angelos, & incorporeas
animas. The whole World is to be accounted the chiefest Temple of
 God; the Sanctū Sanctorū of it is the purest part of the Universe,
 Heaven; the ornaments, the Stars; the Priests, the Ministers
 of His Power, Angels, and immaterial Souls. And as for
 Christian Philosophers, I suppose it would be needlesse to enu-
 merate the passages wherein they adapt the Notion of the
 World already mention'd; and therefore I shall content my
 selfe to adde, that the Scripture it selfe seems to Authorise it by Heb. 8. 2, 5.
 representing to us in the 8th and 9th Chapters of the Epistle
 to the Hebrews, the Mosaical Tabernacle, as an adumbration
 of that Great Temple of the World; and particularly there
 is a signal Text in the latter of those Chapters, where it is said Heb. 9. 24.
 that Christ is not enter'd into Holy places made with Hands
 [*χειροποίητα ἅγια*] which are copies of the true [*ἀντίτυπα τῶν ἀληθινῶν*]
 but into Heaven it selfe, now to appeare in the presence of
 God for us.

Upon what account, *Pyrophilus*, I esteem the World a
 Temple, I may elsewhere have occasion to Declare; but this
 for the present: It will not be rash to infer that if the World
 be a Temple, Man sure must be the Priest, ordain'd (by being
 I qualified

qualifi'd) to celebrate Divine Service not only in it, but for it. For as in Schools, when the Prince or some munificent Benefactor confers some large possession or rich annuity upon the Foundation, though all the Boyes be concern'd in the benefit, yet because most of them are too young to be sensible of it, or too unlearned to be able to make the retribution of a handsome acknowledgment, either the Master or that other person of the Society, who is most capable and the best spoakesman, is by a kind of natural right engag'd to the duty of returning praise and thanks, not for himself alone, but in the name of all the rest: So in the World, where there are so many inanimate and irrational Creatures, that neither understand how much they owe to their Creator, by owing him even themselves, nor are born to a condition inabling them to acknowledge it; Man, as born the Priest of Nature, and as the most oblig'd and most capable member of it, is bound to return Thanks and Praises to his Maker, not only for himselfe but for the whole Creation. In which sense we may reconcile those two current Assertions, *That God made all things for His own Glory, and that God made all things for Man, and Man for himselfe.* Since whether or no Man be a Microcosme or Little World in *Paracelsus's* sense, if not as a ressembler, yet as a representer of the Macrocosme or Great World, he presents with his own adorations the Homages of all the Creatures to their Creator, though they be ignorant of what is done, as Infants under the Law were of the sacrifices offered on their account. And in this Relation may the Creatures answer the Solemn invitation made them in the whole 148 *Psalme*, and numerous other Scriptures: which they may do (to borrow a barbarous but significant School-terme) objectively, though not formally; I mean, by proving occasions, though not fingers of his praises, and being such objects as prompt and invite Man to pay God that praise upon their score, which they cannot actually pay him themselves; even God's muteſt works being capable of being said

to praise him in the same sense (though in an incomparably transcendent degree) that *Solomon* saies of his virtuous Woman (in the last Verse of the Proverbs) *Let her own Works* Prov. 31.13.
praise her in the Gates; that is, give the considerers of them occasion to extol her: and thus by man's referring the knowledge of the Creature to the Creator's Glory, it becomes in some sense, and congruously to its own Nature, the praiser of its Maker, as may seem intimated in this OEconomy of the Last part of one of the *Psalms*, *Blesse the Lord, all ye His Hosts,* Ps. 103.
the Ministers of His that do His pleasure. Blesse the Lord, all His Works, in all places of His Dominion: Blesse the Lord, O my soule. Where by shutting up the rest of God's Creatures betwixt Angels and Man's Soule, he seems to insinuate that the irrational Creatures blesse the Lord by the mouth of those that are Intelligent.

And truly, *Pyrophilus*, I fear it may relish a little of selfishnesse, to make such a disparity betwixt Perfections, all of them equal, because all of them infinite, as to let God's mercy, because it most advantages us, so to ingrosse our thoughts, and wonder, as to make us neglect the contemplation of those other Glorious Attributes, his Power and his VVisdome, which were those that exacted both Man and Angels adoration, before sin gave occasion to the exercise of the first. And I shall not scruple to confesse unto you, that I dare not confine the Acts of Devotion to those which most men suppose to comprise the whole exercise of it; not that I at all undervalue, or would depreciate any, even the meanest practises of Devotion, which either Scripture or reason consonant to it recommends; but that I esteem that God may be also acceptably (and perhaps more nobly) serv'd and glorifi'd by our entertaining of high, rational, and as much as our nature is capable of worthy notions, attended with a profound and proportionable admiration of those divine Attributes and Prerogatives for whose manifesting he was pleas'd to construct this vast Fabrick.

Rev. 4. 11.

To which purpose I consider, that in the Life to come, when we shall questionless glorifie God exactliest, we shall have little either need or use of Faith; Prayer, Liberality, Patience, and resembling Graces; but our Worship will chiefly consist in elevated Notions, and a prostrate Veneration of Gods Omnipotence, Wisdom, Goodness, and other Perfections; and such a one as this is represented in the *Apocalyps*, to be the present employment of the Blest Spirits in Heaven, where the Elders that assist about the Throne of God, are describ'd, casting their Crowns before it, and saying to him that sits on it, *Thou art worthy, O Lord, to receive Glory, and Honor, and Power: for thou hast created allthings, and for thy pleasure they are and were created.*

By this time, *Pyrophilus*, I hope you begin to think, that the Doctrine that tends to deter Men from enquiring into Nature, is as well derogatory from Gods Glory, as prejudicial to Mans Interests. And indeed, I purpos'd to content my self with the having disperst throughout the past Discourse, the grounds of answering their Objection against the study of Physiology, who pretend it is apt to make Men Atheists: But because I am much concern'd to have you satisfied of so important a Truth, as that which we have hitherto been laboring to evince, I must beg your leave, *Pyrophilus*, to adde *ex abundanti* (as they speak) to what has been already alledg'd, some things that may more directly answer the Objection of our Adversaries, and manifest how little their severity is befriended, either by Scripture, Reason, or Experience.

And first, it seems not at all probable, That if the Omniscient Author of Nature knew that the study of his Works did really tend to make Men dis-believe his Being or Attributes, he would have given Men so many Invitations, and almost Necessities, to study and contemplate the Nature of his Creatures: Of these Invitations divers have been mention'd already, and more might be added to them, if we thought it requisite. But what has been above alledg'd, will make us
forbear

forbear the annexing of any, save that of the ancient Institution of the Sabbath, which many eminent Divines do not groundlessly hold to have been ordain'd to commemorate the Creation, and give Men the opportunity every Seventh Day to contemplate God in his Works, as he himself was pleas'd to rest on the first Seventh Day, and contemplate Himself in the works of the first six. And though our Western Churches, for certain Reasons (not here to be inquir'd into) have long since refus'd the Solemnizing of the Saturday, and appointed the Sunday for the Celebration of both the Works of the Redemption, and Creation of the World together; yet 'tis evident enough that the Primitive Christians did for the most part keep the Saturday as Holy-day, as well as the Sunday: For that ancient Book (whoever be resolv'd to have written it) which goes under the Name of *Clement's Constitutions*, affords us, among others, these two memorable Passages to our purpose: And first, Τὸ Σάββατον μὲν τοι (says he) καὶ ἡ κυριακὴ ἑορταζέσθαι. *Lib. 7. cap. 24.* ἔτι τὸ αὐτὸν ἀναμνηστικὸν εἶναι τῆς ἀναστάσεως. *Keep the Sabbath and the Lords Day as Holy-days; that being dedicated to the remembrance of the Creation, and this to that of the Redemption:* To which we shall adde this second Passage of the same Author, Ἐργαζέσθωνται οἱ δούλοι, &c. *Let Servants work for five days; but on the Sabbath, and the Lords-day, let them attend in the Church the Doctrine of Godliness.* To which purpose, I remember the most Learned *Grotius* observes, That the converted Emperor *Constantine*, forbad the compelling Christians to appear before Tribunals on either of those Days, as being their Festivals: Nay, and if Modern Travellers do not misinform me, - I finde that divers of the Eastern Churches, particularly the *Abyssine* Christians, to this day do as well sanctifie the Sabbath-day in commemoration of Gods having created the World, as the Lords-day to commemorate the Resurrection of Christ. And as for the Jews sense of the Fourth Commandment, some of the Learnedst of their Critics are pleas'd to distinguish betwixt the Words *Zachôr* and *Smôr*,

See of the *Abyssine* or *Athiopian* Christians; and likewise of the *Maronites* in the East, in reference to their Celebration of the Saturday, *Alex: Rossé* in his view of all Religions, and the Authors by him cited.

Rem. i. 20.

Smør, Remember and Keep, imploy'd in the Command of solemnizing the Sabbath: For, the remembring of it they hold to be an act of Religion, performable by all Man kinde that are capable of it, and acquainted with its having been commanded; though the keeping of it Holy they suppose onely enjoyn'd to the *Israelites*: On which occasion, I remember I was one Sabbath-day entertain'd at his own Lodgings, by a Learned Jew (who taught me the Holy Language) with Meat then newly dress'd: to remove my wonder at which, he told me, *That it was dress'd by Christians, who, being Gentiles, were not oblig'd to the strict and legal observation of the Sabbath.* But whatever be to be thought of this Jewish Notion, yet questionless if the Fourth Commandment do not, at least, divers other Passages of Scripture do much discountenance their severity, who would fright Men from the indagation of Nature. And he that shall duly consider divers Texts obvious enough in the Book of *Job*, and the *Psalms* (besides other parts of the Bible) will not readily conclude, that Natural Philosophy and Divinity are at such variance, as the Divines we deal with would perswade us. *St Paul* seems to inform us, that the invisible things of God from the Creation of the World, are clearly seen, being understood by the things that are made, even *his eternal Power and God-head*: So that they that were mention'd before are without excuse. And though I ignore not, that not onely several of the *Soci-nians* following their Master *Socinus*, but some few Orthodox Writers, are pleas'd to give a very differing Interpretation of that Text, and make the ἀόρατα αὐτοῦ καὶ ἀψήγηστος to signifie those things of God that have been Invisible ever since the Creation of the World, and referring the ποιήματα to things not made, as we Translate it, but done (as the Miracles of Christ and his Apostles) yet I see no necessity why the ποιήματα should be taken in a sense exclusive of the Creation, and not at least admitted to take in all the Ways and Methods imployed by God to manifest the invisible things there intimated unto Man: And

And certainly, however St Paul may be supposed to appear but darkly, yet Job was clearly of a differing Opinion from theirs, who teach, *That the study of Nature leads to Atheism*: Job 12. 7, 8, 9. *For ask now the Beasts (says he) and they will teach thee, and the Fowls of the Air, and they shall tell thee: or speak to the Earth, and it shall teach thee, and the Fishes of the Sea shall declare unto thee. Who knoweth not in all these that the hand of the Lord hath wrought this?* And consonantly hereunto (which 'twere not amiss for our Adversaries to take notice of) we may observe, That almost all the Writers of Natural Theology, and the most also of those that have labored to demonstrate the Truth of Christian Religion (divers of whom have been as well Profound Divines, as otherwise Eminent Scholars) have undertaken to evince, by the consideration of the Universe, both that there is a God, and that he is the Author of it: Which I the rather mention, *Pyrophilus*, because I would not be mistaken, as if I disputed against Divines in general, or were guilty of the least Irreverence towards a Faculty, in whose Study I have thought my self oblig'd, as a Christian, to spend much of my time; and especially, I would not appear dis-respectful to Divines in *England*, where they have already been but too much vilified, though questionless for their Sins against God, yet, I fear, not without the Sin of their Oppressors.

In the next place I consider, That since Physiology is said to tempt to Atheism, but by enabling Men to give an account of all the *Phænomena* of Nature, by the knowledge of Second Causes, without taking in the First, it will not be so easie a matter as many presume, for the contemplation of Nature, to turn a considering Man Atheist. For we are yet, for ought I can finde, far enough from being able to explicate all the *Phænomena* of Nature by any Principles whatsoever. And even of the Atomical Philosophers, whose Sect seems to have the most ingeniously attempted it, some of the

the eminentest have themselves freely acknowledged to me, their being unable to do it convincingly to others, or so much as satisfactorily to themselves. And indeed, not onely the Generation of Animals is a Mystery, which all that Naturalists have said to explain it, hath been far enough from depriving of that Name; but we see that to explicate all the various *Phænomena* that belong to that single inanimate, and seemingly homogeneous Body, *Mercury*, so as not to make any *Hypothesis* assum'd to make out one of its Properties or Effects incongruous to any other *Hypothesis* requisite to the explanation of any of the rest, hath been hitherto found so difficult, that if our Posterity be not much happier Unriddlers, then our Fore-Fathers, or we have been, it is like to prove a Task capable of defeating the Industry and Attempts, I say not of more then one Philosopher, but of more then one Age; even our Chymical Tortures hitherto, having, from that deluding *Proteus*, forc'd no Confessions that bring us not more Wonder then Satisfaction, and do not Beget almost as many Scruples as they Resolve.



ESSAY





ESSAY IV.

*Containing a requisite Digression concerning
those that would exclude the Deity from
intermedling with Matter.*

I Ignore not that not onely *Leucippus*, *Epicurus*, and other *Atomists* of old, but of late some Persons, for the most part Adorers of *Aristotle's* Writings, have pretended to be able to explicate the first *Beginning of Things*, and the Worlds *Phænomena*, without taking in, or acknowledging any Divine Author of it: And therefore, though we may elsewhere, by the assistance of that Author, have an opportunity to give You an Account of our unsatisfiedness with the Attempts made by some bold Wits in favor of such Pretensions; Yet since the main Truth We plead for, in this Discourse, is so nearly concern'd in what hath been taught by those that would keep God from being thought to have any share in the Production of the Universe; I can scarce forbear (as unwilling as I am to digress) to represent to You, on the present occasion, a few Considerations which may assist You, if not to lessen the Arrogance of such Persons, at least, to keep Your self from thinking their Evidence as great as their Confidence is wont to be. Now of the Philosophers we speak of, some being *Atomists*, and others not, it will be requisite to say something to each of the two sorts: And because we not long since, in an Illustrious Company, where You, *Pyrophilus*, are not unknown, met with one of them, who avowedly grounded his Opinions on the *Aristotelean* or vulgar Physiology, We

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shall

shall first recommend to You two or three Considerations concerning such arrogant Peripateticks (For I speak not of that Sect in general, of which I know there are divers excellent Men.)

First then, You will in many Passages of the following Essays, finde, that divers things that have been very Magisterially taught, and confidently believ'd among the Followers of *Aristotle*, are Errors or Mistakes; and that as several, even of the obvious *Phænomena* of Nature, do contradict the common Peripatetick Doctrine, so divers, at least of those that are more abstruse, are not explicable by it; and as confidently as these his Followers talk of the expounding the very Riddles of Nature; yet I remember that he himself somewhere (for I cannot call to minde the place) did not scruple to confess, that *As the Eyes of Owls are to the splendor of the Day, so are those of our Minds even to things obvious and manifest.*

I shall next take notice, That Philosophers, who scorn to ascribe any thing to God, do often deceive themselves, in thinking they have sufficiently satisfied our Enquiries, when they have given us the nearest and most immediate causes of some things; whereas oftentimes the assignment of those Causes is but the manifesting that such and such Effects may be deduc'd from the more Catholick affections of things, though these be not unfrequently as abstruse as the *Phænomena* explicated by them, as having onely their Effects more obvious, not their Nature better understood: As when, for instance, an account is demanded of that strange supposed Sympathy betwixt Quick-silver and Gold; in that we finde, that whereas all other Bodies swim upon Quick-silver, it will readily swallow up Gold, and hide it in its Bosom. This pretended Sympathy the Naturalist may explicate, by saying, That Gold being the onely Body heavier then Quick-silver of the same bulk, the known Laws of the *Hydrostaticks* make it necessary, that Gold should sink in it, and all lighter Bodies swim on it: But though the cause of this Effect be thus plausibly assign'd,
by

by deducing it from so known and obvious an affection of Bodies, as Gravity, which every man is apt to think he sufficiently understands; yet will not this put a satisfactorie period to a severe Inquirers Curiositie, who will, perchance, be apt to alledge, That though the Effects of Gravity indeed be very obvious; yet the Cause and Nature of it are as obscure as those of almost any *Phænomenon* it can be brought to explicate. And that therefore he that desires no further account, desists too soon from his Enquiries, and acquiesces long before he comes to his Journies end. And indeed, the investigation of the true nature and adequate cause of gravity, is a task of that difficulty, that in spight of ought I have hitherto seen or read, I must yet retain great doubts whether they have been clearly and solidly made out by any Man. And sure, *Pyrophilus*, there are divers Effects in Nature, of which, though the immediate Cause may be plausibly assign'd, yet if we further enquire into the Causes of those Causes, and desist not from ascending in the Scale of Causes till we are arriv'd at the top of it, we shall perhaps finde the more Catholick and Primary causes of Things, to be either certain, primitive, general and fix'd Laws of Nature (or rules of Action and Passion among the parcels of the Universal Matter) or else the Shape, Size, Motion, and other primary Affections of the smallest parts of Matter, and of their first Coalitions or Clusters: especially those endowed with seminal Faculties or Properties, or (to dispatch) the admirable conspiring of the several parts of the Universe to the production of particular Effects; of all which it will be difficult to give a satisfactory Account, without acknowledging an intelligent Author or Disposer of Things.

And the better to clear so weighty a Truth, let us further consider on this occasion, That not onely *Aristotle*, and those that, mis-led by his Authority, maintain the Eternity of the World, but very many other Philosophers and Physitians, who ascribe so much to Nature, that they will not be reduc'd to acknowledge an Author of it, are wont very much to delude

*Physiologo qui
veritatem con-
templatur ulti-
marum causarum
cognitio non finis
est, sed initium ad
primas supre-
masque causas
proficiscendi.*
*Plutarchi lib.
de primo Fri-
gido.*

*Τὸ πρῶτον αἰ-
τιὸν ἐστὶν ἐννοεῖ
ἐξ αὐτοῦ. Ari-
stot. Ethic.
Nicom. lib. 3.
cap. 8.*

both themselves and others in the account they presume to give us, as satisfactory of the Causes or Reasons of very many Effects: I will not instance in the Magnetick Properties of Things, nor any of those numerous abstrusities of Nature, which 'tis well known that the *Aristoteleans* are wont to refer to Sympathy, Antipathy, or Occult Qualities, and strive to put Men off with empty Names, whereby they do not so much lessen our Ignorance, as betray their own.

But I shall instance in those more obvious *Phænomena*, of which they suppose they have given us very satisfactory Accounts: If you ask one of those I speak of, whence it comes to pass that if a Man put one end of a long Reed into a Vessel full of Water, and suck at the other end, his Mouth will be immediately fill'd with that Liquor; he will readily tell you, That the Suction drawing the Air out of the cavity of the Reed, the Water must necessarily succeed in the place deserted by the Air, to prevent a Vacuity abhorr'd by Nature. If you likewise ask such a Man, Why to Women about a certain Age, their *Purgationes Menstruæ* do commonly supervene, he will think he has sufficiently answered you, when he has told you, that about that Age, beginning to beripe for Procreation, Nature has wisely provided that their superfluous Blood should be sent to the Uterine Vessels, partly to dis-burthen the Mass of Blood of an useless load, and partly to contribute Matter, or at least afford Nourishment in case of Conception. But though these Solutions are wont to be acquiesc'd in by such as those that give them, yet I see not how they can satisfy a rigid Reasoner. For not now to mention what may be objected against them out of some Modern Mechanical and Anatomical Observations, let us a little consider, that to say that the ascent of the Water in the first Problem, proceeds from Natures Detestation of a Vacuity, supposes that there is a kinde of *Anima Mundi*, furnished with various Passions, which watchfully provides for the safety of the Universe; or that a Brute and Inanimate Creature, as Water, not onely has a power to move its

its heavy Body upwards, contrary (to speak in their Language) to the tendency of its particular Nature, but knows both that Air has been suck'd out of the Reed, and that unless it succeed the attracted Air, there will follow a *Vacuum*; and that this Water is withal so generous, as by ascending, to act contrary to its particular inclination for the general good of the Universe, like a Noble Patriot, that sacrifices his particular Interests to the publick ones of his Countrey.

But to shew Men by an easie Experiment how little Attraction is perform'd to avoid a *Vacuum*, I have sometimes done thus; I have taken a slender Pipe of Glass, of about four Foot long, and putting one of the open ends of it into a Vessel full of Quick-silver, I have suck'd as strongly as I could at the other, and caus'd one to watch the ascent of the Quick-silver, and mark where it was at the highest, and I found not that at one suck, I could raise it up much above a Foot; and having caus'd a couple of strong Men, one after another, to suck at the same end of the same Pipe, I found not that either of them could draw it up much higher. Nor did it appear that by repeated Suctions, though the upper end of the Pipe were each time stopp'd, to hinder the relapse of the Quick-silver, it could at all be rais'd above the seven and twenty Digits at which it us'd to subsist in the *Torrecellian* Experiment *De Vacuo*: Whereas the same end of that Tube being put into a small Vessel of Water, I could at one suck make the Water swiftly ascend thorow the perpendicularly held Tube into my Mouth, which argues, that the ascension of Liquors upon Suction, rather depends upon the pressure of the Air, and their respective measures of Gravity and Lightness compar'd to that Pressure, then it proceeds from such an abhorrency of a *Vacuum* as is presum'd.

And so likewise in the other Question propos'd, it is imply'd, that there is in a Female Body something, that knows the rule of Physitians, that of a *Plethora*, the Cure is the convenient Evacuation of Blood, and that this intelligent Faculty is wise enough

nough also to propose to it self the double end above-mentioned, in this Evacuation, and therefore will not provide a Quantity of Blood great enough to require an Excretion, nor begin it till the Female be come to an Age wherein 'tis possible for both the Ends to be obtain'd; & that also this presiding Nature is so charitable, as that Man-kinde might not fail, it will make the Female subject to such Monethly Superfluities of Blood, from which Experience informs us, that a whole Set of Diseases peculiar to that Sex, does frequently proceed. And in a word, there is a multitude of Problems, especially such as belong to the use of the Parts of a humane Body, and to the Causes and Cures of the Diseases incident thereunto, in whose Explication those we write of, content themselves to tell us, That Nature does such and such a thing, because it was fit for her so to do; but they endeavor not to make intelligible to us, what they mean by this Nature, and how meer, and consequently bruit, Bodies can act according to Laws, and for determinate Ends, without any knowledge either of the one or of the other. Let them therefore, till they have made out their *Hypothesis* more intelligibly, either cease to ascribe to irrational Creatures such Actions as in Men are apparently the Productions of Reason and Choice, and sometimes even of Industry and Virtue; or else let them with us acknowledge, that such Actions of Creatures in themselves Irrational, are perform'd under the superintendence and guidance of a Wise and Intelligent Author of Things. But that you may not mistake me, *Pyrophilus*, it will be requisite for me, to acquaint you in two or three words with some of my present thoughts concerning this subject: That there are some Actions so peculiar to Man, upon the account of his Intellect and Will, that they cannot be satisfactorily explicated after the maner of the Actings of meer corporeal Agents, I am very much inclin'd to believe: And whether or no there may be some Actions of some other Animals, which cannot well be Mechanically explicated, I have not here leisure or opportunity to examine.

But

But for (most of) the other *Phænomena* of Nature, methinks we may, without absurdity, conceive, That God, of whom in the Scripture 'tis affirm'd, *That all his Works are known to him from the Beginning*; having resolved, before the Creation, to make such a World as this of Ours, did divide (at least if he did not create it incoherent) that Matter which he had provided into an innumerable multitude of very variously figur'd Corpuscles, and both connected those Particles into such Textures or particular Bodies, and plac'd them in such Scituations, and put them into such Motions, that by the assistance of his ordinary preserving Concourse, the *Phænomena*, which he intended should appear in the Universe, must as orderly follow, and be exhibited by the Bodies necessarily acting according to those Impressions or Laws, though they understand them not at all, as if each of those Creatures had a Design of Self-preservation, and were furnish'd with Knowledge and Industry to prosecute it; and as if there were diffus'd through the Universe an intelligent Being, watchful over the publick Good of it, and careful to Administer all things wisely for the good of the particular Parts of it, but so far forth as is consistent with the Good of the whole, and the preservation of the Primitive and Catholick Laws established by the Supreme Cause. As in the formerly mention'd Clock of *Strasburg*, the several Pieces making up that curious Engine, are so fram'd and adapted, and are put into such a motion, that though the numerous Wheels, and other parts of it, move several ways, and that without any thing either of Knowledge or Design; yet each performs its part in order to the various Ends for which it was contriv'd, as regularly and uniformly as if it knew and were concern'd to do its Duty; and the various Motions of the Wheels, and other parts concur to exhibit the *Phænomena* design'd by the Artificer in the Engine, as exactly as if they were animated by a common Principle, which makes them knowingly conspire to do so, and might, to a rude Indian, seem to be more intelligent than

Acts 15. 18.

Conradus Dasypodius himself, that published a Description of it, wherein he tells the World, That he contrived it, who could not tell the hours and measure time so accurately as his Clock. And according to this Notion, if you be pleas'd to bear it in your memory, *Pyrophilus*, you may easily apprehend in what sense I use many common Phrases, which custom hath so authorized, that we can scarce write of Physiological subjects without employing either them, or frequent and tedious Circumlocutions in their stead: Thus when I say, that a stone endeavors to descend towards the Centre of the Earth, or that being put into a Vessel of Water, it affects the lowest place: I mean that not such a Mathematical Point as the Centre of the Earth, hath power to attract all heavy Bodies, the least of which, it being a point, it cannot harbor; or that a Stone does really aim at that unknown and unattainable Centre; but that, as we say, that a Man strives or endeavors to go to any place, at which he would quickly arrive, if he were not forcibly hindered by some Body that holds him fast where he is, and will not let him go: So a Stone may be said to strive to descend, when either by the Magnetical Steams of the Earth, or the pressure of some subtle Matter incumbent on it, or by whatever else may be the cause of Gravity, the Stone is so determined to tend downwards, that if all Impediments, interpos'd by the Neighboring Bodies, were removed, it would certainly and directly fall to the ground; or being put into a Vessel with Water, or any other Liquor much less heavy than it self (for on Quick-silver, which is heavier, Stones will swim) the same Gravity will make it subside to the bottom of the Vessel, and consequently thrust away its bulk of Water, which though heavy in it self, yet because it is less ponderous than the Stone, seems to be light. And so in our late instance in the Clock, if it be said that the Hand that points at the Hours affects a circular motion, because it constantly moves round the Centre of the Dial-plate, 'tis evident that the inanimate piece of Metal affects not that motion more than any other, but onely that the im-

impression it receives from the Wheels, and the adaptation of the rest of the Engine, determine it to move after that manner. And although if a Man should with his Finger stop that Index from proceeding in its course, it may be said, in some sense, that it strives or endeavors to prosecute its former Circular Motion; yet that will signifie no more, then that by virtue of the Contrivance of the Engine, the Index is so impell'd, that, if the Obstacle, put by the Finger of him that stops it, were taken away, the Index would move onwards, from that part of the Circle where it was stop't, towards the mark of the next Hour. Nor do I by this, *Pyrophilus*, deny that it may in a right sense be said, as it is wont to be in the Schools, that *Opus Naturæ est opus Intelligentiæ*: Neither do I reject such common Expressions as *Nature always affects and intends that which is best*, and *Nature doth nothing in vain*. For since I must, according to the above-mention'd Notion, refer many of the actions of irrational Creatures to a most wise Disposer of Things, it can scarce seem strange to me, that in those particulars in which the Author intended, and it was requisite that irrational Creatures should operate so and so for their own Preservation, or the Propagation of their Species, or the publick good of the Universe, their Actions being ordered by a Reason transcending Ours, should not onely oftentimes resemble the Actings of Reason in Us, but sometimes even surpass them. As in effect we see that Silk-worms and Spiders can, without being taught, spin much more curiously their Balls and Webs, then our best Spinsters could; and that several Birds can build and fasten their Nests more Artificially then many a Man, or perhaps any Man could frame and fasten such little and elaborate Buildings. And the Industries of Foxes, Bees, and divers other Beasts, are such, that 'tis not much to be wondered at that those Creatures should have Reasons ascrib'd to them by divers Learned Men, who yet perhaps would be less confident, if they considered how much may be said for the Immortality of all rational Souls. And that the

subtle Actings of these Beasts are determined to some few Particulars requisite for their own Preservation, or that of their Species; whereas on all other occasions, they seem to betray their want of Reason, and by their Voice and Gestures seem to express nothing, but the Natural Passions, and not any Rational or Logical Conceptions. And therefore, as when (to resume our former comparison) I see in a curious Clock, how orderly every Wheel and other part performs its own Motions, and with what seeming Unanimity they conspire to shew the Hour, and accomplish the other Designs of the Artificer, I do not imagine that any of the Wheels, &c. or the Engine it self is endowed with Reason, but commend that of the Workman who fram'd it so Artificially. So when I contemplate the Actions of those several Creatures that make up the World, I do not conclude, the inanimate Pieces, at least, that 'tis made up of, or the vast Engine it self, to act with Reason or Design, but admire and praise the most wise Author, who by his admirable Contrivance can so regularly produce Effects, to which so great a number of successive and conspiring Causes are requir'd.

And thus much, *Pyrophilus*, having been represented concerning those, that rejecting from the Production and Preservation of Things, all but Nature, yet imbrace the Principles of the vulgar Philosophy, you will perhaps think it more then enough: but Object, That what is not to be expected from the barren Principles of the Schools, may yet be perform'd by those Atomical ones which we our selves have within not very many Pages seem'd to acknowledge Ingenious. And I know indeed, that the modern Admirers of *Epicurus* confidently enough pretend, that he and his Expositors have already, without being beholding to a Deity, clearly made out, at least the Origine of the World, and of the principal Bodies 'tis made up of: But I confess, I am so far from being convinc'd of this, that I have been confirm'd rather, then unsetled in my Opinion, of the difficulty of making out the Original of the World, and

and of the Creatures, especially the living Ones that compose it, by considering the accounts which are given us of the Nativity (if I may so speak) of the Universe, and of the Animals, by those great Denyers of Creation and Providence, *Epicurus*, and his Paraphrast *Lucretius*: Whose having shown themselves (as I freely confess they have) very subtile Philosophers in explicating divers Mysteries of Nature, ought not so much to recommend to us their impious Errors, about the Original of Things, as to let us see the necessity of ascribing it to an Intelligent Cause. This then is the account of this matter, which is given us by *Epicurus* himself, in that Epistle of his to *Herodotus*, which we finde in *Diogenes Laertius*:

Quod ad Meteora attinet existimari non oportet, aut motum, aut conversionem, aut Ecclipsin, aut ortum occasumvè, aut alia hujuscemodi ideo fieri quod sit Praefectus aliquis, qui sic disponat, disposueritvè ac simul beatitudinem immortalitatemq, possideat:

And having interposed some Lines, to prove that the Providence of God is not consistent with his Felicity, he addes, *Quare opinandum est, tum cum Mundus procreatus est, factos fuisse eos circumplexus convolventium se Atomorum, ut nata fuerit hac necessitas, quâ circuitus tales obierint:* And elsewhere in the same Epistle, *Infiniti* (says he) *sunt mundi, alii similes isti, alii vero dissimiles. Quippe Atomum cum sint infinita, ut non multo ante demonstratum est per infinitatem spatiorum, & alibi alia, ac procul ab hoc ad fabrefactionem Mundorum infinitorum variè concurrunt.* And least this Epicurean Explication of the Worlds Original should seem to owe all its unsatisfactoriness to its obscure brevity, we shall not scruple to give you that elegant Paraphrase and Exposition of it, which *Lucretius* has delivered in his 5th Book, *De Rerum Natura*:

*Sed quibus ille modis, conjectus, materiai
Fundavit Cælum, ac Terram Pontiq, profunda
Solis, Lunæ cursus ex ordine ponam,
Nam certe, neque conciliis primordia rerum*

*Ordine se quaque atque sagaci mente locarunt,
 Nec quos quaque darent motus pepigere profecto:
 Sed quia multa modis multis primordia rerum
 Ex infinito jam tempore percita plagis,
 Ponderibusque suis, consuerunt concita ferri,
 Omnimodisque coire, atque omnia pertentare,
 Quaecunque inter se possent congressa creare;
 Propterea fit, ut magnum volgata per auum,
 Omnigenos cætus & motus experiundo,
 Tandem conveniant: ea quæ conjuncta repente
 Magnarum rerum fiant exordia sæpè
 Terrarum maris, & cæli generisq; animantum.*

The *Hypothesis* express'd in these Verses (which please our Author so well, that he has almost the same Lines in several other places of his Poem) he prosecutes and applies to some particular parts of the Universe in the same 5th Book: But whilst he thus refuseth to allow God an Interest in the Worlds production, his *Hypothesis* requires that we should allow him several things, which he doth assume, not prove: As First, That Matter is Eternal. 2. That from Eternity it was actually divided, and that into such insensibly small parts, as may deserve the name of Atoms; whereas it may be suppos'd, that Matter, though Eternal, was at first one coherent Mass, it belonging to Matter to be divisible, but not so of necessity, to be actually divided. 3. That the number of these Atoms is really infinite. 4. That these Atoms have an *inane Infinitum* (as the Epicureans speak) to move in. 5. That these Atoms are endowed with an almost infinite variety of determinate Figures, some being round, others cubical, others hooked, others conical, &c. whereas not to mention beforehand what we may elsewhere object, besides against this Assumption, he shews not why, nor how this Atome came to be Spherical rather than Conical, and another Hooked rather than Pyramidal: But these Assumptions I insist not on, because of

two others much more considerable, which our Author is fain to take for granted in his *Hypothesis*: For 6^y. He supposes his Eternal Atoms to have from Eternity been their own Movers, whereas it is plain that Motion is no way necessary to the Essence of Matter, which seems to consist in extension: For Matter is no less Matter, when it rests, then when it is in motion; and we daily see many parcels of Matter pass from the state of motion to that of rest, and from this to that, communicating their motion to Matter that lay still before, and thereby loosing it themselves. Nor has any Man, that I know, satisfactorily made out how Matter can move it self: And indeed, in the Bodies which we here below converse withal, we scarce finde that any thing is mov'd but by something else; and even in these motions of Animals that seem spontaneous, the Will or Appetite doth not produce the motion of the Animal, but guide and determine that of the Spirits, which by the Nerves move the Muscles, and so the whole Body, as may appear by the weariness and unweildiness of Animals, when by much motion the Spirits are spent. And accordingly I finde that *Anaxagoras*, though he believed, as *Aristotle* did after him, that Matter was Eternal, yet he discern'd that the notion of Matter not necessarily including motion, there was a necessity of taking in a *Mens*, as he styles God, to set this sluggish Matter a moving. And I remember *Aristotle* himself, in one place of his *Metaphysicks*, disputing against some of the antienter Philosophers, asks, *Quonamque modo movebuntur si nulla erit actu causa? non enim ipsa materia seipsam movebit* *ἀλλὰ τὸν κίνησιν rerum opifex Virtus*: But though elsewhere I have met with Passages of his near of kin to this, yet he seems not to express his Opinion uniformly and clearly enough to engage me to define it or make a Weapon of it: And therefore I shall rather proceed to take notice, That according to the Epicurean *Hypothesis*, not onely the motion, but the determination of that motion is supposed. For *Epicurus* will have his Atoms move downwards, and that

Aristot: Metaphys: lib. 12. cap. 6.

not in paralel Lines, lest they should never meet to constitute the World, but according to Lines somewhat inclining towards one another; so that there must be not onely motion, but gravity in Atoms, before there be any Centre of gravity for them to move towards; and they must move rather downwards then upwards, or side-ways, and in such Lines as nothing is produc'd capable of confining them to. Which are Assumptions so bold and precarious, that I finde some, even of his Admirers, to be asham'd of them: Which will save me the labor of arguing against them, and allow me to take notice in the 7^h place, That this Epicurean Doctrine supposes that a sufficient number of Atoms, and their motion downwards being granted, there will need nothing but their fortuitous concourse in their fall, to give a Being to all those Bodys that make up the World. Indeed, that the various coalitions of Atoms, or at least small Particles of Matter, might have constituted the World, had not been perhaps a very absurd Opinion for a Philosopher, if he had, as Reason requires, suppos'd that the great Mass of lazy Matter was Created by God at the Beginning, and by Him put into a swift and various motion, whereby it was actually divided into small Parts of several Sizes and Figures, whose motion and crossings of each other were so guided by God, as to constitute, by their occurrences and coalitions, the great inanimate parts of the Universe, and the seminal Principles of animated Concretions. And therefore I wonder not much that the *Milesian Thales* (the first of the Grecian Philosophers (as *Cicero* informs us) that inquir'd into these matters) should hold that Opinion which *Tully* expresses in these Words: *Aquam dixit esse initium rerum, Deum autem eam Mentem quæ ex aqua cuncta finxerat*: And that of *Anaxagoras*, the same Author should give us this account, *Omnium rerum descriptionem & modum mentis infinitæ vi ac ratione ratione designari & confici voluit*: For though these great Men exceedingly err'd, in thinking it necessary that God should be provided of a pre-existent, and by him not crea-

De Nat. Deorum, lib. 1^o.

Idem ibidem.

created Matter to make the World of, yet at least they discern'd and acknowledg'd the necessity of a Wise and Powerful Agent to dispose and fashion this rude Matter, and contrive it into so goodly a Structure, as we behold, without imagining with *Epicurus*, that chance should turn a Chaos into a World. And really it is much more unlikely, that so many admirable Creatures that constitute this one exquisite and stupendous Fabrick of the World should be made by the casual confluence of falling Atoms, jussling or knocking one another in the immense vacuity, then that in a Printers Working-house a multitude of small Letters, being thrown upon the Ground, should fall dispos'd into such an order, as clearly to exhibit the History of the Creation of the World, describ'd in the 3 or 4 first Chapters of *Genesis*, of which History, it may be doubted whether chance may ever be able to dispose the fallen Letters into the Words of one Line. I ignore not that sometimes odde Figures, and almost Pictures may be met with, and may seem casually produc'd in Stones, and divers other inanimate Bodies: And I am so far from denying this, that I may elsewhere have opportunity to shew You, that I have been no carelesse Observer of such Varieties.

But first, even in divers Minerals, as we may see in Nitre, Chrystal, and several others, the Figures that are admired are not produc'd by chance, but by something analogous to seminal Principles, as may appear by their uniform regularity in the same sort of Concretions, and by the practice of some of the skilfullest of the Salt-peter Men, who when they have drawn as much Nitre as they can out of the Nitrous Earth, cast not the Earth away, but preserve it in heaps for six or seven Years; at the end of which time, they finde it impregnated with new Salt-peter, produced chiefly by the seminal Principle of Nitre implanted in that Earth. To prove that Metalline Bodies were not all made at the beginning of the World, but have some of them a Power, though slowly to propagate their Nature when they meet with a dis-

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posed Matter; you may finde many notable Testimonies and Relations in a little Book of *Physico-Chymical* Questions, Written by *Jo: Conradus Gerhardus*, a *Germane* Doctor, and most of them recited (together with some of his own) by the Learned *Sennertus*: But lest you should suspect the Narratives of these Authors, as somewhat partial to their Fellow Chymists Opinions, I shall here annex that memorable Relation which I finde Recorded by *Linschoten*, and *Garcias ab Horta*, a pair of unsuspected Writers in this case concerning Diamonds, whereby it may appear that the seminal Principles of those precious Stones, as of Plants, are lodg'd in the Bowels of the Mine they grow in: *Diamonds* (says the first, in that Chapter of his Travels where he treats of those Jewels) *are digg'd like Gold out of Mines, where they digg'd one year the length of a Man into the Ground, within three or four years after there are found Diamonds again in the same place, which grow there; sometimes they finde Diamonds of 400 or 800 Grains.* *Adamantes* (says the latter) *qui altissimè in terra visceribus, multisq; annis perfici debebant in summo fere solo generantur & duorum aut trium annorum spatio perficiuntur: Nam si in ipsa fodina hoc anno ad cubiti altitudinem fodias Adamantes reperies. Post biennium rursus illic excavato ibidem, invenies Adamantes.* And next, how inconsiderable, alas, are these supposed Productions of Chance, in comparison of the elaborate Contrivances of Nature in Animals? since in the Body of Man, for instance, of so many hundred Parts it is made up of, there is scarce any that can be either left out, or made otherwise then as it is, or plac'd elsewhere then where it is, without an apparent detriment to that curious Engine; some of whose parts, as the Eye, and the valves of the Veins, would be so unfit for any thing else, and are so fitted for the uses that are made of them, that 'tis so far from being likely that such skilful Contrivances should be made by any Being not intelligent, that they require a more then ordinary Intelligence to comprehend how skilfully they are made.

Simpl: in India nascenti.
lib. 1. cap. 47.

As for the account that *Lucretius*, out of *Epicurus*, gives us of the first Production of Men, in I know not what Wombs adhering to the Ground, and which much more becomes him as a Poet, then as a Philosopher, I shall not here waste time to manifest its unlikelyness, that witty Father * *Lactantius* having already done that copiously for me. And indeed it seems so pure a Fiction, that were it not that the *Hypothesis* he took upon him to maintain, could scarce afford him any less extravagant

* Tanta ergo qui videat, & talia potest existimare nullo affecta esse consilio, nulla providentia, nulla ratione divinâ, sed ex atomis subtilibus exiguâ concreta esse tanta miracula? Nonne prodigio simile est, aut natum esse hominem qui hæc diceret, ut Lucippum, aut existisse qui crederet, ut Democritum, qui auditor ejus fuit, vel Epicurum in quem vanitas omnis de Lucippi fonte profluxit, lib. 2. cap. 11

account of the Original of Animals, The unsuitableness of this *Romance*, to those excellent Notions with which he has enriched divers other parts of his Works, would make me apt to suspect, that when he writ this part of his Poem, he was in one of the Fits of that Phrensie, which some, even of his Admirers, suppose him to have been put into by a Philtre given him by his either Wife, or M^{rs} *Lucillia*, in the Intervals of which, they say, that he writ his Books.

And here let us further consider, That as confidently as many Atomists, and other Naturalists, presume to know the true and genuine Causes of the Things they attempt to explicate, yet very often the utmost they can attain to in their Explications, is, That the explicated *Phænomena* May be produc'd after such a Manner as they deliver, but not that they really Are so: For as an Artificer can set all the Wheels of a Clock a going, as well with Springs as with Weights, and may with violence discharge a Bullet out of the Barrel of a Gun, not onely by means of Gunpowder, but of compress'd Air, and even of a Spring. So the same Effects may be produc'd by divers Causes different from one another; and it will oftentimes be very difficult, if not impossible for our dim Reasons to discern surely which of those several ways, whereby it is possible for Nature to produce the same *Phænomena* she has really made use of to exhibit them. And sure, he that in a skilful Watch-makers Shop shall observe how many several ways

Watches and Clocks may be contriv'd, and yet all of them shew the same things, and shall consider how apt an ordinary Man, that had never seen the inside but of one sort of Watches, would be, to think that all these are contriv'd after the same manner, as that whose Fabrick he has already taken notice of; such a Person, I say, will scarce be backward to think that so admirable an Engineer as Nature, by many pieces of her Workmanship, appears to be, can, by very various and differing Contrivances, perform the same things; and that it is a very easie mistake for Men to conclude, that because an Effect may be produc'd by such determinate Causes, it must be so, or actually is so. And as confident as those we speak of use to be, of knowing the true and adequate Causes of Things, yet *Epicurus* himself, as appears by ancient Testimony, and by his own Writings, was more modest, not onely contenting himself, on many occasions, to propose several possible ways whereby a *Phænomenon* may be accounted for, but sometimes seeming to dislike the so pitching upon any one Explication, as to exclude and reject all others: And some Modern Philosophers that much favor his Doctrine, do likewise imitate his Example, in pretending to assign not precisely the true, but possible Causes of the *Phænomenon* they endeavor to explain. And I remember, that *Aristotle* himself (what ever confidence he sometimes seems to express) does in his first Book of *Meteors* ingeniously confess, that concerning many of Nature's *Phænomena*, he thinks it sufficient that they May be so perform'd as he explicates them. But granting that we did never so certainly know in the general that these *Phænomena* of Nature must proceed from the Magnitudes, Figures, Motions, and thence resulting Qualities of Atoms, yet we may be very much to seek as to the particular Causes of this or that particular Effect or Event: For it is one thing to be able to shew it possible for such and such Effects to proceed from the Various Magnitudes, Shapes, Motions, and Concretions of Atoms, and another thing to be able to declare what precise, and

and determinate Figures, Sizes, and Motions of Atoms, will suffice to make out the propos'd *Phænomena*, without incongruity to any others to be met with in Nature: As it is one thing for a Man ignorant of the Mechanicks to make it plausible, that the motions of the fam'd Clock at *Straßburge* are perform'd by the means of certain Wheels, Springs, and Weights, &c. and another to be able to describe distinctly, the Magnitude, Figures, Proportions, Motions, and (in short) the whole Contrivance either of that admirable Engine, or some other capable to perform the same things.

Nay, a Lover of disputing would proceed farther, and question that way of reasoning, which even the eminentest Atomists are wont to employ to demonstrate that they explicate things aright.

For the grand Argument by which they use to confirm the truth of their Explications, is, That either the *Phænomenon* must be explicated after the manner by them specified, or else it cannot at all be explicated intelligibly: In what sense we disallow not, but rather approve this kinde of Ratiocination, we may elsewhere tell you. But that which is in this place more fit to be represented, is, That this way of arguing seems not in our present case so Cogent, as they that are wont to imploy it think it to be: For besides that, it is bold to affirm and hard to prove that, what they cannot yet explicate by their Principles, cannot possibly be explicated by any other Men, or any other Philosophy; besides this, I say, that which they would reduce their Adversaries to, as an Absurdity, seems not to deserve that name: For supposing the Argument to be conclusive, That either the propos'd Explication must be allow'd, or Men can give none at all that is intelligible, I see not what absurdity it were to admit of the consequence: For who has demonstrated to us, That Men must be able to explicate all Natures *Phænomena*, especially since divers of them are so abstruse, that even the Learnedst Atomists scruple not to acknowledge their being unable to give an account of them.

And how will it be prov'd that the Omniscient God, or that admirable Contriver, Nature, can exhibit *Phænomena* by no wayes, but such as are explicable by the dim Reason of Man? I say, Explicable rather than Intelligible; because there may be things, which though we might understand well enough, if God, or some more intelligent Being then our own, did make it his Work to inform us of them, yet we should never of our selves finde out those Truths. As an ordinary Watch-maker may be able to understand the curiousest Contrivance of the skilfullest Artificer, if this Man take care to explain his Engine to him, but would never have understood it if he had not been taught. Whereas to explicate the Nature and Causes of the *Phænomena* we are speaking of, we must not onely be able to understand, but to investigate them.

And whereas it is peremptorily insisted on by some Epicureans, who thereby pretend to demonstrate the excellency and certainty of their Explications, that according to them, Nature is declar'd to produce things in the way that is most facile and agreeable to our Reason: It may be replyed, That what we are to enquire after, is, how Things have been, or are really produced, not whether or no the manner of their Production be such, as may the most easily be understood by us: For if all things were, as those we reason withal maintain, casually produced, there is no reason to imagine that Chance considered what manner of their Production would be the most easily intelligible to us. And if God be allowed to be, as indeed he is, the Author of the Universe, how will it appear that He, whose Knowledge infinitely transcends ours, and who may be suppos'd to operate according to the Dictates of his own immense Wisdom, should, in his Creating of things, have respect to the measure and ease of Humane Understandings, and not rather, if of any, of Angelical Intellects, so that whether it be to God, or to Chance, that we ascribe the Production of things, that way may often be fittest or likelyest for Nature to work by, which is not easiest for us to understand.

And

And as for the way of arguing, so often imploy'd (especially against the Truth we now contend for) and so much rely'd on by many Modern Philosophers, namely, That they cannot clearly conceive such or such a thing propos'd, and therefore think it fit to be rejected; I shall readily agree with them in the not being forward to assent to any thing, especially in Philosophy, that cannot well be conceiv'd by knowing and considering Men: But there is so much difference among Men, as to their faculty of framing distinct Notions of things, and through Mens partiality or lazyness, many a particular Person is so much more apt, then these Men seem to be aware of, to think, or at least, to pretend, that he cannot conceive, what he has no minde to assent to, that a Man had need be wary how he rejects Opinions, that are impugn'd onely by this way of Ratiocination, by which, I hope, it will not be expected that we should be more prevail'd with, then that Sect of Philosophers that imploy's it most. And among those that resolve the *Phænomena* of Nature into the Mechanical Powers of Things, or the various Figures, Sizes and Motions of the parts of Matter; I meet with some, as the *Epicureans*, who tell us, They cannot frame a Notion of an Incorporeal Substance or Spirit, nor conceive how, if the Soul were such, it could act upon the Body: And yet others that seem no less speculative, seriously and solemnly profess, That they can conceive a clear and distinct Notion of a Spirit, which they believe the humane Soul, that regulates at least, if not produces divers Motions of the Body, to be; denying on the other side, That it can be clearly conceiv'd, either that any thing that is onely material can think, or that there can possibly be any *Vacuum* (that is, Place without any Body) in the Universe; both which the *Epicureans* profess themselves not onely to conceive as Possible, but to believe as True.

And thus much, *Pyrophilus*, it may suffice to have said in relation to those who would reject God from having any thing to do, either in the Production or Government of the World,
upon

upon this ground, that they, if you will believe them, can explicate the Original and *Phænomena* of it without him; but 'tis not all, nor the greatest part of the Favorers of the Atomical Philosophy, that presume so much of themselves, and derogate so much from God: To say therefore something to the more moderate and judicious of that Perswasion, we will candidly propose on their behalf the most plausible Objection we can foresee against the Truth we have been all this while pleading for. They may then thus argue against us, That though the Atomists cannot sufficiently demonstrate from what Natural Causes every particular Effect proceeds, and satisfactorily explicate after what determinate manner each particular *Phænomenon* is produc'd; yet it may suffice to take away the necessity of having recourse to a Deity, that they can make out in general, That all the things that appear in the World, may, and must be perform'd by meerly corporeal Agents; or if you please, That all Natures *Phænomena* may be produc'd by the parcels of the great Mass of Universal Matter, variously shap'd, connected, and mov'd. As a Man that sees a screw'd Gun shot off, though he may not be able to describe the number, bigness, shape and coaptation of all the Pieces of the Lock, Stock, and Barrel, yet he may readily conceive that the Effects of the Gun, how wonderful soever they may seem, may be perform'd by certain pieces of Steel or Iron, and some parcels of Wood, of Gun-powder, and of Lead, all fashion'd and put together according to the exigency of the Engine, and will not doubt, but that they are produc'd by the power of some such Mechanical Contrivance of things purely Corporeal, without the assistance of spiritual or supernatural Agents.

In answer to this Objection, I must first profess to you, That I make a great doubt whether there be not some *Phænomena* in Nature, which the Atomists cannot satisfactorily explain by any Figuration, Motion, or Connection of material Particles whatsoever: For some Faculties and Operations of
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the reasonable Soul in Man, are of so peculiar and transcendent a kinde, that as I have not yet found them solidly explicated by corporeal Principles, so I expect not to see them in haste made out by such. And if a spiritual Substance be admitted to enter the Composition of a Man, and to act by and upon his Body; besides that, one of the chief and fundamental Doctrines of the *Epicureans* (namely, That there is nothing in the Universe but *Corpus* and *Inane*) will thereby be subverted; it will appear that an Incorporeal and Intelligent Being may work upon Matter, which would argue, at least a possibility that there may be a spiritual Deity, and that he may intermeddle with, and have an influence upon the Operations of things Corporeal: But to insist no longer on this, let us give a further and direct Answer to the propos'd Objection, by representing, That although as things are now established in the World, an Atomist were able to explain the *Phænomena* we meet with, by supposing the parts of Matter to be of such Sizes, and such Shapes, and to be mov'd after such a manner as is agreeable to the Nature of the particular *Phænomenon* to be thereby exhibited, yet it would not thence necessarily follow, That at the first production of the World, there was no need of a most powerful and intelligent Being to dispose that *Chaos*, or confus'd heap of numberless Atoms into the World, to establish the universal and conspiring Harmonie of things; and especially to connect those Atoms into those various seminal Contextures, upon which most of the more abstruse Operations, and elaborate Productions of Nature appear to depend: For many things may be perform'd by Matter variously figur'd and mov'd, which yet would never be perform'd by it, if it had been still left to it self without being, at first at least, fashion'd after such a manner, and put into such a Motion by an Intelligent Agent. As the Quill that a Philosopher writes with, being dipt in Ink, and then mov'd after such and such a manner upon White Paper, all which are Corporeal things, may very well

well trace an excellent and rational Discourse; but the Quill would never have been mov'd after the requisite manner upon the Paper, had not its motion been guided and regulated by the Understanding of the Writer: Or rather, yet once more to resume our former Example of the *Strasbourg* Clock, though a skilful Artist, admitted to examine and consider it, both without and within, may very well discern that such Wheels, Springs, Weights, and other Pieces of which the Engine consists, being set together in such a coaptation, are sufficient to produce such and such Motions, and such other Effects as that Clock is celebrated for, yet the more he discerns the aptness and sufficiency of the parts to produce the Effects emergent from them, the less he will be apt to suspect that so curious an Engine was produc'd by any casual concurrence of the Parts it consists of, and not rather by the skill of an intelligent and ingenious Contriver; or that the Wheels, and other parts, were of this or that Size, or this or that determinate Shape, for any other reason, then because it pleas'd the Artificer to make them so; though the reason that mov'd the Artificer to employ such Figures and Quantities, sooner then others, may well be suppos'd to have been, that the Nature of his Design made him think them very proper and commodious for its accomplishment, if not better then any other suited to the several Exigencies of it.

If an *Epicurean* should be told, that a Man, after having been for some days really dead, became alive again, I think it will not be doubted, but that he would reject such a Relation as impossible, and therefore too manifestly false to be believed by any Man in his Wits: And yet, according to his Principles, the Man, as well Soul as Body, consisted onely of divers Particles of the Universal Matter, by various Motions brought together, and dispos'd after a certain manner: And consequently, he must ground his perswasion that 'tis impossible to reintegrate the Engine once spoil'd by death, upon this,
That

That as Chance cannot with the least probability be presum'd to have produc'd such a strange Effect; so according to him, there can be no Cause assign'd, knowing and powerful enough, to rally and bring together again the disbanded and scattered parcels of Matter (or substitute other equivalent ones) that together with the remaining Carcase, compos'd the dead Man, so to reunite them to the rest; and lastly, so to place and put into Motion both the one and the other, as were requisite to make a living Man once more result from them. I know that this Example reaches not all the Circumstances of the Controversie we have been debating; but yet, if I mistake not, it will serve the turn for which I propose it: For, not now to insist upon this inference from it, That a considering Man may confidently reject a thing that is not absolutely impossible, provided it be highly incredible; not to insist on this, I say, the thing I aim at in the mention of it, is onely to shew, That such things may possibly be effected by Matter and Motion, as no wise Man will believe to have been produc'd by a bare Agitation of the Particles of Matter, not guided by the superintendency of a Powerful and Knowing Director.

Now that the Atoms, or Particles of Matter of which the World consists, made no agreement with each other to convene and settle in the manner requisite to constitute the Universe, *Lucretius* does not so properly confess, as affirm, in that fore-cited Passage where he judiciously tells us, That

— *Certè neq; consiliis Primordia rerum
Ordine se quæque, atque sagaci mente locarunt:
Nec quos quæque darent Motus pepigere profecto.*

And the thing it self is manifest enough, from the Nature of Atoms confessedly inanimate and devoid of understanding.

So that although we should grant, *Pyrophilus*, the possible
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Emergency of the innumerable Effects we admire in the World, from the various Properties and Coalitions of Atoms, yet still you see the formerly mention'd difficulty (touching the Resulting of All things from Matter left to it self) would recur; and it would as well be incredible that an innumerable multitude of insensible Particles, as that a lesser number of bigger Parcels of Matter, should either conspire to constitute, or fortuitously juggle themselves into so admirable and harmonious a Fabrick as the Universe, or as the Body of Man; and consequently it is not credible that they should constitute either, unless as their motions were (at least, in order to their seminal Contextures and primary Coalitions) regulated and guided by an intelligent Contriver and Orderer of things. And I should so little think it a Disparagement to have but so much said of any *Hypothesis* of mine, that I suppose I may affirm it, without offending either the most sober, or the generality of the Atomical Philosophers, to whom, and to their Doctrine, my Writings will manifest me to be no otherwise affected then I ought.



ESSAY





ESSAY V.

Wherein the Discourse interrupted by the late Digression, is resumed and concluded.

IT remains now, *Pyroph:* that we at length return into the way from whence the foregoing Digression has, I fear, too long diverted us, and that to prosecute and finish our Discourse, we take it up where we left it and were tempted to digress, namely, at the end of the III *Essay*; betwixt which, and the beginning of this V, all that has been interpos'd may be look'd upon but as a long Parenthesis.

In the third place then I consider, That whether or no it be true which our Antagonists suggest, that there are some things in Nature which tempt Philosophers more than they doe the Vulgar, to doubt or deny a God; yet certainly there are divers things in Nature that do much conduce to the evincing of a Deity, which Naturalists either alone discern, or at least discern them better then other Men: For besides the abstruse Properties of particular Bodies, not discover'd by any but those that make particular Enquiries into those Bodies, there are many things in Nature, which to a superficial Observer seem to have no relation to one another; whereas to a knowing Naturalist, that is able to discern their secret Correspondencies and Alliances, these things which seem to be altogether Irrelative each to other, appear so Proportionate and so Harmonious both betwixt themselves, and in reference to the Universe they are parts of, that they represent to him a very differing and incomparably better Prospect then to another

Man: As he that looks upon a Picture made up of scatter'd and deform'd pieces, beholding them united into one Face, by a Cylindrical Looking-glass aptly plac'd, discerns the skill of the Artist that drew it, better then he that looks onely on the single parts of that Picture, or upon the whole Picture, without the uniting Cylinder. Which brings into my minde, That whereas in the Sacred Story of the Creation, when mention is made of Gods having consider'd the Works of each of the first six Days, at the end of it, it is said of the Work of every Day, *That God saw that it was good* (except of the second Day, because the separation of the Waters was but imperfectly made on that day, and compleated in the next, on which it is therefore twice said, *That God saw that it was good*) whereas, I say, when God look'd upon his Works in particular, it is onely said, *That he saw that they were good*; when He is introduc'd at the close of the Creation, as looking upon, and surveying his Creatures in their Harmony, and entire System, it is emphatically said, *That he saw every thing that he had made, and behold it was very good.* And if *Aristotle* be indeed the Author of the Book *De Mundo ad Alexandrum*, which pass'es for his, and is said to have been Written by him towards the end of his Life, it would not be unworthy our Observation to take notice, how he that in his other Writings is wont to talk of Gods Interest in the Creatures darkly, and hesitantly enough, is wrought upon by the Contemplation of the Universe, as it is an orderly Aggregate or System of the Works of Nature, to make Expressions of the Divine Architect, which are not unworthy of *Aristotle*, though being meerly humane they cannot be worthy of God. Amongst many I shall single out some; and I hope, *Pyrophilus*, you will excuse me, if in this *Essay*, and some of the precedent ones, I do contrary to my custom, employ pretty store of Passages taken out of other Authors. For first, the nature of my Design makes it requisite for me to shew what Opinion the Heathen Philosophers had of the Study of Physiology, and what
Power

Power their Contemplation of Nature had to engage them to Acts of Religion. And next, since divers of the same Passages wherein they had set down their Opinions, contain'd also the Grounds and Reasons of them, whereby they have anticipated much of what we should say upon the same subjects, I was unwilling to deprive you of their pertinent Ratiocinations, or rob them of the Glory of what they had well Written. And this necessary Apology premis'd, let us proceed to consider his Passages; and first, *Restat* (says he) *ut summam de Causa differamus, quæ cunctarum ipsarum vim habet tutricem & continentem, quemadmodum cetera perstrinximus: Flagitii enim instar esset, cum de mundo dicere instituerim, tractatu minus exquisito fortasse, at certe qui sat esse possit ad formulam doctrinæ crassiorē, intactam præcipuam mundi partem principemq; præterire.* And a little after, *Etenim* (says he) *cunctarum quæ rerum natura complectitur, cum servator est Deus, tum vero quæcunque in hoc mundo quoquomodo perficiuntur eorum omnium idem est Genitor: Non sic tamen ipse ut opificis in morem, animalisq; lassitudinem sentientis labore affici possit, ut qui ea facultate utatur, quæ nulli cedat difficultati, cuius ipse vi facultatis omnia in potestate continet, nec minus etiam quæ longius ab ipso videntur esse summa: To which purpose he elsewhere says, Augustius decentiusq; existimandum est, Deum summo in loco ita esse collocatum: Numinis ut tamen ejus vis per universum mundum pertingens, tum Solem, Lunamq; moveat, tum Cælum omne circumagat, simulq; causam præbeat eorum quæ in Terra sunt salutis atq; incolumitatis: And in the same Book he adds, Ut vero summatim loquamur quod in navi Gubernator est, quod in Curru agitator, quod in Choro præcentor, quod deniq; lex in Civitate, & dux in exercitu, hoc Deus est in mūdo. Nisi si hæc tenus interest, quod labor, & motus multiplex illos exercet, & curæ angunt variæ, cum huic illaborata succedunt ōnia, omnis molestiæ expertia. And certainly he that is a stranger to Anatomy, shall never be able to discern in the circulation of the blood, the motion of the Chyle, and the contrivance of all the parts of a humane Body, those*

Arist. de Mundo, Cap. 6:

Ibidem.

Eodem Cap.

Eodem Cap.

Proofs

Proofs, as well as Effects, of an Omniscient *Δημιουργός*, or Artist, which a curious Anatomist will discover in that elaborate and matchless Engine: as I remember, I had occasion not long since to take notice of in the shape of that strange Muscle (the *obturator internus*) which some call from its Figure *Marsupialis*; serving to the motion of the Thigh. For this Muscle seems so made, as if Nature had design'd in it, to manifest, That she is skill'd in the Mechanicks, not onely as a Mathematician that understands the powers of Distance, Weight, Proportion, Motion and Figure; but as an Artificer, or Handy-crafts man, who knows by dextrous Contrivances to furnish the more endanger'd parts of his Work, with what is more useful to make it lasting: There being (to omit other Observables, belonging to that Muscle) a deep notch made in the *Coxendix*, to shorten the way betwixt the two extremities of the Muscle, and make it bear upon the Bone with a blunter Angle. And because the *Tendon* is long, lest, notwithstanding the former provision, it should be apt to fret out upon the edge of the Bone, Nature has provided for it a Musculous piece of Flesh, wherein it is as it were sheath'd, that so it might not immediately bear, and grate upon the Bone; just as our Artificers use to sow Cales of Leather upon those parts of filken Strings, which being to grate upon harder Bodies, were otherwise endangered to be fretted out by Attrition.

And a like skilfulness of Nature in the Mechanical Contrivance of the Parts, is more obviously discernable in the Structure of that admirable Engine, by which such variety of other Engines are made, the Hand: where (not to mention the *Ligamentum latum*, or Wrist-band, that keeps the *Tendons* that move under it from inconveniently starting up upon the Contraction of the respective Muscles) the wonderful perforations that are made through the *Tendons* of the *Musculi per forat*, by those of the *Musculi perforantes*, for the more commodious motion of the Joynts of the Fingers, may conspicuously manifest the Mechanical Dexterity of Nature; as it may her Husbanding

banding (if I may so speak) of her Work, That in a *Fœtus*, whilst it lies in the Womb, because the Lungs are not to be display'd as afterwards, and so the Blood needs not circulate thorow Them from the right Ventricle of the Heart, into the left, for the use of Respiration, as it must in grown Animals, she contrives a nearer way; and by certain short Pipes, peculiar to such young Creatures, she more commodiously performs in them the Circulation of the Blood, proportion'd to their present condition; and afterwards, when the Animal is brought out of the Womb into the open Air, and put upon the constant exercise of his Lungs, these temporary Conduit-pipes little by little vanish. So careful is Nature not to do things in vain.

And therefore I do not much wonder, that *Galen*, though I remember he somewhere (unprovokedly and causelessly enough) derides *Moses*, and seems not over-much inclin'd to make Religious acknowledgements; yet when he comes to consider particularly the exquisite Structure of a humane Body, should break forth into very elevated, and even pathetical Celebrations of God, and tell us, That in his Books, *De usu Partium*, he compos'd Hymns to the Creators praise. And certainly, he that shall see a skilful Anatomist dextrously dissect that admirable part of Man, the Eye, and shall consider the curious Contrivance of the several Coats, Humors, and other Parts it consists of, with all their adaptations and uses, would be easily perswaded, That a good Anatomist has much stronger Invitations to believe, and admire an Omniscient Author of Nature, then he that never saw a Dissection, especially if he should see how all of these concur to make up one Optical Instrument to convey the Species of the visible object to the Optick Nerve, and so to the Brain; as I have, with pleasure consider'd it, in the recent Eye of a Cat (for with keeping, it will grow flaccid) cut cleanly off, where the Optick Nerve enters the *Sclerotis*, and is going to expand it self into the *Retina*, for holding this Eye at a convenient distance betwixt

*Galenus, lib.
30. De usu
Partium.*

betwixt yours and a Candle, you may see the Image of a Flame lively exprest upon that part of the back side of the Eye at which the Optick Nerve enters the above-mention'd *Sclerotis*: Some thing of this kinde we have also shown our Friends with the eyes of dead Men, carefully sever'd from their heads; and with the (dexterously taken out) Crystalline humor of a Humane Eye, we have often read, as with a *Lens* or Magnifying glass. And to assist you in so pleasing a speculation, as that of the Eye, we shall adde, That by reason Ox Eyes are much larger, and much easier to be had then humane ones, we are wont to make much use of them, and to discern some things better in their Coats, we immerse them for a little while in boyling Water, and to be able to consider the form and bigness of the Vitreous and Crystalline humors, better then the fluidity of the one, and the softness of the other are wont to allow Anatomists to do; we have sometimes, by a way hereafter to be set down, speedily frozen Eyes, and thereby have turn'd the Vitreous humor into very numerous and Diaphanous Films (as it were of Ice, and the Crystalline into a firm Substance, but (which perhaps you will wonder at) not Transparent. An eye thus frozen, may be cut along that which Optical Writers call the Optical Axis, and then it affords an instructive Prospect, which we have not been able to obtain any other way. But because, notwithstanding this Expedient in the Eyes of Men, and the generality of Terrestrial Animals, the Opacousness of the *Sclerotis* hinders the Pictures that outward Objects (unless they be lucid ones) make with in the Eye to be clearly discern'd. We think our selves oblig'd to that excellent Mathematician of your Acquaintance, *Pyrophilus*, who, upon some Discourse we had with him concerning this Subject, lately advis'd us to make use of the Eyes of white Rabbits (for if those Animals be of another colour, he says, their Eyes will not prove so fit for our purpose) For having held some of these Eyes at a convenient distance betwixt my Eyes and the Window, I found them to be so transparent, That the

rayes

rayes proceeding from the Panes of Glass, Iron Bars, &c. of the Window, passing through the CrySTALLINE humor, and in their passage refracted, did on the *Retina* exhibit in an inverted Posture, according to the Optical Laws, the contracted, but lively Pictures of those external Objects; and those Pictures, by reason of the transparency of the *Sclerotis*, became visible through it to my attentive Eyes: As in a darken'd Room the shadows of Objects without it, projected on a fine sheet of Paper, may, by reason of the thinness of the Paper, be seen thorow it by those that stand behinde it. By Candle-light we could see little in the bottom of these eyes, but lucid Objects, such as the flame of the Candle, which appear'd tremulous, though inverted; but by Day-light we could manifestly discern in them both the motions of very neighboring Objects, and the more vivid of their colours.

And really, *Pyrophilus*, it seems to me not onely highly dishonorable for a Reasonable Soul to live in so Divinely built a Mansion, as the Body she resides in, altogether unacquainted with the exquisite Structure of it; but I am confident, it is a great obstacle to our rendring God the Praises due to him, for his having so excellently lodg'd us, that we are so ignorant of the curious Workmanship of the Mansions our Souls live in; for not onely the Psalmist, from the consideration of the Divine Art display'd by God, in the moulding and fashioning his Body in the Womb, takes a just occasion to celebrate his Maker, *I will praise thee* (says he) *because I am fearfully and wonderfully made, marvellous are thy works, and that my Soul knoweth right well: My substance was not hid from thee, when I was made in secret, and curiously wrought* (with as much curiosity as Tapstry or Embrodery, as the Hebrew *Rukkamt* seems to import) *In the lowest parts of the Earth, thine eyes did see my substance, yet being unperfect; and in thy Book all my members were written, which in continuance were fashioned, when as yet there were none of them.* But even from Galen himself Anatomical Reflections have been able to extort Expressions

Psal. 139 v. 14,
15, 16.

Galen de plac:
Hip: & Plat:
Libr: 7.

of Devotion: Cum igitur (says he) quod in omnibus recte fit, omnes ad artem referunt, quod autem in uno, aut duobus non ad artem, sed fortunam; merito ex nostri structura corporis licet admirari summam artem, equitatem, & vim naturæ, quæ nos construxit. Constat siquidem corpus nostrum ex ossibus pluribus quam ducentis, ad singula ossa vero pervenit nutriens vena; sicut ad musculos: cum hæc etiam arteria, & Nervi; pariaq; admissi sunt, & animo similia in dextra animantis parte sita, iis quæ in altera sunt; Os ossi, Musculus musculo, Vena vena, Arteria arteria, ac Nervus nervo; idq; exceptis visceribus, atque nonnullis particulis quæ habere propriam descriptionem videntur. Duplices itaq; corporis nostri partes, omnino inter se sunt similes, & magnitudine & conformatione, sicuti & consistentia quam voco juxta mollitiem, duritiemq; differentia. Quemadmodum igitur de Humanis effectibus judicium facimus, ex navi summa arte constructa cognoscentes peritiam artificis, ita etiam de Divinis facere convenit, corporisq; nostri Opificem admirari, quicumq; tandem is Deorum existat, etiam si eum non videmus.

Perhaps it may be truly said yet further, That although in humane Bodies, many Wonders, as we have lately mention'd, have been discover'd to us by Anatomy, yet Anatomy it self has not discover'd to us all the Wonders to be met with in a humane Body, nor will detect them, till Anatomists be skill'd in some other things over and above that of dexterously Dissecting: For it seems very probable, that the excellent contrivance of some parts will never be fully apprehended, without a competent knowledge of the Nature of those Juices that are to pass thorow them, and some of them receive their beginning or some alteration in them; And the Nature of these Juices will scarce be exactly known, without some skill in divers parts of Physiology, and especially in Chymistry. Besides, the reason of the Origination, Shape, Bulk, Length, Progress, and Infection of each particular Muscle, can hardly be well accounted for, without some skill in the Principles of Mechanicks, and in the nature and properties of Leavers, Pulleys,

leys, &c. Moreover, there is a certain Harmonious Proportion betwixt the parts of a humane Body, in reference both to the whole, and to one another, which is not wont to be heeded by Anatomists, but much taken notice of by Statuaries and Painters: For they reckon, that when a Mans Arms are display'd, the distance betwixt his middle Fingers is equal to the height of his Body; so they reckon sometimes seven, sometimes eight lengths of the Head, to the length of the Body, and four times the length of the Nose to that of the Head, as three times the same length to that of the Face: And divers such Observations we have met with among them, which we shall not now insist on, but rather tell you, That without some skill in Opticks, it will be hard for an Anatomist to shew the Wisdom of God in making the Crystalline humor of the Eyes of Men, onely of a somewhat convex or lenticular form, rather then as those of Fishes of an almost perfectly Spherical one. Nor do I remember that in Anatomy Schools I have heard any account given of this difference, which yet tends much to manifest the Wisdom of the Author of Nature, who has so excellently suited the Eyes of Animals to the several parts of the Universe he design'd them to inhabit. For Men, and other Terrestrial Animals living in the Air, the Beams of Light, reflected from visible Objects, and falling over the *Cornea* and the Aqueous humor, do necessarily suffer a Refraction there, as coming from the Air, which is a thinner *Medium* into a thicker, and so there needs the less of further Refraction to be made by the Crystalline humor, and consequently its Figure needs to be but moderately convex; whereas Fishes living constantly in the Water, the *Medium*, through which they see things, is almost of a like thickness with the *Cornea* and Aqueous humor; so that there being little or no Refraction made in their Eyes but by the Crystalline itself, it was necessary that that should be exceedingly convex, that it might make a very great Refraction, and thereby unite the Beams nearer at hand; which if the Crystalline were less

convex, would tend to a point of Concourse beyond the *Retina*, and consequently paint on it but a languid and confus'd Picture of the Object they should represent.

Lib. 3. De usu
Part.

As for *Paracelsus*, certainly he is injurious to Man, if (as some eminent Chymists expound him) he calls Man a Microcosm, because his Body is really made up of all the several kinds of Creatures the Macrocosm or greater World consists of, and so is but a Model or Epitomy of the Universe: For (to omit that the Antients (as *Galen* informs us) gave the Title of Microcosms to Animals in general) 'tis the Glory and Prerogative of Man, that God was pleas'd to make him not after the Worlds Image, but His own. On which occasion, give me leave to tell you, That however, the consideration of the dignity conferr'd on us in the Image of God, (in whatever that Image be resolv'd to consist) should, methinks, be some engagement to us to look upon our selves as belonging unto God; As our Saviour, from the Image of *Cæsar* stamp't upon a Coyn, pronounc'd it fit to render unto *Cæsar* the things of *Cæsar*, and to God, those of God.

In the fourth place, I consider that the universal experience of all Ages manifests, That the contemplation of the World has been much more prevalent to make those that have addict-ed themselves to it, Believers, then Denyers of a Deity: For 'tis very apparent that the old Philosophers, for the most part, acknowledg'd a God, and as evident it is by their want of revelation, by many Passages in their Writings, and by divers other things not now to be insisted on, That the consideration of the works of Nature, was the chief thing that Induc'd them to acknowledge a Divine Author of them. This Truth I could easily make out, were I at leisure to transcribe Testimonies, which, because I am not, I shall content my self to mention to you one, which may well serve for many, it being a Confession made by *Aristotle*, or whatever other Learned Philosopher it was, who writ the Book *De Mundo*, That Gods being the Architect and Upholder of the World, was the general belief of the

the Ages that preceded his: *Vetus* (says he) *sermo est à majoribus proditus, inter omnes homines, universa tum ex Deo tum per Deū constituta fuisse, atq; coagmentata, nullamq; naturam satis instructam ad salutem esse posse, quæ citra Dei præsidium, sua ipsa demum tutela permissa sit:* And as for both the Opinion of that eminent Author himself, and the Grounds of it, he speaks of God and the Creation almost in the terms of *S^t Paul*: *Proinde* (says he) *hæc etiam de Deo sentienda nobis sunt, illo quidem, si vim spectes, Valentissimo, si decorem, Formosissimo, si vitam Immortali, deniq; si virtutem Præstantissimo. Quapropter cum sit inconspicibilis natura omni interitura, ipsis nihilominus ipse cernitur ab operibus, atq; ea quidem quæ aëre quoquomodo affecto, quæ in terra, quæ in aqua, ea certe Dei opera esse merito dixerimus; Dei inquam opera, cum imperio summo Mundum, ac pro potestate obinentis, Ex quo deo ut inquit Empedocles Physicus.*

Libro de Mundo, Cap. 6.

Alibi eodem Cap.

*Omnia quotquot erunt, quot sunt præsentia, quotq;
Orta fuere antehac stirpes, hominesq; feraq;
Inde etiam volucres, piscesq; humoris Alumni.*

And those few Philosophers (if ever there have been any at all) that have been really Atheists, are no ways considerable for their number, in respect of those that have asserted a Deity; and their Paradoxes have been lookt upon as so Irrational, that as soon as they have been propos'd, they have been disdainfully rejected and condemn'd by all the rest of Man-kinde, who have look'd upon the Patrons of them as Monsters rather than Philosophers. And if there be, at this day, any Nations (as Navigators inform us there are in *Brasil*, and some other parts of the *Indies*) that worship no God, they consist not of Naturalists, but Bruit, and Irrational Barbarians, who may be suppos'd rather to ignore the Being of God, then deny it; and who at least are little less strangers to the Mysteries of Nature, then to the Author of it. And if it be a Truth that there

are

Pſalm C. 3.

Judg. V. 20.

Cap. 6.

are really ſuch Atheiſtical People, it may ſerve to recommend to us the Study of Phyſiology, by ſhewing us, That without the help of any ſuch innate belief, or perſwaſion of a God, as is ſuppoſ'd connatural to Man, Reason exerciſ'd upon the Objects the Creation preſents us with, is ſufficient to convince Philoſophers of a Deity; and indeed ſuch a care has God taken, to make his Being conſpicuous in his Creatures, that they all ſeem loudly and unanimoſly to ſpeak to their attentive Conſiderers, in the Pſalmiſts Language, *Know ye that the Lord, he is God: 'tis he that hath made us, and not we our ſelves*: And as it is ſaid, *That the Stars in their courſes fought againſt Siſera*, ſo it may be truly ſaid, That not onely the Stars, but all the reſt of the Creatures do in their courſes fight againſt the Atheiſts, by ſupplying an unprejudic'd Conſiderer of them with Weapons fit to over-throw his impious Error. To which purpoſe, I remember *Ariſtotle*, in his Book *De Mundo*, makes uſe of a pretty Simile to declare the conſpicuousneſs of the Creator in his Creatures: *Fama eſt* (ſays he) *Phidiam illum ſtatuarium, quum Minervam illam qua eſt in Arce, coagmentaret, in medio ejus ſcuti faciem ſuam expreſſiſſe, oculosq; fallenti artificio ita devinxiſſe ſimulachro, eximere ut inde ipſam ſiquis cu- peret, minime poſſet, aliter quidem certe, quam ut ipſum ſolveret ſimulachrum, opusq; ejusmodi compactile confunderet*; *Hanc eandem rationem Deus habet in Mundo utpote qui univerſorum coagmentationem coherentem cohibeat & coarctet, incolumitatemq; Univerſitatis conſervet*; *Niſiquatenus non medio ille loco in Terra ſcilicet, ubi Turbida Regio eſt, ſed in excelſo ſitus eſt, purus ipſe in puro loco.*

But to declare how Atheiſts may be reduc'd either to confeſs a firſt Cauſe, or to offer violence to their own Faculties, by denying things as certain as thoſe, which 'tis apparent that (in other caſes) themſelves firmly aſſent to, would require a Diſcourſe too large to be proper to be proſecuted here; and therefore if I have not, in another Treatiſe, an opportunity of inſiſting on that ſubject, I muſt content my ſelf to refer you
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for further satisfaction on it, to the Writers of Natural Theology.

Nor does Physiology barely conduce to make Men believe the existence of a Deity, but admire and celebrate the Perfections of it: And the noblest Worship from that greater part of the World, to which God did not vouchsafe any explicate and particular Revelation of his Will, hath been paid Him, by those whom the beauty of this goodly Temple of the Universe, transported with a rational Wonder at the Wisdom, Power, and Goodness of the Divine Architect. And this kinde of Devotion being commonly proportionate to the discoveries of Nature that begot it, it needs not seem strange, that divers of the best Philosophers amongst the Heathens, should be the greatest Celebrators of God: And 'twas therefore perhaps not without cause that the *Indian* Gymnosophists, the *Persian Magi*, the *Egyptian* Sacrificers, and the old *Gauls Druides*, were to their Peoples both Philosophers and Priests; and that in divers Civiliz'd Nations, Philosophy and Priesthood were so ally'd, that those whose Profession should give them most interest in the definition of Man, made a more strict profession of celebrating and praising God. I might easily, with divers Instances, manifest how great a Veneration the Study of the Creatures has given Philosophers, for those Attributes of God that are stamp'd upon them, and conspicuous in them: But my willingness to hasten to the more Experimental part of what I have to say concerning the usefulness of Physiology, makes me content my self to present you with a couple, or a leash of Authorities, for proof of what has been alledg'd; the first shall be of *Galen*, in his third Book *De usu Partium*, where treating of the Skin that invests the sole of the Foot: *Cutem ipsam* (says he) *non laxam, aut subtilem, aut mollem, sed constrictam, & mediocriter duram, sensilemque, ut non facile pateretur subdidit pedi sapientissimus Conditor noster: Cui commentarios hos, ceu hymnos quosdam compono, & in eo pietatem esse existimans, non si Taurorum* ἐκταβύβας *ei plurimus quis-*

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piam sacrificarit, & casias aliq³, sexcenta unguenta suffumigarit: Sed si noverim ipse primus deinde exposuerim aliis quanam sit ipsius Sapientia, quæ Virtus, quæ Providentia, quæ Bonitas; ignorantia quorum summa Impietas est, non si à sacrificio abstinereas. Quod enim cultu convenienti exornavit omnia, nulliq³ bona inviderit id perfectissima Bonitatis specimen esse statuo, Invenisse autem quo pacto omnia adornarentur summa Sapientia est, at effecisse omnia quæ voluit Virtutis est invicta. To which Illustrious Passage he annexes much more, worthy of Galens Pen, and your perusal.

To this let me adde, in the second place, that of *Hermes Trismegistus*, almost at the very beginning of his first Book, Englished by Dr. Everard: He that shall learn and study the things that are, and how they are ordered and governed, and by whom, and for what cause, or to what end, will acknowledge thanks to the Work-man, as to a good Father, an excellent Nurse, and a faithful Steward; and he that gives Thanks shall be Pious or Religious, and he that is Religious shall know both where the Truth is, and what it is; and learning that, he will be yet more and more Religious: To which I cannot but adde a resembling Passage of that great Hermetical Philosopher (as his Followers love to call him) *Paracelsus*: *Oppido* (says he) *admirabilis, in suis Operibus, Deus est; à quorum contemplatione nec interdiu, nec noctu desistendum, sed jugiter illorum indagationi vacandum est, Hoc enim est ambulare in Viis Dei.* All which bears witness to, and may, in exchange, receive Authority from that remarkable passage of that Great and Solid Philosopher, *Sir Francis Bacon*, who scruples not somewhere to affirm, "That it is an assured Truth, and a conclusion of Experience, That a little or superficial taste of Philosophy, may, perchance, incline the minde of a Man to Atheism, but a full Draught thereof, brings the Minde back again to Religion. For in the entrance of Philosophy, when the Second Causes, which are next unto the Senses, do offer themselves to the Minde of Man, and the Minde it self cleaves unto them, and dwells there,

Paracel: de Mineral; Tract. 1.

Sir Francis Bacon Advan: of Learning, Lib. 1.

there, a forgetfulness of the Highest Cause may creep in: But when a Man passeth further, and beholds the Dependency, Continuation, and Confederacy of Causes, and the Works of Providence, then according to the Allegory of the Poets, he will easily believe that the highest Link of Natures Chain must needs be tyed to the foot of *Jupiters* Chair; or (to speak our Chancellors thoughts more Scripturally) That Physiology, like *Jacobs* Vision, discovers to us a Ladder, whose top Gen. 28. reaches up to the foot-stool of the Throne of God: To which he deservedly addes, *Let no Man, upon a weak conceit of sobriety, or ill-applied moderation, think or maintain that a Man can search too far, or be too well studied in the Book of Gods Word, or in the Book of Gods Works, Divinity, or Philosophy: But rather let Men awake themselves, and chearfully endeavor and pursue an endless progress or proficiency in both; onely let them beware lest they apply Knowledge to Swelling, not to Charity; to Ostentation, not to Use: And again, That they do not unwisely mingle and confound these distinct Learnings of Theology and Philosophy, and their several Waters together.*

In the fifth place, *Pyrophilus*, I consider, that when the Divines we are answering suppose Physiology likely to render a Man an Atheist, they do it (as hath above been noted already) upon this Ground, That Natural Philosophy may enable him to explicate both the regular *Phænomena*, and the aberrations of Nature, without having recourse to a first Cause or God. But though this supposal were as great a Truth, as we have endeavored to make it a Mistake, yet I see not why a Studier of Physiology, though never so great a Proficient in it, may not rationally be an utter Enemy to Atheism: For the Contemplation of the Creatures, is but one of the ways of coming to be convinc'd that there is a God; and therefore, though Religion were unable to make use of the Argument drawn from the Works of Nature, to prove the existence of a Deity, yet has the other Arguments enough besides, to keep any Considerate

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Jam. 11.19.

and Impartial Man from growing an Atheist. And here give me leave, for the sake of these Divines, to observe, That though the Devils be Spirits, not onely extreamly knowing in the Properties of Things (by their hidden skill in Physioly, by which they teach Magicians, and their other Clients, to do divers of the strange things for which they are admired) But also unmeasurably proud, and willing to pervert their knowledge to the cherishing of Atheism; yet St. James informs us, *That they themselves believe there is a God, and tremble at him*; which argues, either that skill in Natural Philosophy does not necessarily lead to Atheism, or that there are other Arguments, besides those drawn from Science, sufficient to convince the most refractory of the existence of a Deity.

But not to insist on any thing of this nature, nor so much as to mention what proofs the consideration of our own Minds, and their in-bred Notions, may afford us of a Deity, I shall content my self to minde you, That the several Patefactions which God has been pleas'd to make of himself, to Man especially, those made by seasonably accomplish'd Prophecies, and by Miracles, do not onely demonstrate the Being, but the Providence, and divers of the Attributes of God. And indeed, methinks, the Divines we reason with may well allow these Patefactions to be capable of evincing the existence of a God, since they are sufficient, and, for ought I know, the best Arguments we have to convince a rational Man of the truth of the Christian Religion. For the Miracles of Christ (especially his Resurrection) and those of his Disciples, by being Works altogether supernatural, overthrow Atheism; and being owned to be done in Gods Name, and to authorize a Doctrine ascrib'd to his Inspiration; his Goodness, and his Wisdom, permit us not to believe that he would suffer such numerous, great, and uncontrouled Miracles, to be set as his Seals to a Lie, and delude Men little less then inevitably into the belief of a Doctrine not true. And as for the Miracles themselves (especially that

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of Christs Resurrection, so much, and so deservedly insisted on by *Peter* to the Jews, and *Paul* to the Gentiles) the truth of them is so ascertain'd to us by many of the solemnist, and most authentick ways of Attestation, whereby the certainty of Matters of Fact is capable of being satisfactorily made out, that 'tis hard to shew how these Testimonies can be deny'd, without denying some acknowledg'd Principle of Reason, or some other received Notion, which these Contradictors Opinions or Practice manifest them to look upon as a truth. And upon this account, so much might be said to evince the reasonableness of assenting to the Christian Religion, and to shew, that as much may be said for it, as need be said for any Religion, and much more then can be said for any other; that it need be no wonder, that, as Learned Men as ever the World admir'd, have not been many of them Embracers, but some of them Champions of it. But having more fully, in another Treatise, discours'd of this subject, I shall content myself to make this Inference from what has been alledg'd, that since the most Judicious Propugners of Christianity have held and found, that, upon the score of Gods miraculous Revelations of himself, rational Men might be brought to believe the abstruser Articles of the Christian Religion, those Revelations cannot but be sufficient to convince them of so fundamental and refulgent a Truth (which all the others suppose) as that of the existence of God.

In the sixth and last place, I will here adde (on this occasion) that an insight into Physiological Principles, may very much assist a Man to answer the Objections of Atheists, against the Being of a Deity, and the Exceptions they make to the Arguments brought to prove that there is one: For though it has long been the custom of such Men, to talk as if themselves; and those of their minde, were not alone the best, but almost the onely Naturalists; and to perplex others with pretending, that, whereas it is not conceiveable how there can be a God,

all things are by the Principles of the Atomical Philosophy, made clear and facil. Though this, I say, have long been us'd among the Opposers of a Deity, yet he that not regarding their confidence, shall attentively consider the very first Principles of things, may plainly enough discern, that of the Arguments wherewith Natural Philosophy has furnish'd Atheists, those that are indeed considerable, are far fewer then one would readily think; and that the difficulty of conceiving the Eternity, Self-existence, and some other Attributes of God (though that afford them their grand Objection) proceeds not so much from any absurdity belonging to the Notion of a Deity, as such; as from the difficulty which our dim humane Intellects finde to conceive the Nature of those first Things (whatever we suppose them) which, to be the Causes of all others, must be themselves without cause: For he that shall attentively consider, what the Atomists themselves may be compell'd to allow concerning the Eternity of Matter, the Origine of local Motion (which plainly belongs not to the Nature of Body) the Infinity or Boundlessness of space, the Divisibleness or non-Divisibility of each Corporeal Substance into infinite Material Parts, may clearly perceive that the Atomist, by denying that there is a God, cannot free his Understanding from such puzzling Difficulties as he pretends to be the Reasons of his Denyal. For instead of one God, he must confess an infinite number of Atoms to be Eternal, Self-existent, Immortal, Self-moving, and must make Suppositions, incumbred with Difficulties enough to him that has competently accustomed his Thoughts to leave Second Causes beneath them, and contemplate those Causes that have none. But I am unwilling to swell this Essay, by insisting on such Considerations as these, especially since you may finde them more aptly deduc'd in other Papers, some of which treat of the Truth of Christian Religion, and others are design'd for the Illustration of some things in this
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& the fore-going Essays. For I must confess to you, *Pyrophilus*, that by reason of the sundry Avocations, I have been so diverted from proposing some of the Reasons I have employ'd, to their best advantage, that I my self, at another time, could have both mention'd them with lesser disadvantage, and have added divers others: And therefore I have not onely had thoughts of enlarging upon some Passages of our past Discourse, but I long since made a Collection (though it be not now in my power) of Observations, and Experiments to elucidate a Point in one of those Discourses, whereby may be enervated one of the three chief Physiological Reasonings, that I have met with among the Atheists.

Upon consideration of all the Premises, I confess, *Pyrophilus*, that I am enclined to think there may, perhaps, be more cause to apprehend, that the delightfulness of the Study of Phisiology should too much confine your Thoughts and Joys to the Creatures, then that your Proficiency in it should bring you to dis-believe the Creator: For I have observ'd it to be a fault, incident enough to Ingenious Persons, to let their mindes be so taken up, and, as it were, charm'd with that almost infinite variety of pleasing Objects, which Nature presents to their Contemplation, that they too much dis-relish other Pleasures and Employments, and are too apt to undervalue even those wherewith the improv'd Opportunities of serving God, or holding Communion with Him, are capable of Blessing the Pious Soul.

But, *Pyroph*: though comparatively to Fame, and Mistresses, and Baggs, and Bottles, and those other transient, unsatisfactory, (in a word) deluding Objects, on which the greatest part of mistaken Mortals, so fondly dote, the entertaining of our Noblest Faculties, with Objects suited to them, and proper both to gratifie our Curiosity, and to enrich our
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understandings, with variety of acceptable and useful Notions, affords a satisfaction that very well deserves the choice and preference of a rational Creature: Yet certainly, *Pyrophilus*, as God is infinitely better then all the things that he has made, so the Knowledge of Him is much better then the knowledge of them; and he that has plac'd so much delightfulness in a Knowledge, wherein he allows his very Enemies to become very great Proficients, has sure reserv'd much Higher, and more contenting Pleasures to sweeten and endear those Disclosures of Himself, which He vouchsafes to none but those that love Him, and are lov'd by Him.

And therefore, *Pyrophilus*, though I will allow you to expect from the Contemplation of Nature a greater satisfaction, then from any thing you need decline for it, yet I would not have you expect from it any such satisfaction as you may entirely acquiesce in, for nothing but the enjoyment of Him that made the Soul for Himself can satisfy it, the Creatures being as well incapable to afford us a compleat Felicity by our Intellectual Speculations of them, as by our sensual Fruitions of them; for though the knowledge of Nature be preferable by odds to those other Idols which we have mention'd, as inferior to it, yet we here attain that knowledge, but very imperfectly, and our acquisitions of it cost us so dear, and the Pleasures of them is so allay'd with the disquieting Curiosity they are wont to excite, that the wisest of Men, and greatest of Philosophers among the Antients, scruples not, upon his own experience, to call the addicting of *ones heart to seek and search out by Wisdom, concerning all things that are done under the Heaven, a sore travel given by God to the sons of Men, to be exercis'd* (or, as the Original hath it, *to afflict themselves*) *therewith*: And the same experienc'd Writer elsewhere tells us, *That he that encreases knowledge, encreases sorrow.* And 'twas perhaps for this reason that *Adam* was form'd out of Paradise, and afterwards by God brought into it, to intimate, That
Felicity

Ecclef. 1.13.

Ecclef. 1.18.

Felicity is not a thing that Man can acquire for himself, but must receive as a free gift from the liberal Hand of God: And as the Children of the Prophets sought translated *Elias* with very great diligence, but with no success, so do we as Fruitlessly as Industriously, seek after perfect Happiness here, both they and we, missing of what we seek for the same reason; because we seek for that on Earth, which is not to be found but in Heaven: And this I forewarn you of, *Pyrophilus*, not at all to discourage you from the study of Physiology, but to keep you from meeting with that great Discouragement of finding in it much less of satisfaction than you expected, and over-great expectation from it, being one of the disadvantageous Circumstances with which it is possible for any thing to be enjoyed.

But at length, *Pyrophilus*, though late, I begin to discern into how tedious a digression my zeal for Natural Philosophy, and for you, has mis-led me, and how it has drawn from my Pen some Passages, which may seem to relish more of the Preacher, than the Naturalist; yet I might alledge divers things to justify, or, at least, extenuate what I have done: As first, That if in making this Excursion I have err'd, I have not done so without the Authority of great Examples; for not onely *Seneca* doth frequently both season his Natural Speculations with Moral Documents and Reflections, and owns, that he purposely does so, where he says, *Omni-
nibusq; sermonibus aliquid salutare miscendum est, cum imus per
Occulta Natura, &c.* but even *Pliny* (as far as he was from being guilty of over-much Devotion) does from divers Passages in his Natural History, allow himself to take occasion to inveigh against the Luxury, Excesses, and other Epidemical Vices of his time. And I might next represent, that perhaps the endeavoring to manifest, that the knowledge of the Creatures should, and how it may be referr'd to the Creators Glory, is not altogether impertinent to the design I have of promoting
Physio-

2 Kings cap. 23

*Seneca Nat:
Quest: lib. 2:
cap. 59.*

Physiology, for it seems consonant both to Gods Goodness, and that repeated Axiome in the Gospel, which tells us, *That he that improves his Talents to good uses, shall be intrusted with more*, That the imploying the little Knowledge I have in the service of Him I owe it to, may invite Him to encrease that little, and make it less despicable. And perhaps it is not the least cause of our ignorance, in Natural Philosophy it self, that when we study the Great Book of Nature, call'd *The Universe*, we consult, peradventure, almost all other Expositors to understand its Mysteries, without making any address for instruction to the Author, who yet is justly stil'd in the Scripture, *That Father of Lights* (in the plural Number) *from whom descends every good and every perfect Gift*, not onely those supernatural Graces, that relate to another World, but those intellectual Endowments, that qualifie Men for the prosperous Contemplation of this: And therefore in the Evangelical Prophet, he is said, to instruct even the Plough man, and teach him the skill and understanding he displays in his own Profession. And though I dare not affirm, with some of the *Helmontians* and *Paracelsians*, that God discloses to Men the Great Mystery of Chymistry by Good Angels, or by Nocturnal Visions, as he once taught *Jacob*, to make Lambs and Kids come into the World speckled, and ring-streaked; yet perswaded I am, that the favor of God does (much more then most Men are aware of) vouchsafe to promote some Mens Proficiency in the study of Nature, partly by protecting their attempts from those unlucky Accidents which often make Ingenuous and Industrious endeavors miscarry; and partly by making them dear and acceptable to the Possessors of Secrets, by whose Friendly Communication they may often learn that in a few Moments, which cost the Imparters many a Years toyl and study; and partly too, or rather principally, by directing them to those happy and pregnant Hints, which an ordinary skill and industry may so improve as to do such things, and make

Jam. 1. 17.

Isa. 28. 25, 26.

Gen. 31.

make such discoveries by virtue of them, as both others, and the person himself, whose knowledge is thus encreased, would scarce have imagin'd to be possible: And in effect, the chiefest of the Secrets that have been communicated to me, the Owners have acknowledg'd to me to have been attain'd, rather, as they were pleas'd to speak, by accidental Hints, then accurate Enquiries: confessions of this nature I have divers times met with in the Writings of the more Ingenious of the Chymists, and of other Naturalists, and by one of these accidental Hints, of late, the acute and lucky *Pecquet* was directed to finde the newly discovered *Lactea Thoracica*, as before him *Asellius* found without seeking, as himself confesseth, the *Lactea Mesenterica*; and by an accident too (as himself hath told me) did our industrious Anatomist, Dr. *Folius*, first light upon those yet more freshly detected Vessels, which afterwards the Ingenious *Bartholinus*, without being inform'd of them, or seeking for them, hath met with, and acquainted the World with, under the name of *Vasa Lymphatica*; and the two great Inventions of the later Ages, Gunpowder, and the Loadstones respect unto the Poles, are suppos'd to be due rather to Chance, then any extraordinary skill in Philosophical Principles (which indeed would scarce have made any Man dream of such extravagant Properties, as those of Magnetick Bodies) As if God design'd to keep Philosophers humble, and (though he allow regular Industry, sufficient encouragement, yet) to remain Himself dispenser of the chief Mysteries of Nature.

To what hath been represented, *Pyrophilus*, I might adde much morero excuse my Excursions, if I were not content to be beholden to you for a Pardon, and to invite you to grant it me, I shall promise you to be very careful not to repeat the like offence; and whereas most Chymical Writers take occa-

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fion from almost every Discovery or Process they acquaint us with, to digress and wander into tedious, and too often dull and impertinent Theological Reflections or Sermons. I have troubled you with almost all that I have to say (to you) of Theological at once, and I have endeavored to sprinkle it as far as the subject would allow me, with some Passages Experimental. And indeed I should not at all have engag'd my self into so long a Discourse of the not onely Innocency, but Usefulness of the knowledge of Nature, in reference to Religion, but that I could not acquiesc in what I had met with on that subject in any of the Writers I have perus'd, Divines being commonly too unacquainted with Nature, to be able to manage it Physiologically enough; and Naturalists commonly esteeming it no part of their work to treat of it at all. And therefore I scruple not to confess freely to you, *Pyrophilus*, that, as I shall think my self richly rewarded for all the ensuing Essays, if the past Discourse but prove so happy as to bring you to value, and to make the Religious use of the Creatures recommended to you in it: So I had rather any of my Papers should be pass'd by unperused, then those parts of these Essays that treat of that use. And indeed 'tis none of the least of Satisfaction, I hope, to derive from my Physical Composures, that by premising before them the now almost finish'd Discourse, I have done my hearty endeavor to manifest and recommend the true use of all the Discoveries of Nature, which either my Enquiries, or your own, may afford you. And indeed for my part, *Pyrophilus*, I esteem the Doctrine I have been pleading for of that importance, that I am perswaded, That he that could bring Philosophical Devotion into the request it Merits, should contribute as much to the solemnizing of Gods Praises, as the Benefactor of Choristers and Founders of Chauntries, and not much less then *Dauids* so celebrated

brated designation and settlement of that Religious Levitical Musick, instituted for the solemn Celebration of God.

For the sensible Representations of Gods Attributes to be met with in the Creatures, occurring almost every where to our observation, would very assiduously solicit us to admire Him, did we but arightly discern Him in them: And the Impressions made on the Minde by these Representations, proceeding not from a bare (and perhaps languid) whether Belief or Notion of the Perfections express'd in them, but from an actual and operative intuition of them, would excite an admiration (with the Devotion springing thence) by so much the more intense, by how much (it would be) more rational. And sure, *Pyrophilus*, so much admirable Workmanship as God hath display'd in the Universe, was never meant for Eyes that wilfully close themselves, and affront it with the not judging it worthy the speculating. Beasts inhabit and enjoy the World: Man, if he will do more, must study, and (if I may so speak) Spiritualize it: 'Tis the first act of Religion, and equally obliging in all Religions: 'Tis the duty of Man, as Man; and the Homage we pay for the Priviledge of Reason: Which was given us, not onely to refer our selves, but the other Creatures, that want it, to the Creators Glory. Which makes me sometimes angry with them who so busie themselves in the Duties and Employments of their second and superinduc'd Relations, that they will never finde the leisure to discharge that Primitive and Natural Obligation, who are more concern'd as Citizens of any place, then of the World; and both worship God so barely as Catholick or Protestants, Anabaptists or Socinians, and live so wholly as Lords or Counsellors, *Londoners* or *Parisians*, that they will never finde the leisure, or consider not that it concerns them to worship and live as Men. And the neglect of this Philosophical Worship of

God, for which we are pleading, seems to be culpable in Men proportionably to their being qualified, and comply with that invitation of the Psalmist, to *sing Praises* to God *with understanding*, or (the Expression in the Original being somewhat ambiguous) *to sing to him a learn'd Canticle*, as he elsewhere speaks, *to praise him according to his excellent Greatness*. For Knowledge being a gift of God, intrusted to us to glorifie the Giver with it, the Greatness of it must aggravate the neglect of imploying it gratefully; and the sublimest Knowledge here attainable will not destroy, but onely heighten and enoble our admiration, and will prove the Incense (or more spiritual and acceptable part, of that Sacrifice of Praise (for those reflections which their Nature makes onely acts of Reason, their End may make acts of Piety) wherein the Intelligent Admirer offers up the whole World in Eucharists to its Maker. For admiration (I do not say astonishment or surprize) being an acknowledgement of the Objects transcending our Knowledge, the learned the transcendent Faculty is, the greater is the admired Objects transcendancy acknowledg'd: And certainly, Gods Wisdom is much less glorifi'd by the vulgar astonishment of an unlettered Starer (whose ignorance may be as well suspected for his Wonder, as the excellency of the Object) then from their learned Hymns, whose industrious Curiosity hath brought their understandings to a prostrate Veneration of of what their Reason, not Ignorance, hath taught them not to be perfectly comprehensible by them.

And as such Persons have such piercing Eyes, that where a transient or unlearned glance scarce observes any thing, they can discern an adorable Wisdom, being able (as I may so speak) to read the Stenography of Gods omniscient hand; so their skilful Fingers know how to choose, and how to touch those Strings that may sound sweetest to the Praise of their
 Maker

Maker. And on the open'd Body of the same Animal, a skilful Anatomist will make reflections, as much more to the honor of its Creator, then an ordinary Butcher can; as the Musick made on a Lute, by a rare Lutanist, will be preferable to the noise made on the same Instrument by a Stranger unto Melody. And give me leave to tell you, *Pyrophilus*, that such a reasonable Worship (*λογική λατρεία*) of God (to use St. *Paul*'s Expression, though in an other sense) is perhaps a much nobler way of adoring him, then those that are not qualified to practise it, are aware of, and is not improper even for Christians to exercise: For, *Pyrophilus*, it would be considered, That as God hath not by becoming (as the Scripture more then once stiles him) our Saviour laid by his first Relation to us as our Creator (whence St. *Peter* exhorts, even the suffering Christians of his time, to commit their Souls to God under the notion of a Faithful Creator) so neither hath he given up his right to those Intelligent Adorations from us, which become us upon the account of being his rational Creatures; neither are such performances made less acceptable to him by the filial relation into which Christ hath brought us to him, that Glorious relation as well endearing to him our services as our persons.

Rom. 12. 1.

Tim. 1. 17.

Tit. 2. 10.

1 Pet 4. 19.

And let me adde, *Pyrophilus*, that not onely *Galen* (as we have seen already) tells us, That the discerning ones self, and discovering to others the Perfections of God display'd in the Creatures, is a more acceptable act of Religion, then the burning of Sacrifices or Perfumes upon his Altars; and not onely *Trismegistus* forbidding *Asclepius* to burn Incense, tells him, That the Thanks and Praises of Men, are the noblest Incense that can be offered up to God: But God himself (in his written Word) is pleas'd to say, That he that sacrificeth Praise

Hermes
Trismeg. in
Asclep. cap.
15.

(for

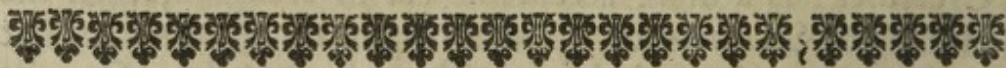
(for so'tis in the Original) *honoreth him*: And the Scripture
 consonantly mentions as a very acceptable part of Religious
 Worship, the *Sacrifice of Praise, and the Calves of our Lips*:
 By offering up of which, we make that true use of the Crea-
 tures, of so referring them to their Creators Glory, that
 (to conclude this Discourse by Crowning it (as it were) with
 that excellent Circle mention'd by the Apostle) *As all things*
are Of him, and Through him, so they may be To him: to
whom be Glory for ever Amen.

Hebr. 13.
15.

Rom. 11.
36.



THE



*The Citations English'd.**P. 24. Seneca de Otio Sap. Cap. 32.*

‘**N**ATURE, conscious to her Self of her own Beauty and
 ‘Artifice, hath given us a curious searching Wit, and to
 ‘so excellent and great shews, begat us to be Spectators; other-
 ‘wise, she would have lost the Fruit of her Self, if to a de-
 ‘sert and solitude she should have set forth so magnificent, so
 ‘famous, so finely drawn, so fair and many ways beautiful
 ‘Pieces. That you may know she would not only have them
 ‘seen, but look’d upon, take notice of the place she hath given
 ‘us: For she hath not onely made Man of an upright Stature,
 ‘but being so made, for better Contemplation, that he might
 ‘follow with his Eye the course of the Stars, from the Rising
 ‘to the Setting, and carry about his Looks, together with his
 ‘whole Body, she hath both given him a tall Head, and placed
 ‘that upon a flexible Neck: Then she shews six Constellations
 ‘by Day, and six by Night; She hath laid open every part of
 ‘her Self, that by those things which she hath offered to the
 ‘Eyes of Man, she might breed a desire of knowing the rest.
 ‘Yet neither do we see all her Works, nor those that we see,
 ‘do we see in those Proportions which they truly have: But our
 ‘Sight, by searching, does open a way unto it self, and lay the
 ‘grounds of Truth, that so Inquiry may pass from things that
 ‘are plain to things that are obscure, and finde somewhat more
 ‘Ancient even then the World it self, See *Sen. de Vita Beata,*
 ‘*Cap. 32.*

‘*Pag. 28.* What does he that contemplates the Nature of
 ‘the Univerſe, of honor unto God? This, that his great Works
 ‘are not without a Witneſs.

P. 28. Sen. 2. de Ira. cap. 27.

‘ We are not the cause of the seasons and returns of Summer and Winter to the World: These have their own Laws, accommodated to the Exercise of Divine Beings: We arrogate too much honor to our selves, if we esteem our selves worthy that such vast Bodies should fulfil such Motions for our sakes.

Ib. Lactantius de Ira Dei, cap. 13.

‘ True is the Opinion of the Stoicks, that say, How that for our sakes the World was made for all things that are, and the World doth by it self generate, are accommodated to the Advantage of Man.

Ib. Seneca de Benef. cap. 23.

‘ The Gods were not careless or unconcern’d in the making of Man, for whom they made so many other Creatures: For Nature design’d us, and drew us out in Idea before she made us.

Ib. Cicero 2. De Nat. Deorum.

‘ And for whose sake then was the World made? For those Beings that have Reason and Intelligence viz. Gods and Men, then whom no Being is more excellent.

P. 43. Piso in Medicina Brasili: Lib. 1.

‘ It is observable, That so many excellent Trees, Shrubs, and an innumerable company of Herbs, some few excepted, should all appear so unlike the Vegetables of the Antiently known World, both in Figure, Leaf and Fruits: And the same Observation is made of Birds, Beasts and Fishes; and of Insects both Flying and Creeping, which are monstrously

P. 47.

“ numerous, and of unspeakable Beauty in Colour, some
 “ known to us, and some unknown.

P. 47. *Piso*, ib. “ You can scarce determine, whether in
 “ these Countries there are found mote Poisons or Anti-
 “ dotes: The Leaves, Flowers, and Fruits of the Herbs
 “ *Tangarack* and *Fuquer*, the two most potent Venoms of
 “ *Brasil*, each of these hath its proper Root for an oppo-
 “ site Antidote—The *Barbarians* apply the Fat and Heads
 “ of Vipers, and the whole Bodies of those Insects, prepa-
 “ red according to Art, that stung or struck any Person, and
 “ that with boldness, and happy success, to the Wounds made
 “ by them, and so by the effects do attempt to prove, That
 “ in every Venom its own Antidote is contained.

P. 49. *Piso*, ib.

“ From the Root *Mandihoca*, that abounds with a very
 “ potent Poison, there is made not onely excellent Aliment,
 “ but even Antidote too.

P. 50. *Ex Augustino*.

“ You ought not to use your Eyes as a Bruit, onely to take
 “ notice of Provisions for your Belly, and not for your
 “ Minde: Use them as a Man: Pry up into Heaven: See the
 “ things made, and enquire the Maker: Look upon those
 “ things you can see, and seek after Him whom you can-
 “ not see, and believe on Him you cannot see, because of those
 “ things you see: And be not like the Horse and Mule, &c.

P. 75. *Epicurus in Epist: ad Herod: in Laertia*.

“ As to the Meteors, you ought not to believe that there
 “ is either Motion, or Change, or Ecclipse, or the rise or
 R setting

' setting of them, because of any superior President, which
 ' doth, or hath so disposed of it, and himself possesses all the
 ' while Happiness and Immortal Life: Wherefore you must
 ' think, that when the World was made, those implications
 ' and foldings of Atoms happen'd, which caused this necessity,
 ' ty, that these Bodies should pass through these Motions.
 ' There are infinite Worlds, some like this, some unlike it:
 ' For since Atoms are infinite (as I newly shewed from the in-
 ' finiteness of the Spaces) some in one, others in others, di-
 ' stant parts of these Spaces far from us, variously concur to
 ' the making of infinite Worlds.

P. 75. *Lucretius, Lib. 5.*

*But how at first, when Matter thus was whirl'd,
 Heav'n, Earth, and Sea, the high and lower World,
 The Sun and Moon, and all were made, I'll shew:
 For sure the first rude Atoms never knew
 By sage Intelligence, and Council grave,
 To appoint the places that all Beings have:
 Nor will I think, that all the Motions here
 Order'd at first by fixt Agreements were,
 But th' Elements that long had beat about,
 Been buffeted, now in, now carry'd out:
 Screw'd into every hole, and try'd to take,
 With any thing, in any place to make
 Somewhat at last; after much time and coyl,
 Motions and Meetings, and a world of toyl
 Made up this Funto. And thus being joyn'd:
 And thus in kinde Embraces firmly twin'd,
 And link'd together, they alone did frame,
 Heav'n, Earth and Sea, and th' Creatures in the same.*

P. 77. *Aristot: Metaph: 12. c. 6.*

‘How shall things be mov’d if there be no actual cause:
‘For Matter cannot move it self, but requires to be mov’d by
‘a *Tectonic* thing-creating Power.

P. 78. *Ciceronis de Thalete.*

‘He said, Water was the Principle of all things, but God
‘was that Intelligence, that made all things out of Water:
‘*Ejusdem de Anaxagorâ*: The delineation and manner of all
‘things he thought to be design’d and made by the power and
‘reason of an infinite Intelligence.

P. 80. *Garcias ab Horto, L. 1. simp: c. 47.*

‘Diamonds, which ought to be brought to perfection in the
‘deepest Bowels of the Earth, and in a long tract of Time,
‘are almost at the top of the Ground, and in three or four
‘Years space made perfect: For if you dig this Year but the
‘depth of a Cubit, you will finde Diamonds; and after two
‘Year dig there, you will finde Diamonds again.

P. 93. *Arist: de Mundo. cap. 6.*

‘It remains that we speak briefly concerning that Cause,
‘whose Power preserves and supports all things, in like man-
‘ner, as we have compendiously handled other matters: For
‘it would seem criminal to pass over the chief part of the
‘World untouch’d, having design’d to discourse of the Uni-
‘verse in a Treatise, which, if less accurate, yet certainly may
‘be sufficient for a rough platform of Doctrine.

Ibid.

‘For God is both the Preserver of all things contain’d in

' the Universe, and likewise the Producer of every thing
 ' whatsoever which is any wise made in this World: Yet not
 ' so as to be sensible of labor, after the manner of a Work-
 ' man, or a Creature, which is subject to weariness; for he is
 ' indued with a power which is inferior to no difficulty, and
 ' whereby he contains all things under his authority, even
 ' such as seem most distant from him.

' 'Tis more magnificent and agreeable to conceive God, so
 ' resident in the Highest Place, that nevertheless his Divine
 ' Energy being diffus'd throughout the whole World, moves
 ' both the Sun and Moon, turns round the whole Globe of
 ' Heaven, and affords the causes of Safety and Preservation
 ' of such things as are upon the Earth.

' But to sum up all in brief; what the Pilot is in a Ship;
 ' what the Driver in a Chariot; what the chief Singer is in a
 ' Dance: finally, what Magistracy is in a Commonwealth,
 ' and the General in an Army, That is God in the World:
 ' Unless there be this difference, That much toil and manifold
 ' cares perplex them; but all things are perform'd by God
 ' without labor or trouble.

P. 98. Galen. de Plac: Hipp: & Plat: Lib. 7.

' Whereas therefore (saith he) all Men ascribe that to Art,
 ' which is made aright in all respects; but that which is so only
 ' in one or two, not to Art, but Fortune: The structure of
 ' our Body gives us cause to admire the excellent Art, exact-
 ' ness and power of Nature which fram'd us. For our Body
 ' consists of above Two hundred Bones; to each of which
 ' tends a Vein for conveying of nourishment (in like manner
 ' as to the Muscles) which is accompanied with an Artery and
 ' a Nerve; and the parts are exactly pairs, and those plac'd
 ' in the right side of an Animal, are wholly alike to those in
 ' the

' the other, Bone to Bone, Muscle to Muscle, Vein to Vein,
 ' Artery to Artery, and Nerve to Nerve; excepting onely
 ' the Bowels, and some other parts, which seem to have a pe-
 ' culiar construction. So that the parts of our Body are
 ' double, and altogether alike among themselves, both in
 ' greatness and shape, as also in consistence, which I place in
 ' the diversity of softness and hardness. As therefore we use
 ' to judge of things made by Men, acknowledging the skill
 ' of a Work-man, by the building of a Ship with extraordi-
 ' nary Art; so also it behoveth to do in those of God, and to
 ' admire the Framers of our Body, whosoever of the Gods he
 ' were, although we do not see Him.

P. 101. Arist: de Mundo, Cap. 6.

' 'Tis an ancient Tradition (saith he) diffus'd amongst all
 ' Mankinde from our Ancestors, That all things were made
 ' and produc'd of God, and by God; and that no Nature can
 ' be sufficiently furnish'd for its own safety, which is left with-
 ' out the support of God, to its own protection.

P. Ead:

' Thus therefore we ought to conceive of God; If we con-
 ' sider His Power, He is Omnipotent; if His Shape, most
 ' Beautiful; if His Life, Immortal; and finally, if His Vir-
 ' tue, most Excellent. Wherefore though undiscernable by
 ' any corruptible Nature, yet He is perceiv'd by such, in
 ' His Works; and indeed those things which are pro-
 ' duc'd in the Air, by any mutation whatsoever; in the
 ' Earth, or in the Water, we ought deservedly to term the
 ' Works of God; which God is the absolute and sovereign
 ' Lord of the World, and out of whom (as saith *Empedocles*
 ' the Naturalist)

All

*All things beginning have, which e'r shall be,
Are present or to come, Plants, Men and Beasts,
And Fowl, and Fish the off-spring of the Sea.*

Pag. 102. Arist: de Mundo, Cap. 6:

'Tis reported, That when *Phidias*, the excellent Statuary,
made the Image of *Minerva*, which is in the Castle at *A-*
thens, he contriv'd his own Picture in the middle of her
Shield, and fastned the Eyes of it to the Statue by so cunning
Workmanship, that if any one were minded to take it away,
he could not do it without breaking the Statue, and disorder-
ing the connection of the Work. After the same manner is
God in the World, retaining and upholding the coherence
of all things, and preserving the safety of the Universe:
Onely, He is not in the midst of it (namely the Earth)
which is a turbulent Region, but in the highest place, which
is sutable to His Purity.

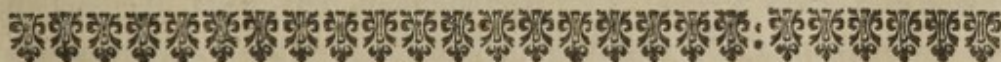
P. 103, 104. Galen de Usu partium.

Our most wise Creator hath plac'd under the Foot a skin,
not loose, or thin, or soft, but close, and of indifferent
hardness and sense, to the end it might not easily suffer injury.
To Him I compose these Commentaries as certain Hymns,
esteeming Piety not to consist in Sacrificing many *Hecatombs*
of Oxen to Him, or burning *Cassia*, and a thousand other
Perfumes; but in this, first to know my self, and then to
declare to others, what His Wisdom, Power, Providence
and Goodness is: the ignorance of which, not the abstaining
from Sacrifice, is the greatest Impiety. For I account it an
evidence of most perfect goodness, that He hath furnish'd all
things with convenient ornament, and deny'd His benefits
to

‘to none. Now, to have devis’d how all things might be
‘handsomly fram’d, is the part of highest Wisdom; but to
‘have made all things which he would, of insuperable Power.

P. 104. *Paracelsus de Mineral: Tract. 1:*

‘God is very admirable in His Works; from the Contem-
‘plation of which we ought not to desist Night or Day, but
‘continually be imploy’d in the inquisition of them. *For this
is to walk in the ways of God.*



...none. Now, to have seen how all things might be
...tionally stand, is the part of highest Wisdom, but to
...made all things which the world of invisible Power.

...for, as we have seen, that the
...God is very desirable in His Works; from the Con-
...tion of which we ought not to desire Night or Day, but
...continually be employed in the perfection of them. For this
...is to be the work of God.

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OF THE
VSEFVLNESSE
OF
Naturall Philosophy.

The Second Part.

*Of its Usefulness to promote the Empire of
Man over things* CORPOREAL.

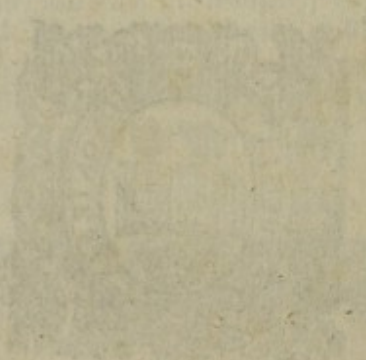


OXFORD,
Printed by HEN: HALL Printer to the University, for RIC: DAVIS.
In the year of our Lord, 1663.

OF THE
VSEFULNESSE
OF
Natural Philosophy.

By the Second

Of the English to promote the Empire of
Mankind by the CORPORA.



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OF THE
USEFULNESSE
OF
Naturall Philosophy.

The Second Part.

The first SECTION.
Of it's Usefulness to PHYSICK.

OF THE
VSEFULNESS
OF
Natural Philosophy.

The Second Part.

Of its Usefulness to PHYSICK.
The first Section.



ESSAY I.

*Containing some Particulars tending to
shew the Usefulness of Natural
Philosophy to the Physiolo-
gical part of Physick.*

After having, in the former part of this Treatise, *Pyrophilus*, thus largely endeavored to manifest to you the advantageousness of Natural Philosophy to the minde of Man, we shall now proceed to speak of its Usefulness, both to his Body and Fortune. For I must ingeniously confess to you, *Pyrophilus*, That I should not have neer so high a value as I now cherish for Physiology, if I thought it could onely teach a Man to discourse of Nature, but not at all to master Her; and served onely, with pleasing Speculations, to entertain his Understanding without at all increasing his Power. And though I presume not to judge of other Mens knowledge, yet, for my own particular, I shall not dare to think my self a true Naturalist, till my skill can make my Garden yield better Herbs and Flowers, or my Orchard better Fruit, or my
Fields

Fields better Corn, or my Dairy better Cheese than theirs that are strangers to Physiology. And certainly, *Pyrophilus*, if we seriously intend to convince the distrustful World of the real usefulness of Natural Philosophy, we must take some such course, as that *Milesian Thales* did, who was by the Antients reckoned among the very first of their Naturalists, and their seven celebrated Wise-men: Of this *Thales* it is reported, That being upbraidingly demanded what advantage the Professors of Astrology could derive from the knowledge of it; he Astrologically foreseeing what Year it would prove for Olives, before any wonted signs of it did appear to Husbandmen, Ingrossed, by giving earnest, the greater part of the Olives, which the next Season should afford to *Chios* and *Miletus*; And being thereby enabled, when most Men wanted Oyl, to sell his at his own rates, he made advantage enough of his skill, to let his Friends see, That Philosophers may have the acquisition of Wealth more in their power than in their aim.

Me thinks, it should be a disparagement to a Philosopher, when he descends to consider Husbandry, not to be able, with all his Science, to improve the precepts of an Art, resulting from the lame and unlearned Observations and Practice of such illiterate Persons as Gardeners, Plow-men, and Milk-maids. And indeed, *Pyrophilus*, though it be but too evident, that the barren Philosophy, wont to be taught in the Schools, have hitherto been found of very little use in humane Life; yet if the true Principles of that fertile Science were thorowly known, consider'd and apply'd, 'tis scarce imaginable, how universal and advantagious a change they would make in the World: For in Man's knowledge of the nature of the Creatures, does principally consist his Empire over them. (his Knowledge and his Power having generally the same limits) And as the Nerves, that move the whole
Body,

Body, and by it, that great variety of Engines imployed by Man on his manifold occasions, proceed from the Brain; so all the operations, by which we alter Nature and produce such changes in the Creatures, flow from our knowledge of them. Theological inquiries excepted, there is no Imployment wherein Mankind is so much and so generally concern'd, as 'tis in the study of Natural Philosophy. And those great Transactions which make such a noise in the World, and establish Monarchies or ruine Empires, reach not to so many Persons with their influence, as do the Theories of Physiology.

To manifest this Truth, we need but consider, what changes in the Face of things have been made by two Discoveries, trivial enough; the one being but of the inclination of the Needle, touched by the Load-stone, to point toward the Pole; the other being but a casual Discovery of the supposed antipathy between Salt-Peter and Brimstone: For without the knowledge of the former, those vast Regions of *America*, and all the Treasures of Gold, Silver, and Precious Stones, and much more Precious Simples they send us, would have probably continued undetected; And the latter, giving an occasional rise to the invention of Gunpowder, has quite alter'd the condition of Martial Affairs over the World, both by Sea and Land. And certainly, true Natural Philosophy is so far from being a barren speculative Knowledge, that Physick, Husbandry, and very many Trades (as those of Tan-ners, Dyers, Brewers, Founders, &c.) are but Corollaries or Applications of some few Theorems of it.

If I had not a great respect for the Great *Hippocrates*, I should venter to say, That some of those rigid Laws of *Draco* (whose severity made Men say, That they were written in Blood) have, perhaps, cost fewer Persons their Lives, than that one Aphorism of *Hippocrates*, which teaching, *That if a*

teeming Woman be let Blood, she will miscarry, has for divers Ages prevail'd with great numbers of Physitians, to suffer multitudes of their Female Patients to die under their hands, who might propably have been rescued by a discreet Phlebotomy, which experience has assured us (whatever the close of * the Aphorism says to the contrary) to have been sometimes not onely safely, but usefully employed, even when the Infant is grown pretty big. But my respect for so great a Person as Hippocrates, makes me content it should be thought, That till of late, Physitians have for the most part mistaken their Dictators meaning in this Aphorism, provided it be granted me, That through this mistake numbers of teeming Women have been suffered to perish, who might probably, by the seasonable loss of some of their Blood, have prevented that of their Lives.

* Hippo.

Apho 31.

lib. 5.

τοῦ ἐν

γαστρὶ ἄχρη,

φλεβοτομῇ

οὐ ἐκπυρῶν

τὴν μήτραν

εἰ μὴ ζῶν

εἴη τὸ

ἐμβρυον.

Comment: in

Aph: 1. lib. 1.

And if an Error, which occasion'd onely a fault of omission, hath been so prejudicial to Man-kinde, I suppose you will readily grant that those Errors of Physitians, that are apt to produce faults of commission, and rash attempts, may prove much more hurtful. And so much I finde to be acknowledg'd by Galen, in that honest and excellent Passage of his, in his Comment upon the Aphorisms, where having mention'd the danger of trying conclusions upon Men, by reason of the nobleness of the Subject; and having added, That the Physitians Art is not like that of a Potter, a Carpenter, or the like, where a Man may freely try what he pleases to gratifie his curiosity, or satisfy himself about his Notions, because that if he spoils (for instance) the Wood he works on, no Body is in danger'd by his miscarriage: He thus concludes, *In corpore autem Humano ea tentare, quæ non sunt experientium comprobata periculo non vacat; cum temeraria experientia finis sit totius Animantis internecio.*

And indeed, since the Physitian borrows his Principles of

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the Naturalist, I cannot but somewhat admire to see divers Persons, who are by themselves and others thought such wise Men, think the study of Natural Philosophy of small concernment: for when by their Policy or good Fortune they have acquired never so much Wealth or Power, and all other transitory Goods, and are blest with Children to inherit them, if the Principles of Natural Philosophy be mis-laid, we oftentimes see the ignorance or the mistake of a Doctor, deprive them of all at once, and shew how dangerous it is to be solicitous of the means of attaining the accommodations of Life, with the contempt of that Knowledge which in very many cases is humanely necessary to the preservation of Life it self.

But, *Pyrophilus*, though our unintended prolixity in the former part of our Discourse concerning the Usefulness of Physiology, oblige us to the greater brevity in this latter part of it; yet to shew you, That of the two things, which you may remember we told you *Pythagoras* pronounc'd most God like in Man (*The Knowledge of Truth, and the Doing of Good*) Physiology as well qualifies us for the latter, as it enriches us with the former. It will not be amiss a little more particularly (though as succinctly as so copious a Subject will permit) to consider the probability there is that no small Improvement may be made by Mens proficiency in Experimental Knowledge of those Arts which are the chiefest Instruments of Man's dominion over the Creatures. These Arts (to divide them not accurately, but popularly) do serve either to relieve Man's necessities, as Physick and Husbandry; or for his accomodation, as the Trades of Shoo-makers, Diers, Tanners, &c. or for his delight, as the Trades of Painters, Confectioners, Perfumers, &c. to all which Arts, and many others ally'd to them, Philosophical Experiments and Observations,

servations, may, by a knowing Naturalist, be made to extend a meliorating Influence.

If I should, *Pyrophilus*, say this, without offering any thing at all by way of Proof that I say it not inconsiderately, You would, I fear, believe, that I deliver it too slightly for a Matter of that moment: And if, on the other side, I should in this Discourse present to you all the Particulars that I think I could, without Impertinency, employ to countenance what I have said, it would swell this Treatise to a Volumn, and defraud divers of my other Essays. And therefore I hold it not unfit to choose a middle way, and set down, on this occasion, either onely or chiefly those things which do the most readily occur to me, and do not so properly belong to the rest of my physiological papers. And to avoid Confusion, I shall, according to the Division newly propos'd, employ one Section of this Second part of the present Treatise, in setting down such things as relate to the Improvement of Physick: And in the other Section, deliver such particulars as concern those other useful Arts that depend upon Natural philosophy. But in regard that (as I have already intimated) the following Discourse is to consist chiefly of those things that belong not to any of my other Essays, You will not, I presume, expect that I should handle any subject fully or Methodically on this occasion: Which warning I especially intend for that part of the ensuing Discourse that relates to physick. For you will easily believe, that I am far from pretending to be a Doctor in that Faculty: And accordingly, in this and the four following Essays, I shall onely throw together divers such particulars as not belonging to my Writings, would, perhaps be lost, if I did not lay hold on this Opportunity for their preservation, of which they are not altogether judged unworthy by some knowing Men, whose Encouragements, to mention them to you, have dissuaded me from wholly passing by, in this Discourse,

course Matters properly Medical, what scruples soever I had to venture at speaking of them, Especially since I have not now the Conveniency to furnish these Essays with divers Particulars (by some thought not inconsiderable) which I may, perhaps be invited to adde to them hereafter, if I finde by your Reception of these that the others are like to be welcome.

To say something then of Physick, and to suppose the fitness of the now receiv'd division of it into five Parts: The Physiological (the Physitian taking that in a stricter sense then Philosophers, and then we do every where, save in this Essay) Pathological, Semeiotical, Hygieinal and Therapeutical, let us briefly take notice how each of these is indebted to, or capable of being improved by experienc'd Naturalists. And indeed, such is the affinity between Natural Philosophy and Physick, or the dependance of this on that, that we need not wonder at the judicious Observation of *Aristotle*, where he ^{*Arist. lib. de sensu & sensili, cap.*} thus writes, *Naturalium ferè plurimis & Medicorum, qui magis Philosophicè artem prosequuntur, illi quidem finiunt ad ea, quæ de Medicina; hi verò ex iis quæ de Natura, incipiunt quæ de Medicina.* But we must instance these things more particularly: And first for Physiology, 'tis apparent, That the Physitian takes much of his Doctrine in that part of his Art from the Naturalist: And to mention now no other parts of Physiology, in its stricter acception, the experience of our own age may suffice to manifest, what light the Anatomical doctrine of Mans Body may receive from Experiments made on other subjects. For since it were too barbarous, and too great a violation of the Laws, not onely of Divinity but Humanity, to dissect humane Bodies alive, as did *Herophilus* and *Erasistratus*, who (as I finde in some of the Ancients) obtain'd of Kings the Bodies of Malefactors for that purpose, and scrupled not to destroy Man to know him; And since, nevertheless divers things in Anatomy, as particularly the motion of
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the Blood and Chyle cannot be discover'd in a dead dissected Body (where the cold has shut up and obliterated many Passages) that may be seen in one open'd alive ; it must be very advantageous to a Physicians Anatomical knowledge, to see the Dissections of Dogs, Swine, and other live Creatures, made by an inquisitive Naturalist: Consonantly whereunto we may remember, that the discoveries of the milky Vessels in the Mesentery by *Asellius*, of those in the *Thorax* by *Pecquet*, and of the *Vasa Lymphatica* by *Bartholinus*, were first made in Brute Bodies, though afterwards found to hold in humane ones. Nor is it a small convenience to the Anatomist, that he may in the Bodies of Bruits make divers instructive Experiments, that he dares not venture on in those of Men; as for instance, that late noble, and by many not yet credited Experiment of taking out the Spleen of a Dog without killing him: For that this Experiment may be very useful, we may elsewhere have occasion to shew. And that it is possible to be safely made (though many, I confess, have but unprosperously attempted it, and it hath been lately pronounced impossible in Print) our selves can witness. And because I have not yet met with any Author that professes himself not to relate this Experiment (of the exemption of a Dogs Spleen) upon the credit of others, but as an eye-witness; I am content to assure you, That that dextrous Dissector, Dr *Folive* (of whom we formerly made mention) did the last Year, at my request, take out the Spleen of a yong Setting-dog I brought him: And that it might not be pretended, the Experiment was unfaithfully or favorably made, I did part of it myself, and held the Spleen (which was the largest in proportion to his Body that ever I saw) in my Hand, whilst he cut assunder the Vessels, reaching to it, that I might be sure there was not the least part of the Spleen left unextirpated, and yet this Puppy, in less then a Fortnight, grew not onely well, but as sportive

sportive and as wanton as before: which I need not take pains
 to make you believe, since you often saw him at your Mo-
 thers House, whence at length he was stol'n. And though I
 remember the famous Emperick *Fiorouanti*, in one of his *Ita-
 lian* Books, mentions his having been prevail'd with by the
 importunity of a Lady (whom he calls *Marulla Greca*) much
 afflicted with Splenetick distempers, to rid her of her Spleen;
 and addes, That she out-liv'd the loss of it divers Years. Yet
 he that considers the situation of that part, and the consider-
 ableness of the Vessels belonging to it in humane Bodies, will
 probably be apt to think, that though his relation may be
 credited, his venturousness ought not to be imitated. The
 Experiment also of detaining Frogs under Water for very
 many hours (sometimes amounting to some days) without
 suffocation, may, to him that knows that Frogs have Lungs
 and Breath as well as other Terrestrial Animals, appear a con-
 siderable discovery, in order to the determining the Nature of
 Respiration. Besides, the scrupulousness of the Parents or
 Friends of the deceased Persons, deprives us oftentimes of
 the Opportunities of Anatomizing the Bodies of Men, and
 much more those of Women, whereas those of Beasts are
 almost always and every where to be met with. And 'twas,
 perhaps, upon some such account, that *Aristotle* said that the
 external parts of the Body were best known in Men, the inter-
 nal in Beasts, *Sunt enim* (says * he, speaking of the inward
 parts) *hominum imprimis incerta atq; incognita: quamobrem*
ad ceterorum animalium partes quarum similes sunt humana re-
ferentes eas contemplari debemus. And questionless in many
 of them, the frame of the parts is so like, that of those an-
 swerable in Men, that he that is but moderately skill'd in An-
 dratomy (as some of the Moderns call the Dissection of Mans
 Body, to distinguish it from Zootomy, as they name the Dis-
 sections of the Bodies of other Animals) may, with due dili-

Arist. Hist.
Ani. lib. 1.
cap. 16.

gence and industry, not despicably, improve his Anatomical knowledge. In confirmation of which truth, give me leave to observe to you, That though *Galen* hath left to us so many, and by Physitians so much magnified Anatomical Treatises, yet not onely divers of those Modern Physitians, that would eclipse his Glory, deny him to have learn'd the skill he pretends to, out of the inspection of the Dissected Bodies of Men or Women, or so much as to ever have seen a humane Anatomy. But I finde even among his Admirers, Physitians that acknowledge that his Knives were much more conversant with the Bodies of Apes, and other Bruits, then with those of Men, which in his time those Authors say 'twas thought little less then Irreligious, if not Barbarous, to mangle; which is the less to be wondred at, because even in this our Age, that great People of the Muscovites, though a Christian and European Nation, hath deny'd Physitians the use of Anatomy and Skeletons; the former, as an inhumane thing; the latter, as fit for little but Witchcraft, as we are inform'd by the applauded Writer *Olearius*, Secretary to the Embassy lately sent by that Learned Prince, the present Duke of *Holsteine*, into *Moscovia* and *Persia*. And of this, the same Author gives us the instance of one *Quirin*, an excellent German Chyrurgion, who, for having been found with a Skeleton, had much adoe to scape with his Life, and was commanded to go out of the Kingdom, leaving behinde him his Skeleton, which was also dragg'd about, and afterwards burnt.

*Voyage de
Muscovie
& de Per-
se, pag. 128*

To these things we may adde, *Pyrophilus*, that the diligence of Zootomists may much contribute to illustrate the Doctrine of *Andratomy*, and both inform Physitians of the true use of the parts of a humane Body, and help to decide divers Anatomical Controversies. For as in general 'tis scarce possible to learn the true Nature of any Creature, from the
con-

consideration of the single Creature it self: so particularly of divers parts of a humane Body 'tis very difficult to learn the true use, without consulting the Bodies of other Animals, wherein the part inquired after is by Nature either wholly left out as needless, or wherein its differing bigness, or situation, or figure, or connection with, and relation to other parts, may render its use more conspicuous, or at least more discernable.

This Truth may be somewhat illustrated by the following Observations, which at present offer themselves to my thoughts upon this occasion.

The Lungs of Vipers, and other Creatures (whose Hearts and whose Blood, even whilst it circulates, we have always found, as to sense, actually cold) may give us just occasion to inquire a little more warily whether the great use of Respiration be to cool the Heart.

The suddain falling and continuing together, which we may observe in that part at least of a Dogs Lungs, that is on the same side with the Wound, upon making a large Wound in his Chest, though the Lungs remain untouched, is a considerable Experiment, in order to the discovery of the principal Organ of Respiration.

If you dexterously take out the Hearts of Vipers, and of some smaller Fishes, whose coldness makes them beat much more unfrequently and leisurely, then those of warm Animals, the contraction and relaxation of the Fibres of the Heart may be distinctly observed, in order to the deciding or reconciling the Controversie about the cause and manner of the Hearts motion, betwixt those Learned modern Anatomists, that contend, some of them, for Dr. *Harvey's* Opinion; and others, for that of the Cartesians.

Towards satisfying my self in which difficulty, I remember, I have sometimes taken the Heart of a Flounder, and having cut it transversly into two parts, and press'd out, and
with

with a Linnen cloth wip'd off the Blood contain'd in each of them, I observ'd, that for a considerable space of time, the sever'd and bloodless parts held on their former contraction and relaxation. And once I remember that I observed, not without Wonder, That the sever'd portions of a Flownders Heart, did not onely, after their Blood was drain'd, move as before, but the whole Heart, observ'd for a pretty while, such a succession of motion in its divided and exsanguious pieces, as I had taken notice of in them whil'ft they were coherent, and as you may with pleasure both see and feel in the intire Heart of the same Fish.

Some of the other Controversies agitated among Anatomists and Philosophers, concerning the use of the Heart, and concerning the principal seat of Life and Sense, may also receive light from some such Experiments, that we made in the Bodies of Bruits, as we could not of Men.

And the first of these that we shall mention, shall be an Experiment that we remember our selves formerly to have made upon Frogs: For having open'd one of them alive, and carefully cut out his Heart, without closing up the Orifice of the Wound (which we had made wider then was necessary) the Frog notwithstanding leaped up and down the Room as before, dragging his Entrals (that hung out) after him; and when he rested, would upon a puncture leap again, and being put into the Water, would swim, whil'ft I felt his Heart beating betwixt my Fingers. The Hearts of others of them were taken out at an Incision, no greater then was requisite for that purpose; when we had stitched or pin'd up the Wound, we observ'd them to leap more frequently and vigorously then the former: They would, as before they were hurt, close and open their Eye lids upon occasion: Being put into a Vessel not full of Water, they would as orderly display their fore and hinder Legs in the manner requisite to swimming, as if they

they wanted none of their parts, especially not their Hearts; they would rest themselves sometimes upon the surface of the Water, sometimes at the bottom of it, and sometimes also they would nimbly leap, first out of the Vessel, and then about the Room, surviving the exsection of their Hearts; some about an hour, and some longer. And that which was further remarkable in this Experiment, was, that we could, by gently pressing their Brest and Belly with our Fingers, make them almost at pleasure make such a noise, as to the By-standers made them seem to croak; but how this Experiment will be reconcil'd to the Doctrine ascrib'd to Mr. *Hobs*, or to that of the *Aristotelians*, who tell us, That their Master taught, the Heart to be the seat of Sense (whence also though erroneously, he made it the original of the Nerves) let those that are pleas'd to concern themselves to maintain all his Opinions, consider.

And whereas Frogs, though they can move thus long without the Heart, yet they cannot at all bear the exemption or spoiling of the Brain; we will adde what we have observ'd, even in hot Animals, whose Life is conceived to be much more suddenly dissipable, and the motion of each part much more dependent upon the influence of the Brain: We open'd then an Egge, wherein the Chick was not onely perfectly formed, but well furnished with Feathers, and having taken him out of the Membrane that involved him, and the Liquors he swam in, and laid him on his Back on a flat piece of Glass, we clip'd away, with a pair of Scissers, the Head and the Brest-bone; whereby the Heart became expos'd to view, but remain'd fastned to the Headless Trunk: and the Chick lying in this posture, the Heart continued to beat above a full hour, and the Ears seem'd to retain their motion a pretty while after the Heart it self had lost his; the motion of none of the other Parts appearing many moments to survive the loss of the Head:

Head: and which is most considerable, the seemingly dead Heart was divers times excited to new, though quickly ceasing motion, upon the puncture of a Pin, or the point of a Pen-knife. And to evince that this was no casual thing, the next Day we dealt with the Chick of another Egge, taken from the same Hen, after the above recited manner; and when the motion of the Heart and Ears began to cease, we excited it again, by placing the Glass over the warm steam of a Vessel full of hot Water, bringing still new Water from off the Fire to continue the heat, when we perceiv'd the former Water to begin to cool; and by this means we kept the Heart beating for an hour and an half by measure. And at another time, for further satisfaction, we did, by these and some other little industries, keep the Heart of a somewhat elder Chick, though exposed to the open Air, in motion, after we had carefully clipt off the Head and Neck, for the space of (if our memory do not much misinform us) two hours and an half by measure. Upon what conjectures we expected so lasting a motion in the Heart of a Chick, after it had lost the Head, and consequently the Brain, would be more tedious and less fit to be mention'd in this place, then the strange vivacity we have sometimes, not without wonder, observed in Vipers: Since not onely their Hearts clearly sever'd from their Bodies may be observ'd to beat for some hours (for that is common with them to divers other cold Animals) but the Body it self may be sometimes two or three days after the Skin, Heart, Head, and all the Entrals are separated from it, seen to move in a twining or wrigling manner: Nay (what is much more) may appear to be manifestly sensible of punctures, being put into a fresh and vivid motion, when it lay still before, upon the being pricked, especially on the Spine or Marrow with a Pin or Needle.

And though Tortoises be in the Indies many of them very large

large Animals, yet that great Traveller, *Vincent le Blanc*, in his French Voyages, giving a very particular account of those Tortoyfes, which the East Indian King of *Pegu* (who was much delighted with them) did, with great curiosity, cherish in his Ponds, adds this memorable Passage as an Eye-witness of what he relates: *When the King hath a minde to eat of them, they cut off their heads, and five days after they are prepar'd; and yet after those five days they are alive, as we have often experienc'd.* Now although I will not say, that these Experiments prove, that either 'tis in the Membranes that sensation resides (though I have sometimes doubted whether the Nerves themselves be not so sensible, chiefly as they are invested with Membranes) or that the Brain may not be confined to the Head, but may reach into the rest of the Body, after another manner then is wont to be taught: Yet it may be safely affirm'd, that such Experiments as these may be of great concernment, in reference to the common Doctrine of the necessity of unceasing influence from the Brain, being so requisite to Sense and Motion, especially if to the lately mention'd Particulars we adde on this occasion what we have observ'd of the Butter-flies, into which Silk-worms have been Metamorphos'd; namely, That they may not onely, like common Flys, and divers other winged Insects, survive a pretty while the loss of their Heads, but may sometimes be capable of Procreation after having lost them: as I not long since tryed (though not perhaps without such a Reluctancy as *Aristotle* would have blam'd in a Naturalist) by cutting off the Heads of such Butter-flies of either Sex. *Quamvis enim Mas cui prius amputatum est caput nequaquam adduci posset (quæcunq; Insecti illius est salacitas) ut Feminam comprimeret: Decollata tamen Femina marem alacriter admisit. Et licet post horas aliquot coitu insumptas ita requierit immota ut mortuam per multas horas cogitarem; non solum quia omnem penitus mo-*

tum perdidit, & in Thorace satis magnum apparebat foramen, quod à parte aliqua Corporis simul cum capite à trunco disrupta factum videbatur; verum etiam quoniam eodem permansit statu idq; per plures horas, ultra tempus quo, post coitionem cum Mare hujus generis Animalcula solent ordiri proliferationem. Tandem vero postquam jam diu de Vita ejus desperatum esset, Ova fatare tam confertim cœpit ut vel exiguo temporis intervallo eorum plura in manu mea deponeret. An vero Prolifica sint futura nondum comperi.

Their Opinion that ascribe the redness of the Blood to the colour of the Liver, through which it passes, is not discountenanced by the Livers of Men: But in Hen-eggs, about the third or fourth day after incubation (for we have found the circumstances of time much to vary) you may observe the *Punctum saliens*, or Heart, to be ever and anon full of conspicuously red Blood, before the naked Eyes can so much as discern a Liver, at least before they can discover in it any redness; a yellowness being all I could observe in the *Parenchyma* of the Livers of divers Chickens perfectly form'd, and furnish'd with Feathers, though not great enough to make their way out of the Shell. And in divers great Fishes I have found the Vessels of the Liver full of very red Blood, though the *Parenchyma* or substance of it were white, or at least did not at all participate much less impart a sanguine colour.

The Doctrine so unanimously delivered by Physicians and Chirurgions, concerning the irreparable loss of the Limb of an Animal, once violently severed from the Body, will appear unfit to be admitted, without some restriction by what may be experienc'd in Lizards, in Lobsters and Craw-fishes, and perhaps in some other living Creatures. For of Lizards it hath been often observ'd in hot Countreys, and even in France, that their Tails being struck off will grow again. And the like hath been of old observ'd by *Pliny*, and the experienc'd

Bontius

Bontius delivers it upon his own knowledge in these words:
Hoc in domesticis meis non semel animadverti dum filioli mei lustrabundi bacillo caudas iis decutiebant, quas tamen post diem unum aut alterum ad solitum pabulum revertentes vidi, caudasque iis paulatim reaccrescere.

That the Claws likewise of Lobsters being torn off, another will sometimes grow in the room of it, is not onely said by Fisher-men, but hath been affirmed to me by very credible persons, one of which assured me, that he himself had observed it very often. And I am the more apt to believe it, because the like is to be met with among Craw-fishes, which are so like Lobsters, that by many they are taken (though not considerately enough) to be but a smaller kinde of them. For I remember, that going to look upon a Repository where a multitude of them was kept, and causing divers of the fairest to be drawn up, that I might take the stony concretions, commonly called *Oculi Cancrorum*, out of their Heads I observ'd one large Fish that had one of his Claws proportionable to the bulk of his Body, but the other so short and little, that the greater seem'd to be four or five times as big as it; whereupon its good shape and fresh colour, seeming to argue it to be but yong and growing, invited me to ask one of them that had the oversight of the Fish, whether he had formerly seen any Claws torn off to grow again; he affirmed to me, That in that sort of Fish it was very usual.

I could also tell you how fruitlessly I have indeavored to discover that stomachical Acidity, to which many of our Modern Physitians are pleas'd to ascribe the first digestion of the Nourishment of Animals, in the purposely dissected Stomachs of ravenous Sea-fishes, in whose Stomachs, though our taste could not perceive any sensible acidity, yet we found in one of them a couple of Fishes, each of them about a Foot long, whereof the one, which seem'd to have been but newly de-

voured, hath suffered little or no alteration in the great Fishes Stomach; but the other had all its outside, save the Head, uniformly wasted to a pretty depth, beneath the former surface of the Body, and look'd as if it had been not boil'd, or wrought upon by any considerable heat, but uniformly corroded, like a piece of Silver Coyn kept a while in *Aqua-fortis*, according to the criminal tricks of Adulterators of Money.

Yet I am loth, till I have perfected what I design in order to that enquiry, either to imbrace or reject the Opinion I finde so general among the Moderns, concerning the Solution of Meat in the Stomach by something of Acid. And I remember, that when I was considering what might be alleadg'd for, as well as against that Opinion, I devis'd this Experiment, among others, in favor of it: I provided a Liquor, with which I drench'd a piece of the Wing of a roasted Pullet, having first well crush'd it between my Fingers, to make some amends for the omission of chewing it; and having a little incorporated the Liquor and the musculous Flesh, they immediately chang'd colour, and in about an hour, grew to be a kinde of Gelly, in colour and consistence not unlike Quince Marmalade: This mixture, by the next Morning, did, as I expected, turn to a deep Blood red, or sometimes rather a lovely purple Liquor, though all this while there had been no external heat imployed to promote the action of the *Menstruum*. And the like Experiment I tryed also with a piece of Mutton, with Bread, and a piece of Veal, and other edible things, which at that time occur'd to me, and found the operation of the Liquor almost uniform, though it seem'd to act most effectually upon Flesh. And to gratifie in some measure your curiosity, *Pyrophilus*, I am content to tell you, that the *Menstruum* was drawn from Vitriol, and that with the bare Oyl of it I have (though I could not with *Aqua fortis*) perform'd no less then what I have yet mention'd; but

but least this should be thought a digression, let it suffice to have, on this occasion, mention'd thus much upon the by.

To what we lately took notice of concerning the Heart, may be added, That on the Sea-coast of *Ireland*, I observ'd a sort of Fishes, about the bigness of Mackrels, whose Hearts were of an inverted Figure, compar'd to those of other Animals, the basis or broad end of the Heart being nearest the Tail, and the acuminate part or apex being coherent to the great Artery, and respecting the Head.

To all these trifling Observations, divers more considerable ones might be added, but they may be more seasonably insist-ed on elsewhere; and those already mention'd, may suffice to let you see, That the Naturalist by his Zootomy, may be very serviceable to the Physician in his Anatomical Inquiries.

Nor is it onely by the dissection of various Animals, that the Naturalist may promote the Anatomists knowledge, but perhaps also he may do it by devising ways to make the dead Bodies of Men, and other Animals, keep longer then naturally they would do: For since experience teaches us, That Men finde it very easie to forget the originations, windings, branchings, insertions, and other circumstances of particular Vessels, and other parts of the Body, as well as those that study Botanicks, are wont to complain of their easie forgetting, the shapes, differences, and alterations of smaller Plants, it cannot but be a great help to the Student of Anatomy, to be able to preserve the parts of humane Bodies, and those of other Animals, especially such Monsters as are of a very singular or instructive Fabrick, so long that he may have recourse to them at pleasure, and contemplate each of them so often and so considerately, till he have taken sufficient notice of the shape, situation, connection, &c. of the Vessel, Bone, or other part, and firmly impress'd an *Idea* of it upon his memory. We finde our selves much help'd to retain in our memory,

ry, the figures and differences of Vegetables, by those Books which some curious Botanists make, wherein the Plants themselves, artificially dry'd, are display'd upon, and fastned to Leaves of white Paper; if it were not for one of those Books, wherein I have in one vast Volumn almost all the Plants of one of the chief Physick-gardens in *Europe*, I should every Year forget, by the end of Winter, to know again most of the smaller Plants I had learn'd to take notice of in the Spring. And by the way 'tis observable, how long Plants, by being carefully indeed, but barely dried in the shade betwixt Sheets of Paper, which help to soak up the superfluous moisture, may be preserv'd. For I have divers Years had an Herbal, wherein several of the Flowers, and other Plants, retain their native yellow and blue, &c. (but somewhat faint) though by the date it appear'd to be 22 or 23 Years old. And I am apt to think, that it would be very possible for Anatomists also to preserve the Bodies they contemplate for a considerable time: For experience hath inform'd us in good number of such Animals, that Butter-flies, and divers other flying Insects, may have their shape and colours preserv'd; I know not how long, by running them through in some convenient part with Pins, and therewith sticking them to the inside of large Boxes. And on this occasion, I remember, that having sometimes reflected upon the Lasting of Spiders, Flys, and other small living Creatures, that having been casually enclos'd in Amber whil'st it was soft, are ever preserv'd entire and uncorrupted, I thought it not amiss to try whether some Substance, like Amber (at least as to the newly mention'd use of it) might not easily be prepar'd by Art: And hereupon I quickly found, that by taking good clear *Venice* Turpentine, and gently evaporating away about a third part of it (sometimes more, sometimes less, according to the exigency of my particular purpose) I could make a reddish Gum, diaphanous and without Bubbles, which

which would melt with a very gentle heat, and easily (being suffer'd to cool) become again so hard as to be brittle. This resinous Substance should be melted with as little heat as is possible (and therefore should be first powder'd) that the texture of the Vegetable or Animal Bodies to be cas'd over with it, might receive the less alteration: And when it is brought to the requisite degree of fluidity, then the Body to be preserv'd (being, if that be needful, stuck through with a Pin) must be gently plung'd into it, and presently taken out and suffer'd leisurely to cool, being turn'd, from time to time, this way or that way, if there be occasion, that the investing Matter may be every where of an equal thickness upon it. And if at the first time the Case be not thick enough, it may again, when it is cold, be immerst'd into the liquid Matter (as Chandlers are wont to thicken their Candles, by dipping them frequently into melted Tallow) of which some will every way adhere to it. And though these Cases be inferior to Amber, in regard of their being more apt to be sulli'd by dust, or otherwise; yet that inconvenience may be easily remedy'd, by keeping them shut up in Glasses or Boxes, at those times when one hath not occasion to consider them: And their clearness (especially if they be thin) and their smooth surfaces, together with their exactly keeping out the Air from the Body they enclose, may, perhaps, make so cheap and easie an Experiment a not unwelcome trifle, especially considering how easily 'tis capable of Improvement.

But to return to the Preservation of more bulky Bodies, 'tis a known thing, to the Collectors of Rarities, that the external *Idea* of Fishes, Crocodiles, Birds, and even Horses, may be preserv'd for many Years, by taking out the more corruptible parts, and stuffing their prepar'd Skins with any convenient Matter. And that the internal membranous parts of Bodies may be long and easily kept from putrefaction, is not
unknown

unknown to many Anatomists. And not to mention what we have try'd of this sort, we have seen the Veins, Arteries, and Nerves of a humane Body, laid out in their natural situation upon three Boards, by the pains and skill of an accurate Anatomist of *Padua*. And elsewhere, *Uterum vidimus atq; omnia mulieris genitalia*, together with the Bladder, all displaid upon a Board, preserv'd for many Years so entire, and in a situation so near the Natural, that this Scheme was far more instructive, then the most accurate Printed one could possibly be. We have likewise known the flesh of Vipers, kept not onely sweet, but efficacious, for divers Years, by the smoak of a peculiar Powder, chiefly consisting of Aromatick Ingredients, and of which, you, *Pyrophilus*, may command the Composition.

We have also seen the Skeleton of a Monky, made, by an excellent French Chyrurgion of our acquaintance, whereon the Tendons and Fibres of the Muscles were so preserv'd, that it was look'd upon as a rarity, very useful to shew their Originations and Insertions, and to explain the motions of the Limbs: And perhaps there may be some way to keep the Arteries & the Veins too, when they are empty'd of Blood, plump, and unapt to shrink over-much, by filling them betimes with some such substance, as, though fluid enough when it is injected to run into the Branches of the Vessels, will afterwards quickly grow hard. Such may be the liquid Plaster of burnt Alabaster, formerly mention'd, or Ising-glass steeped two days in Water, and then boild up, till a drop of it in the cold will readily turn into a still Gelly. Or else *Saccarum Saturni*, which, if it be dissolv'd often enough in Spirit of Vinager, and the Liquor be each time drawn off again, we have observ'd to be apt to melt with the least heat, and afterwards to grow quickly into a somewhat brittle consistence again. But I must not insist on these Fancies, but rather adde, That I have known an
Embrio,

Embrio, wherein the parts have been very perfectly delineated and distinguishable, preserv'd unputrifi'd for several Years; and I think it still continues so, by being seasonably and artificially embalm'd with Oyl (if I much mis-remember not) of Spikes. And I have elsewhere seen a large *Embrio*, which after having been preserv'd many Years, by means of another Liquor (whose composition I do as yet but guess at) did, when I saw it, appear with such an admirable Entireness, Plumpness, and Freshness, as if it were but newly dead: And that which concurs to make me hope that some nobler way may be yet found out, for, the preservation of dead Bodies, is, that I am not convinc'd that nothing can powerfully resist Putrefaction in such Bodies, but things that are either saline and corrosive, or else hot; nor that the Embalming Substances cannot be effectually apply'd, without ripping open the Body to be preserv'd by them. For *Josephus Acosta*, a sober Writer, relates, That in certain *American* Mountains, Men, and the Beasts they ride on, sometimes are kill'd with the Winds, which yet preserve them from putrefaction, without any other help. So insensible a quantity of Matter, such as it may be, may, without Incision made into the Body, both pervade it, and as it were Embalm it. I know also a very experienc'd and sober Gentleman, who is much talk'd off for curing of Cancers in Womens Breasts, by the outward Application of an Indolent Powder; some of which he also gave me, but I have not yet had the opportunity to make tryal of it: And I shall anon tell you, that I have seen a Liquor, which without being at all either acid or caustick, is in some Bodies far more effectual against Putrefaction, then any of the corrosive Spirits of Nitre, Vitriol, Salt, &c. and then any of the other saline Liquors that are yet in use. We have also try'd a way of preserving Flesh with Musk, whose effects seem'd not despicable to us, but must not here be insisted on.

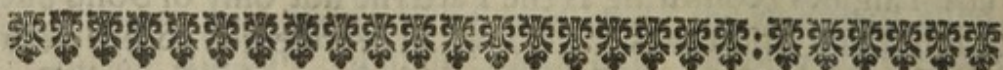
Nor were it amiss that diligent Tryal were made what use might be made of Spirit of Wine, for the Preservation of a humane Body: For this Liquor being very limpid, and not greasy, leaves a clear prospect of the Bodies immer'd in it; and though it do not fret them, as Brine, and other sharp things commonly employ'd to preserve Flesh are wont to do, yet it hath a notable Balsamick Faculty, and powerfully resists Putrefaction, not onely in living Bodies (in which, though but outwardly apply'd, it hath been found of late one of the potentest Remedies against Gangrens) but also in dead ones. And I remember that I have sometimes preserv'd in it some very soft parts of a Body for many Moneths (and perhaps I might had done it for divers Years, had I had opportunity) without finding that the consistence or shape was lost, much less, that they were either putrifi'd or dry'd up: We have also, by mixing with it Spirit of Wine, very long preserv'd a good quantity of Blood, so sweet and fluid, that 'twas wondered at by those that saw the Experiment. Nay, we have for curiosity sake, with this Spirit, preserv'd from further stinking, a portion of Fish, so stale, that it shin'd very vividly in the dark; in which Experiment, we also aim'd at discovering whether this resplendent quality of the decaying Fish would be either cherish'd, or impair'd by the Spirit of Wine (whose operations in this tryal we elsewhere inform you of) and it would be no very difficult matter for us to improve, by some easie way, this Balsamical Virtue of Spirit of Wine, in case you shall think it worth while: But not to anticipate what I may more properly mention to you elsewhere, I shall at present say no more touching the Conservation of Bodies, since probably by all these, and some other Particulars, we may be induc'd to hope so well of humane Industry, as not to despair, that in time some such way of preserving the Bodies of Men, and other Animals, will be found out, as may very much
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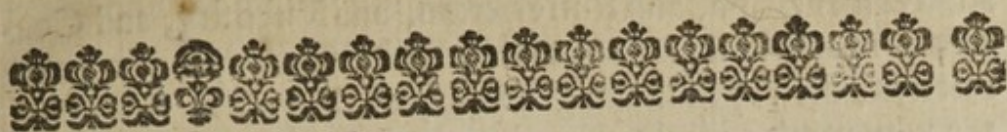
Facilitate, and Advance too, Anatomical Knowledge. Neither is it only by advancing This, that the Naturalist may promote the Physiologicall Part of Physick: for since the Body consists not only of firme and consistent Parts, as the Bones, Muscles, Heart, Liver, &c. but of fluid ones, as the Blood, Serum, Gall, and other Juices. And since consequently to the compleat Knowledge of the use of all the Parts we should investigate, not only the Structure of the Solid ones, but the Nature of the Fluid ones, the Naturalist may do much more then hath yet been done, towards the perfecting of this Knowledge, not only by better explicating what it is in generall makes Bodies either Consistent or Fluid, but by examining particularly, and especially in a Pyrotechnicall way, the Nature of the severall Juices of the Body, and by illustrating the Alterations that those Juices, and the Aliments they are made of, receive in the Stomach, Heart, Liver, Kidneys, and other *Viscera*. For although a humane Body being the most admirable Corporeall Piece of Workmanship of the Omniscent Architect, it is scarce to be hop'd, but that even among the things that happen ordinarily and regularly in it, there will be many which we shall scarce be able to reach with our Understanding, much lesse to imitate with our Hands. Yet peradventure, if Chymicall Experiments, and Mechanicall Contrivances, were industriously, and judiciously, associated by a Naturalist profoundly skill'd in both, and who would make it his Business to explain the *Phænomena* of a Humane Body, not only many more of them then at first one would think, might be made more intelligible then as yet they have been; but diverse of them (especially those relating to the motions of the Limbs and Blood) might be by artificiall Engines (consisting as the Patterne not only of Solid but Liquid and Spirituous Parts) not ill represented to our very Senses: since a humane Body it selfe seems to be but an En-

gine, wherein almost, if not more then almost, all the Actions common to Men, with other Animals, are perform'd Mechanically. But of the difference of these living Engines from others, I may elsewhere have a fitter opportunity to discourse to You. For at present, *Pyro*: I have employ'd so much of the little time my Occasions will allow me to spend upon the Treatise I am now writing, in making out to you the Usefulness of Naturall Philosophy, to the Physiologicall Part of Physick, that I must not only not prosecute this Subject, but must both hasten to mention, and to mention the more cursorily its serviceableness to the four remaining Parts of the Physicians Art.



ESSAY II.





ESSAY II.

*Offering some Particulars relating to the
Pathologicall Part of Physick.*

AND to say something in the next place of *Pathology*, that the Naturalists knowledge may assist the Physitian to discover the nature and causes of severall Diseases, may appear by the light of this Consideration, that, though divers *Paracelsians* (taught, as they tell us, by their Master) do but erroneously suppose, that Man is so properly a Microcosme, that of all the sorts of Creatures whereof the Macrocosme or Universe is made up, he really consists; yet certaine it is that there are many Productions, Operations, and Changes of things, which being as well to be met with in the great, as in the little world, and diverse of them disclosing their natures more discernably in the former, then in the latter; the knowledge of the nature of those things as they are discoverable *out* of mans body, may well be suppos'd capable of illustrating many things *in* man's body, which receiving some Modifications there from the nature of the Subject they belong to, passe under the notion of the Causes or Symptomes of Diseases. If I were now, *Pyrophilus*, to discourse to you at large of this Subject, I think I could convince you of the truth of what I have propos'd. And certainly, unlesse a Physitian be, (which yet I fear every one is not) so much a Naturalist, as to know how Heat, and Cold, and Fluidity, and Compactness,

and Fermentation, and Putrefaction, and Viscosity, and Coagulation, and Dissolution, and such like Qualities, are generated and destroyed in the generality of Bodies, he will be often very much to seek, when he is to investigate the causes of preternaturall Accidents in men's bodies, whereof a great many depend upon the Presence, or Change, or Vanishing of some or other of the enumerated Qualities, in some of the Fluid or Solid Substances that constitute the body. And that the Explications of a skilfull Naturalist may adde much to what has hitherto commonly been taught concerning the Nature and Origine of those Qualities, in Physitians Schools, a little comparing of the vulgar Doctrine, with those various Phænomena, to be met with among Naturall things, that ought to be, and yet seem not to be, explicable by it, will easily manifest to you. And questionlesse 'tis a great advantage to have been taught by variety of Experiments in other bodies, the Differing waies whereby Nature sometimes produces the same effects. For since we know very little *à priori*, the observation of many such effects, manifesting, that nature doth actually produce them so and so, suggests to us severall wayes of explicating the same Phænomenon, some of which we should perhaps never else have dream'd of. Which ought to be esteem'd no small Advantage to the Physitian; since he that knows but one or few of Natures wayes of working, and consequently, is likely to ignore divers of those whereby the propos'd Disease (or Symptome of it) may be produc'd, must sometimes conclude, that precisely *such* or *such* a thing is the determinate Cause of it, and apply his Method of relieving his Patient accordingly; which often proves very prejudiciall to the poor Patient, who dearly paies for his Physitians not knowing, That the Quality that occasions the Distemper, may be as probably, if not more rationally, deduc'd from an other Origine, then from that which is presum'd. This will
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scarce be doubted by him that knowes how much more likely Explications then those applauded some ages since, of divers things that happen as well within as without the body, have been given by later Naturalists, both Philosophers and Physitians: and how much the Theory of the Stone, and many other diseases, that has been given us by those many Physitians, that would needs deduce all the Phænomena of diseases from Heat, Cold, and other Elementary Qualities, is Inferiour to the Account given us of them by those ingenious Moderns, that have apply'd to the advancement of Pathologie, that Circulation of the Blood, the Motion of the Chyle by the Milky vessels to the Heart, the consideration of the effects deducible from the Pores of greater bodies, and the motion and figuration of their minute parts, together with some of the more known Chymicall Experiments: though both of those, and of the other helps mention'd just before them, I fear men have hitherto been far enough from making the best use, which I hope it will dayly more and more appear they are capable of being put to. He that has not had the curiosity to enquire out and consider the severall waies, whereby Stones may be generated out of the body, not only must be unable satisfactorily to explicate how they come to be produc'd in the Kidnies and in the Bladder, but will, perhaps, scarce keep himselfe from imbracing such errors, because authoriz'd by the suffrage of eminent Physitians, as the knowledge I am recommending would easily protect them from. For we find diverse famous, and, otherwise, learned Doctors, who (probably because they had not taken notice of any other way of hardning a matter once soft into a stonelike consistence) have believ'd and taught that the Stone of the Kidneyes is produc'd there by slime baked by the heat and driness of the Part; as a portion of soft Clay may, by externall heat, be turn'd into a Brick or Tile. And accordingly they have
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for cure, thought it sufficient to make use of store of Remedies to moisten and cool the Kidneys; which, though in some bodies this be very convenient, are yet far inferiour in efficacy to those Nobler medicines, that by specifick qualities and properties are averse to such coagulations as produce the Stone. But (not to mention what a Physitian skill'd in Anatomy would object against this Theory from the nature of the part affected) 'tis not unlike, the imbraces of this Hypothesis would not have acquiesc'd in it, if they had seen those putrefactions out of the bodies of men, which we elsewhere mention'd. For these would have inform'd them, that a Liquor abounding with petrescent parts, may not only turn Wood (as I have observ'd in a petrifying Spring) into a kind of Stone, and may give to Cheese and Mosse without spoiling their pristine appearance a strong hardnesse and weight; but may also produce large and finely shap'd Chrystalline bodies (though those I try'd were much lesse hard then Chryfall) in the bosome of the cold water, which brings into my mind, that I have diverse times produc'd a body of an almost stony hardnesse in lesse then halfe an hour, even in the midst of the water, by tying up in a rag, about the quantity of a nutmeg, of well and recently calcin'd Alabaistre, which being thus ty'd up and thrown into the botome of a bason full of water, did there speedily harden into a Lapideous Concretion. And that even in the bodies of Animals themselves such concretions may be generated much otherwise then the Hypothesis we have been speaking of supposes, may appear by what happens to Craw-fishes, which though cold animals, and living in the waters, have generated at certain seasons in their heads Concretions, which for their hard and pulverizable consistence, divers Authors call *lapides Cancrorum*, though in the Shops they are often but abusively styled *Oculi cancrorum*. And such strong concretions are affirm'd

to be generated in these Fishes every Year, which I the less scrupled at, because I have not found them at all times in the Head of the Fish. And besides, these and many more Concretions, that had they been observ'd by the Physicians we have been speaking of, might easily have kept them from acquiescing in, and maintaining their improbable explication of the manner of the Stones nativity: There is yet another kind of Coagulation, which may both be added to the former, and perhaps also serve to recommend the use of Chymical Experiments, in investigating the Causes of Diseases: This is made by the mixture of exquisitely dephlegm'd Spirit of fermented humane Urine, with as exactly rectified Spirit of Wine; for upon the confusion of those two volatile Liquors in a just proportion, they will both of them, as after *Lullius* Experience hath inform'd us, suddenly coagulate into a white Mass, which *Helmont* calls *Offa alba*, and by which, he endeavors to declare the procreation of the *Duelech*: for supposing himself to have found in humane Urine a potential *Aqua vita*, or Vinous Spirit, capable of being excited by a putrid Ferment, and coagulable by the volatile Salt of the same Urine, if there were any volatil Earth lurking in the Liquors, That being apprehended by the uniting Spirits, and coagulated with them both; he supposeth there may emerge from the union of those three Bodies such an anomalous Concretion, as he, after *Paracelsus*, calls *Duelech*.

*Helmont de
Lith: cap. 3.
& 4.*

And that a subtile Terrestrious Substance may lurk undiscerned, even in limpid Liquors, may appear, not onely in Wine, which rejects and fastens to the sides of the containing Vessel, a Tartar, abounding in Terrestrious Feculency; and in common Urine of healthy Men, which, though clear at its first emission into the Urinal, does, after a little rest there, let fall an *Hypostasis*, or Sediment, which, if distill'd before fermentation, leaves in the bottom of the Cucurbite an Earthy

Substance, and commonly some Gravel: but even in rectified Spirit of Urine it self, I have had opportunity to observe, That after very long keeping, there hath spontaneously precipitated a Feculency, copious enough in proportion to the Liquor that afforded it. Nay, in an other parcel of Spirit of Urine, that hath been kept much longer then that already mention'd, we observ'd the other day, that not onely there was a Terrestrial residue fallen to the bottom of the Glass, but to the sides of it as far as the Liquor reach'd, there adhered a great multitude of small Concretions; which, as far as appeared by looking on them through the Crystal Viol, to whose insides they were fastened, were no other then little grains of Gravel, such as are often found sticking to the sides of Urinals, employed by calculous persons.

To which we might adde an Experiment of ours, whereby we are wont almost in a moment, by barely mixing together a couple of Liquors, both of them distill'd and transparent, and yet not both of them salin'd to thicken them very notably and permanently, insomuch that they seem not to precipitate each other; yet having once, for curiosity sake, distill'd them with a pretty strong Fire, I obtain'd a great quantity (as I remember, a fourth of the whole mixture) of a blackish Mass, that was not onely coagulated and dry, but even brittle: But of the coagulation of distill'd Liquors, such as even Chymists themselves are not wont to look upon as at all dispos'd to coagulation, I may elsewhere have a better opportunity to entertain you, and therefore I shall forbear to do it now.

And by this way, *Pyrophilus*, doth *Helmont*, if I understand him aright, attempt to make out the generation of the Stone in humane Bodys: In which Theory, though some difficulties do yet keep me from acquiescing, yet, besides that perhaps what you will meet with by and by (about the distillation of the *Duelech*) may make you the less wonder at this
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explication. Besides this, I say, granting that none of the enumerated ways of Petrescency (if I may so speak) deserves to be look'd upon as satisfactory; yet to give so much as an account, *not very absurd*, of a Disease so anomalous and abstruse, and hitherto so unluckily explicated by Physitians, is perhaps more difficult, then it were to give (at least) a *plausible* account of divers other Distempers.

And possibly it may be safely enough affirmed, That not onely Physiology, in its full extent, but that Hand-maid to it, which is call'd Chymistry, may not a little contribute to clear up the nature of both of the digestions, and of those deficiencies or aberrations in them, which produce a great part of Diseases; especially if we allow what, as well Physitians, as Spagyrist agree in (whether warily enough or not, I shall not now dispute) *viz.* That whatever is separable from Bodies by the Fire, was, as a Constituent Element (or Principle) pre-existent in them.

Perhaps I need not minde you, *Pyrophilus*, that 'tis usual with the meerly *Galenic* Doctors themselves, to explicate the nature of Catarrhs, by comparing the Stomach to a seething Pot, and the Head to an Alembick, where the ascending Vapors, being, by the coldness of the Brain, condens'd into a Liquor, sometimes distil upon the Lungs, and sometimes fall upon other weakned parts, in which explication, though for divers reasons I cannot acquiesce, yet it may suffice to shew you how little scruple many Learned Men, not like to be partial in the Case, would make of employing Chymical Operations to illustrate the Doctrine of Diseases. And indeed, since the Liquors contain'd in the Body abound, divers of them, with saline or sulphureous parts, he that hath been by Chymistry taught the nature of the several sorts of Salts and Sulphurs, and both beheld and considered their various actions one upon another, and upon other Bodies, seems to

have a considerable help to discourse groundedly of the Changes and Operations of the humors, and other Juices contain'd in the Body, which he hath not that hath never had *Vulcan* for his Instructor. He that findes that there may be acid Juices in the Stomach, and elsewhere (as is frequently evident in the sharp Liquors which many Stomachs cast up) and that there are also Sulphureous Salts in the Body (as is apparent in Blood and Urine, which abound with such.) He that knows that the *Serum* that swims upon the Blood out of the Body, is by a gentle heat immediatly coagulable into a thick whitish Substance, not unlike a Custard; and that Chymically analiz'd Blood yields store of volatile and sulphureous, but (as far as our tryals have hitherto inform'd us) no acid saltiness.

He that knows that these animal Salts and Spirits may be so powerful, that we have been able with Spirit of Urine, or of Harts-horn, to make a red Solution of Flowers of Sulphur, and that with Spirit of Urine (though drawn without violence of Fire) we have (as we elsewhere more particularly declare) dissolv'd both in a very gentle heat, and in a very short time, the un-open'd Body of crude Copper, so as to make thereof a Solution of a rich, deep, and ev'n opacous Blew: And that we have done almost the like with unrectified Spirit of Mans Blood.

He that hath, as we have done, examin'd by Fire (especially produc'd by the help of a Burning-glass) that limpid Liquor that is to be found in the Limphatick Vessels, and hath taken notice of that odde consistence, smell, crackling, and other qualities discernable in it by heat.

He that observes how acid Liquors loose their acidity, by working upon some Bodies; as when Spirit of Viniger grows almost insipid upon the coral it hath corroded, and how those saline Liquors, by working upon certain Bodies, degenerate into Salts of another nature, as we have sometimes observ'd
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in Oyl of Vitriol, working upon the fourth part of its weight of Quick-silver, and how the contrariety of acid and sulphureous Salts makes them sometimes disarm, sometimes, after some ebullition, precipitate each other; and sometimes unite into a third substance, of a differing nature from either of those from whose coalition it results, as we see in *Tartarū Vitriolatū*; and, as I have observ'd, in a Salt, I sometimes make to emerge from a due proportion of Oyl of Vitriol and Spirit of Urine, freed, after conjunction, from their aqueous moisture: And He, in a word, that hath carefully analiz'd and made tryals on many parts, both of the Macrocosm and Microcosm, and heedfully applied his Experiments made on the former, to the illustration of the changes observable in the latter, shall be likely to explicate divers particulars in Pathology, more intelligibly than he that is a stranger to Chymistry.

And though I am very unwilling to meddle with Medical Controversies, and am apt to think, that Chymists are wont to speak somewhat too slightly of the humors of the humane Body, and allow them too little a share in the production of Diseases; yet (to skip other reasons) the strange stories related by *Skenkius*, and other eminent Physitians, of the corrosiveness of some Juices, which, rejected by Urine or Vomits, have been able to boyl on Brass, fret Linnen, and stain Silver; together with some odde Observations of this nature, our selves have had opportunity to make, do very much incline us to believe, That the generality of former Physitians have ascrib'd too much to the Humors, under the notion of their being hot and dry, cold and moist, or endowed with such other Elementary Qualities, and have taken a great deal too little notice of the saline (if I may so speak) and Sulphureous Properties of things. And in this Opinion I am not a little confirmed by the authority of *Hippocrates* himself, both in other passages, and especially where he says,

Non

Non calidum, frigidum, humidum, aut siccum, esse quod magnam agendi, vim habet, verum amarum & salsum & dulce & acidum & insipidum & acerbum, &c. are the things which, though inoffensive to the Body, whilst they duly allay each other, prove hurtful to it, and distemper it, when any of them comes to sever it self from the rest, and grow predominant. And indeed, if the Juices of the Body were more Chymically examin'd, especially by a Naturalist that knows the ways of making fix'd Bodies volatile, and volatile fix'd, and knows the power of the open Air in promoting the former of those Operations; it is not improbable, that both many things relating to the nature of the Humors, and to the ways of sweetning, acuating, and otherwise altering them may be detected, and the importance of such Discoveries may be discern'd.

And perhaps it would adde to the usefulness of such an examination, if it were extended to the noxious Juices in distemper'd bodies: such as the rotten Phlegme spit up by those, whose Lungs are disaffected; the slimy excretions voided in the Lyantery, and the liquor that distends the *abdomen* in the Dropsy and *Ascites*: concerning which (to tell you that upon the by) I found that it was of a differing nature from either Water or Urine. For a *paracentesis* being made in the *abdomen* of one dangerously sick of this sort of Dropsie, I found that the Liquor would keep a pretty while without putrefaction, (nor did the Patient's body, when I afterwards saw it open'd, smell almost at all, though the inside of the *abdomen* lookt well neer as black, as if it had been sphacelated;) and having steam'd away some of it, whilst it was pretty fresh, over a somewhat slow fire; it first coagulated into a substance like Whites of Eggs, and, by a little farther evaporation, turn'd to such a glutinous substance, as tradesmen are wont to call *Size*; and being kept longer on the fire grew to be hard like

like fish glew, but more brittle, and transparent enough, but with a little tincture of a greenish yellow; and some of the forementioned liquor being distill'd in a Retort, did towards the end of the operation so darken the vessell with a thick blackish oyle, as hindred me from discerning what else perhaps I might have seen. And I suppose it may prove a usefull instance to the former purpose, if I somewhat circumstantially annex here what occur'd to me, when I was accidentally considering of the *Calculus humanus*.

Having therefore obtain'd of a skilfull Lithotomist of my acquaintance divers Stones, which he had cut out of mens bladders, I chose a couple of them (which were whitish almost, of equall bignesse, and figure, which was neer ovall, and which together weigh'd about two ounces and an halfe, these with the help of a strong knife I carefully open'd, to find whether or no either of them consisted of an entire and uniforme matter, (as most other stones, and even some *calculi humani* do) and I found that each of them was made up of severall shells, as it were, successively involving one another, like the rinds of an Onion, and such shels, but more soft, and more of a colour; we likewise observed in a great stone taken a while since out of an Oxe's Gall, and sent us for a present; and though all of these were of an almost stony hardnesse, yet that hardnesse was not equall in them all; and in one of the stones we observed one of the rinds (to make use of that expression) to be of a differing colour both from that which immediately imbraced it, and from that which it immediately imbrac'd: some of these rinds equalled in thicknesse the length of a barley corne, and others were somewhat thinner. Though they did closely imbrace one another, yet they were actually separable, as well as visibly distinguishable. And proceeding very warily in the breaking one of these stones, we found that in the center of it, there lay a small and soft ovall stone

stone, as it were the kernell of those conglomerated shells; and this kernell lay so loose, that with a little industry and patience we picked it out of the shell, and kept it by us as a rarity. This done, being desirous to know whither Chymicall tortures would force these Concreats to a further confession of their nature, we caused them to be finely powdred, and put into a small but strongly coated glasse Retort, whereunto luting a much larger Retort for a Receiver; we found that these two ounces and halfe of powder, being distilled for some hours in a naked fire, afforded us great store of volatile Salt (partly grey and partly white) which almost covered the inside of the Receiver, and a pretty quantity of reddish spirit, which in the Receiver it selfe soon coagulated into Salt, and having severed our vessels, we found in the neck of the Receiver a very little darkish oyle, but in the neck of the Retort a greater quantity of the same adust Oyl, incorporated with a pretty quantity of volatile Salt, whose smell did readily recall to my minde that peculiar kinde of stink which I had sometimes taken notice of in the volatile Salt of unfermented Urine; nor were the taste of these two Salts unlike. The *caput mortuum* consisted of a fine, light, cole-black Powder, not unlike the finest sort of Soot; and by weighing but of six Drachmes, it inform'd us, that above two thirds of the distill'd *calculi humani* had been, as being volatile, forced from the Terrestrial Parts, even in a close Vessel, wherein the *caput mortuum*, though it were left insipid enough, yet retained stink enough to make us think, it still contained pretty store of heavy Oyl: as indeed, having put it into a Crucible, and kept it a competent while in a stronger fire, we found it reduced to about two Drachmes of a brittle Mass of insipid white Calx, which did not slack, or fall alunder like Lime when it is cast into Water.

To

To this Example of the usefulness of Chymistry, to discover the unobserv'd, and otherwise scarce discoverable difference of the *calculus humanus* from other stones; we may venture to adde, That though some *Paracelsians* do take too much liberty, when they crudely tell us, that there are arsenicall, vitriolate, aluminous, and other minerall substances, generated in humane bodies, yet if they had more warily propos'd their Doctrine, it would not perhaps appear so absurd, as they are wont to think it, who considering only the nature of the Aliments men usually feed upon, cannot conceive that such being but either Animals or Vegetables, can by so gentle a heat as that of man's body, (by which they suppose all the changes of the Aliments must be effected,) be Exalted to an energie like that of such bodies as are compos'd of active Minerall substances, and have some of them perchance acquir'd a violence of operation from the fire. But we see that Concretions, so like Stones, (which belong to the Minerall Kingdome,) as to passe generally for such, may be produc'd in the bodies not only of men but of sucking children, whose Aliment is fluid Milk: and it seems a mistake to imagine (how many soever do so) that Heat must needs be the Efficient of all the changes the matter of our Aliments may happen to undergoe in a humane body: where there are Streiners, and Solvents, and new Mixtions, and perhaps Ferments, and diverse other powerfull Agents, which by successively working upon the assum'd matter, may so fashion and qualifie it, as, in some cases, to bring the more dispos'd part of it to be not unlike even fossile Salts, or other minerall substances. A very eminent person was lately complaining to me, that in the fits of a distemper, which almost as much puzzles her Physitians as her selfe, she sometimes vomits up something so sharp and fretting, that, after it hath burnt her throat in its passage, almost like scalding water, it doth not only Staine the Silver vessels that receiv'd

it, but also work upon them, as if it were a Corrosive Menstruum. And there dyed a while since a very intelligent person, much imploy'd in publick affaires, who complain'd to me, that in the fits of the strange distemper he labor'd under, he divers times observ'd, that, that part of his pillow which his breath pass'd along, would by the strange fuliginous Steams, which that carried off with it, be blackt over, as if it had been held in some sooty smoak or other.

We may also consider, that the Rain-water, which in its passage through a Vine, or an Apricok-tree, or the like plants, is turn'd into a sweet fruit; in its passage through those plants that bear Lemmons and Barberries, is transmuted into a liquor sharp enough to corrode, not only Pearles but Corall, *lapides cancrorum*, and other hard Concrets, as spirit of Vitrioll would do. And writers of unsuspected credit, affirme, that an *Indian* fruit, (whose name I cannot readily call to mind) will speedily corrode and waist the very steel knives 'tis cut with, if its Juice be left long upon them: and we see that some sorts even of our Apples and Peares, will quickly black the blades of Knives on which the Juice is suffer'd to continue. And least what I freshly mention'd about Limmon trees, should be question'd, I will here adde, that I remember also that I have made not only some other hot and strongly tasted Herbs, but even a *Ranunculus* it selfe, to grow and increase notably in weight as well as bulk, though I fed it but with fair water: and allowd it nothing else to shoot its roots into. Wherefore since this plant is reckon'd amongst those, that either are poisonous, or want but little of being so; and since its operation is so violent, that this sort of Vegetables, is taken notice of from the experience of Country people, to be able by outward application to draw blisters, and since nevertheless that which this plant, without any heat discernable by the touch, transmutes into so virulent a substance, is but so unactive.

Give a body as water; why may not such aliments, as may have in them divers parts of a far more operative nature, be in a humane body, by an unusuall concurrence of Causes and Circumstances, so alter'd and exalted, as to approach in operations (especially upon the more tender parts) to those of fossile Salts or other Minerals? So that a Chymist might upon such an account, without any great absurdity, teach some parcels of morbifick matter to be of an Arsenicall, or a Vitriolate, or an Antimoniall nature, especially since we see that sometimes Cancers, Ulcers, and sharp Juices generated in the body, doe by their vitiating and wasting the invaded parts, but too much emulate the pernicious operations of Arsnick, and of fretting Salts: and the infusion of Antimonie doth scarce more stimulate nature to disburthen her selfe both upwards and downwards, then doth sometimes an humor, such as that which causes the *Cholera morbus*, and perhaps more violent diseases.

And that such degenerations of Innocent aliments should sometimes happen in discompos'd bodies, you will perhaps think the lesse strange, if you duly perpend what I lately mention'd, of the transmutation of Water into hot and vesicatory substances; and if thereto I annex, that from a single pound of so common and temperate an Aliment as Bread, I can by an easie way, (and that without addition,) obtaine many ounces of a *menstruum*, which (as tryall has inform'd) will worke more powerfully upon bodies, more compact then some hard mineralls, or perhaps Glasse it selfe: then a wary Chymist would expect to see *Aqua fortis* doe. These things I have mention'd, *Pyrophilus*, to intimate some of the Reasons, why I think Chymicall Experiments may be usefully apply'd, to illustrate some things in Pathologie, either by imitating out of the body, the production of some sorts of morbifick matter, or by such resolutions of that which is generated in the body, as may conduce to the discovery of its nature. And not that

I think, as Spagyrist do, the experiments or notions of vulgar Chymists sufficient to explicate the whole doctrine either of Digestion or of Diseases: for it would be very difficult for them to make out the manner of Nutrition, or so much as how they that feed only on Vegetables, should (to propose the difficulty in their own Terms) have their Blood and Urine copiously enrich'd with a volatile sulphureous Salt, of which sort, plants are not wont to yeild any in distillation. And much more difficult would it be for them by principles peculiar to Chymists to make out the propagation of Hereditary diseases: or how madnesse, & some other distempers, that do not visibly vitiate the organs of those functions that they pervert, should not only prove hereditary, but lurk very many yeares in the inheriting person's body, before they begin to disclose themselves: and sometimes too, be transmitted from the Grandfather to the Grand-child, and skip immediately the intervening Son. And therefore I say again, that I pretend not that Vulgar Chymistry will enable a Physitian to explicate all or most of the Pathologicall *Phænomena*, but that True Chymistry may assist him to explicate diverse of them, which can scarce be solidly explicated without it. And let me adde, that he that thoroughly understands the nature of Ferments and Fermentations, shall probably be much better able then he that ignores them, to give a fair account of divers *phænomena* of severall diseases (as well Feavers as others) which will perhaps be never thoroughly understood, without an insight into the doctrine of Fermentation, in order to which, for that and other reasons, I design'd my Historicall notes touching that subject.

Yet I am not sure, but there may be effervescences, (and perhaps periodical ones) in the Blood and other Juices of the body without Fermentation properly so call'd. For there may be divers other waies of begetting a præternaturall heat
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in the Blood. We often see that in Coughs, when the flegme is rottten (as they speak) that is, when its former viscous texture is alter'd, it does no longer stick fast to the vessels of the Lungs, to which it obstinately adher'd before. And so at certain times other humors in the body, either by growing more fluid themselves, or by some change in the Blood, whereby it becomes fitter to dissolve such humors, may swimme in, and be circulated with, the masse of blood, and thereby occasion præternaturall heats: *either* by their indisposition to be well, and incorporated therewith: *or* by altering its texture: *or* disturbing the wonted motion of its minute parts: *or* by opposing its due Rarefaction as it passeth through the Heart: *or* by obstructing the more slender Vessels, and so hindering the free Circulation of the Blood through them; perhaps also causing some Extravasation, as we see that wounds & bruises are attended with some inflammation, more or lesse, of the part affected; *or* by some other of the waies not now to be declared. And tryall hath taught me, that there are Liquors, in which the bare admixture of Milk, Oyle, or other Liquors, nay or of cold water, will presently occasion a notable heat: and I sometimes imploy a *menstruum*, in which nothing but a little flesh being put, though no visible Ebullition ensue, there will in a few minuts, be excited a Heat, intense enough to be troublesome to him that holds the Glasse. And yet it seems not necessary that this should be ascrib'd to a true fermentation, which may rather proceed from the perturb'd motion of the Corpuscles of the *menstruum*, which being by the adventitious liquor or other body put out of their wonted motion, and into an inordinate one, there is produc'd in the *menstruum* a brisk confus'd Agitation of the small parts that compose it; and in such an agitation, (from what cause soever it proceeds,) the nature of Heat seems mainly to consist. But to dispatch, I scarce doubt, but that if in the history of diseases, there were better

notice taken of those *Phænomena*, that agree not with the opinions already in request, as well as of those that are thought consonant to them; and if also Chymicall tryals were skilfully varied and judiciously applyed to the illustrating of Pathologicall *Phænomena*, the former might be made conducing to the better explication of the latter: especially if the businesse were mannag'd by a Naturalist well ver'd both in Chymicall Experiments, and in Anatomy, and the history of Diseases, without being too much addicted either to the Chymist's notions, or the receiv'd opinions of Physitians.

And as the Naturalist may thus illustrate Pathologie as a Chymist, so may he do the like as a Zoologer; for either the true knowledge of Anatomy must be much lesse usefull to Physitians then they have hitherto beleived, or else the discoveries made by recent Anatomists of the *Asellian*, *Pecquetian*, and *Bartholinian* vessels, by either overthrowing the receiv'd doctrine of Digestions, (from whose aberrations many diseases spring) or at least by making diverse discoveries in relation to the æconomy of Digestions unknown to the Ancients, most probably contribute much to the clearing up of diverse Pathologicall difficulties in the explication of some diseases; besides, that the very liberty of making those Experiments in live Beasts, which are not to be made but in living creatures, nor are allowable to be made in living men, may enable a Zoologist, by giving us a clearer account of divers parts of the body, to determine divers Pathologicall difficulties springing from either our ignorance or mistakes of the use of those parts, as by the formerly mention'd Experiment of the extirpation of a live dogge's Spleen, and a watchfull observation of all the diseases upon that Account, befalling him and other Dogs so serv'd; much light perhaps may be given to the doctrine of the use of the Spleen, together with the diseases supposed to depend on that part, which I fear is hitherto (to the no
small

small prejudice of the Sick) by few Physitians thoroughly understood, and by many unhappily enough mistaken.

And here we may represent unto you, *Pyr:* that not only the dissections of sound Beasts may assist the Physitian to discover the like parts of a humane body, but the dissections of morbid beasts may sometimes illustrate the doctrine of the causes and seats of diseases. For that this part of Pathology has been very much improved by the diligence of modern Physitians, by dissecting the bodies of men kill'd by Diseases, we might be justly accused of want of curiosity, or gratitude, if we did not thankfully acknowledge, For indeed much of that improvement of Physick, (for which the Ancients, if they were now alive, might envy our new Physitians) may, in my poor opinion, be ascribed to their industrious scrutiny of the Seat and Effects of the peccant matter of Diseases in the bodies of those that have been destroyed by them.

And that the instructions deducible from such observations may be either increased or illustrated by the like observations made in the bodies of Beasts, we have been inclin'd to think, partly by the having Chymically analyz'd (as they phrase it) the blood of divers Bruits, as Sheep, Deer, &c. and found its Phlegme, Spirit, Salt, and Oyle, very like that of humane blood; and partly by our having observ'd in the bodies of severall Bruits, (not excepting Fishes) Wormes, Imposthumes, and the like, some of which seem'd manifestly to spring from such causes, as are wont to produce resembling distempers in men: and if the acute *Helmont* had been a more diligent dissector of Beasts, he would perchance have escaped the Error he after others run into (and into which his Authority hath tempted others to run) when he affirm'd, that the Stone was a disease peculiar to men, for, that in the bodies of Beasts, especially very Old ones, Stones are sometimes to be found, not only severall Butchers have assur'd me, but you may gather partly

partly from that taken out of an Oxe's Gall, which I have formerly mention'd, which was about the bignesse of a Wall-nut) but principally from what I elsewhere deliver'd on purpose to disprove that fond assertion: and greater leasure may, upon another occasion, invite us to mention some pathologicall Observations made in diseased Beasts, by which, (were we not willing to hasten,) we might now perhaps much confirme what we have propos'd touching the possibility of illustrating, by such Observations, the nature of some of the Diseases incident to humane bodies.

And here we may also consider that there are diverse Explications of particular Diseases, or troublesome Accidents propos'd by Physitians, especially since the Discovery of the Bloods Circulation, wherein the Compression, Obstruction, or Irritation of some Nerve, or the Distension of some Veine by too much Bloud, or some Hinderance of the free Passage of the Bloud through this or that particular Vessell, is assign'd for the cause of this or that Disease or Symptome. Now in diverse of these cases the Liberty lately mention'd, that a skilfull Dissector may take in Beasts, to open the Body or Limbs, to make Ligatures strong or weak on the vessells, or other inward parts, as occasion shall require, to leave them there as long as he pleaseth, to prick, or apply sharp liquors to any nervous or membranous part, and whenever he thinks convenient, to dissect the Animall again, to observe what change his Experiment hath produc'd there: such a Liberty, I say, which is not to be taken in humane bodies, may in some cases either confirme or confute the Theories propos'd, and so put an end to diverse Pathologicall Controversies, and perhaps too occasion the Discovery of the true and genuine causes of the *Phænomena* disputed of, or of others really as abstruse.

To this let me adde, that there is a whole *classis* of diseases
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to be met with in Physicians Books, which proceed not originally from any internal distemper of the Patient, but are produced by some exterior Poyson, and are therefore wont to be call'd by Doctors, *Morbi à veneno orti*, to the more accurate knowledge of divers of which Diseases, Experiments made on Bruits may not a little conduce: For though I deny not that some things may be Poysons to Man, that are not so to some Beasts; and on the contrary (as we have more then once given to a Dog, without much harming him, such a quantity of *Opium*, as would probably have suffic'd to have kill'd several Men) yet the greater number of Poysons being such both to Man and Bruits, the liberty of exhibiting them, when, and in what manner we please, to these (which we dare not do to him) allows us great opportunities of observing their manner of operation and investigating their Nature, as our selves have tryed, and that sometimes with unexpected events (as when lately a Cat ran mad, so that her Keeper was fain to kill her) upon a large dose of *Opium* which we caus'd to be given her.

And on this occasion I shall not scruple to transcribe an Observation out of a Discourse, I some years since writ to a Friend, about the turning Poysons into Medicines, because that Treatise, I am like, for certain reasons, to suppress: The words, as I there finde them, are these,

Before I take leave of Vipers (or Adders, as some will have, those that here in England commonly pass for Vipers) it will not be impertinent to tell you, That it may be justly doubted, whether they be to be reckon'd amongst poysonous Creatures, in such a sense as those other venomous Creatures, who have in them a constant, and, if I may so speak, gross and tangible Poyson; for it may be suppos'd, that the venom of Vipers consists chiefly in the rage and fury wherewith they bite, and not in any part of the Body, which hath at all times a mortal property: Thus the

madness of a Dog makes his teeth Poysonous, which before were not so: And Authors of good repute supply us with instances of hurts in themselves, free from danger, that have been made fatal by a Venom created by the fierceness of the enraged (though not otherwise poysonous) Creatures that inflicted them. And Baccius, if I mistake not, in his Treatise De Venenis, tells us a memorable Story (whereof he affirms himself to have been an eye-witness) of a Man who was kill'd within three days, by a slight hurt received in his left hand, from an enraged Dung-hill Cock: And that no parts of the Viper have any constant inherent Poyson in them, I have been induced to suspect upon this Experiment; That dissecting some live Vipers, there came in accidentally a strange Dog, to whom I gave the Head, Tail, and Gall (which are the parts supposed to contain the Poyson) of one of them, and the Head and Gall of another, wrapt up in meat; after which, I locked the little Dog up in my own Chamber, and watched him, but found not that he was sick, or offerd to vomit at all, but onely lap'd up greedily some drink which he espyd in the Room; nor was he alone very jocund, for divers hours that I kept him in, but liked his entertainment so well, that he would afterwards, when he met me in the Street, leave those that kept him to fawn on and follow me. And having since related this Experiment to an inquisitive Friend of mine, he assured me, That to satisfie himself further in this particular, he gave to a Dog a dozen Heads and Galls of Vipers, without finding them to produce in him any mischievous symptome: To which I shall adde, That the old Man, you know, that makes Viper Wine, does it (as himself tells me) by leaving the whole Vipers, if they be not very great, perhaps for some moneths, without taking out the Galls, or separating any other part from them in the Wine, till it hath dissolved as much of them as it can.

And though it may seem somewhat improper, whilst we are discoursing of Poysons, to insist on a remedy against them; yet the

the mention of *Vipers* recalling into my minde a memorable Experiment which I tryed against the biting of *Vipers*, I shall choose rather to decline the dictates of Method, then those of Charity, which forbids me to suppress a remedy that may possibly rescue from sudden death, a Person or other fit to live, or unprepar'd to dye; because it does not strictly belong to the Theme whereto it is referred. The remedy then is this, That as soon as ever a Man is bitten (for if the Poyson have had time enough to diffuse it self, and gain the Mass of Blood, I doubt the Experiment will scarce succeed) a hot Iron be held as near the place as the Patient can possibly indure, till it have, as they speak, drawn out all the Venom: which Eye-witnesses assure me (for I have not yet seen that my self) will sometimes adhere like a yellowish spot to the surface of the Iron. But being upon competent grounds satisfied of the Experiment, to convince a Physitian that mistrusted it, I last Summer hired a Man (who doubted it as little as I) to suffer himself to be bitten by a *Viper*; and having in the Physitians house and presence, picked out of a good number of them one of the blackest I could finde (those of that colour being supposed the most mischievous) and commanded the fellow to provoke and anger it (which to my wonder he did, a pretty while before the Beast would fasten on him) At length, being by his very rude handling thoroughly exasperated, it bit him with great fury, as it seem'd, for immediately his hand began to swell, and the injured part was grown tumid before we could take from the Fire, which was hard by, a knife that lay heating there; and having apply'd it as near as he could suffer it, for about ten or twelve minutes, we found that the swelling, though it decreased not, did not spread; and the Man glad of his money, without further Ceremony, went about his affairs, and told me since, That though the tumor continued a while, he had no other inconvenience attending it, and hath divers times got money by repeating the Experiment; though

otherwise, by the casual bitings of *Vipers*, he hath been much distressed, and his Wife almost kill'd.

But, *Pyrophilus*, to return to the Experiments of Poysons made on Beasts, we could wish Physitians were more diligent to make tryals of them, not onely by giving Beasts poysons at the mouth, but also by making external applications of them, especially in those parts where the Vessels that convey Blood more approach the surface of the Body, and also by dexterously wounding determinate Veins with Instruments dipt in Poysons (especially moist or liquid ones) that being carried by the circulated Blood to the Heart and Head, it may be found whether their strength be that way more uninfringed, and their operation more speedy (or otherwise differing) then if they were taken in at the mouth. For I remember sober Travellers have shew'd me some *Indian* Poysons, whose noxious efficacy they affirm'd to be by great intervals of time, differingly mortal, according as the slight hurt made by the points of Arrows, infected with them, did open a capillary, or larger Vein, and were inflicted on a part more or less distant from the Heart; but having not yet made any tryal of this my self, I dare not build upon it. Yet I finde that the formerly commended *Olearius*, in his Travels into *Muscovie* and *Persia*, takes notice of a venomous Insect in *Persia*, which the Natives call *Encureck*, and which he (how justly I know not) makes to be a kinde of *Tarantula*, because it is, as that Creature, in shape almost like a Spider, and speckled, though of twice the bigness of a Thumb: This Insect (says he) instead of stinging or biting, lets his Venom fall in form of a drop of Water, which immediately produces insufferable pains in the part to which it fastens, and suddenly penetrating, as far as to the Stomach, sends up vapors to the Head, which sends again (to use his expression) so profound a sleep to all the Patients limbs,

*Voyage de
Mosco-
vie & de
Perse,
pag. 334*

limbs, that it is impossible to awaken him, but by one onely Remedy, which is to crush one of these Creatures upon the hurt, whence he abstracts all the Poison. Some horrid and unusual symptomes of this Venom, which yet agree not so well with those that are wont to be produc'd in persons bitten by *Tarantula's*, our Author proceeds to mention; and furnishes us with a proof of what we were lately saying, when we told you that some things were poysonous to Men, which were not to some Beasts: by adding, as an admirable singularity, that the Sheep of those parts do not onely eat these fatal Insects, but seek for them. I know also, by sad experience in my self, what an outward application even of *Cantharides* can do; for having occasion to have a large blister drawn on my Neck, the Chirurgion I employed, unknown to me, made use of *Cantharides*, among other Ingredients of his vesicating Plaister, which a few hours after I had taken it, waken'd me with excessive torment, to which it put me about the neck of my Bladder, so that I apprehended it might proceed from some Stone unable to get out; of which sudden and sensible pain, after I had a while in vain conjectur'd what might be the cause, I at length suspected that which was indeed the true one; and having sent for the Chirurgion, he confess'd to me, upon my demand, that he had put some *Cantharides* in his Plaister, not thinking it would have had such an operation: whereupon I soon reliev'd my self, by drinking new Milk very well sweetned with Suger candy.

Postscript.

Postscript.

TO enable you, *Pyrophilus*, to gratifie those inquisitive Persons that have heard some, and yet but an imperfect Report, of a much nois'd Experiment, that was some Years agoe devis'd at *Oxford*, and since try'd in other places before very Illustrious Spectators; I am content to take the occasion afforded me, by what was in the foregoing Essay lately mention'd concerning the Application of Poysons, to inform you, That a pretty while after the writing of that Essay, I happen'd to have some Discourse about matters of the like Nature, with those excellent Mathematicians, Dr. *I. Wilkins*, and Mr. *Christopher Wren*; at which the latter of those *Virtuosi* told us, That he thought he could easily contrive a way to convey any liquid Poision immediately into the Mass of Blood. Whereupon, our knowledge of his extraordinary Sagacity, making us very desirous to try what he propos'd, I provided a large Dog, on which he made his Experiment in the presence, and with the assistance of some eminent Physicians, and other learned Men: His way (which is much better learn'd by sight, then relation) was briefly this: First, to make a small and opportune Incision over that part of the hind-leg, where the larger Vessels that carry the Blood, are most easie to be taken hold of: Then to make a Ligature upon those Vessels, and to apply a certain small Plate of Brasse (of above half an Inch long, and about a quarter of an Inch broad, whose sides were bending inwards) almost of the shape and bigness of the Nail of a Mans Thumb, but somewhat longer. This Plate had four little holes in the sides, near the corners, that by threads pass'd thorow them, it might be well fasten'd

fasten'd to the Vessel: And in the same little Plate there was also left an Aperture, or somewhat large Slit, parallel to the sides of it, and almost as long as the Plate, that the Vein might be there expos'd to the Lancet, and kept from starting aside. This Plate being well fasten'd on, he made a Slit along the Vein, from the Ligature towards the Heart, great enough to put in at it the slender Pipe of a Syringe: By which I had propos'd to have injected a warm solution of *Opium* in Sack, that the effect of our Experiment might be the more quick and manifest. And accordingly our dexterous Experimenter having surmounted the difficulties which the tortur'd Dogs violent struglings interpos'd, convey'd a small Dose of the Solution or Tincture into the open'd Vessel, whereby, getting into the mass of Blood (some quantity of which, 'tis hard to avoid shedding in the operation) it was quickly, by the circular motion of That, carry'd to the Brain, and other parts of the Body. So that we had scarce unty'd the Dog (whose four feet it had been requisite to fasten very strongly to the four Corners of the Table) before the *Opium* began to disclose its Narcotick Quality, and almost as soon as he was upon his feet, he began to nod with his head, and falter and reel in his pace, and presently after appear'd so stupifi'd, that there were Wagers offer'd his Life could not be sav'd. But I, that was willing to reserve him for further observation, caus'd him to be whipp'd up and down the Neighboring Garden, whereby being kept awake, and in motion, after some time he began to come to himself again; and being led home, and carefully tended, he not onely recover'd, but began to grow fat so manifestly that 'twas admir'd: But I could not long observe how it far'd with him. For this Experiment, and some other tryals I made upon him, having made him famous, he was soon after stoin away from me. Succeeding attempts inform'd us, that the Plate was not necessary, if the Finger were
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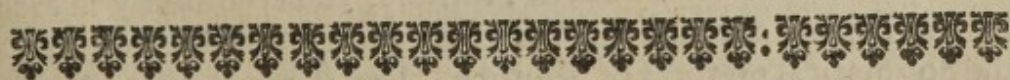
skilfully employ'd to support the Vessel to be opened; and that a slender Quill, fasten'd to a Bladder, containing the matter to be injected, was somewhat more convenient than a Syringe; as also that this notwithstanding, unless the Dog were pretty big, and lean, that the Vessels might be large enough and easily accessible, the Experiment would not well succeed: The Inventor of it afterwards practic'd it in the presence of that most Learned Noble-man, the Marquess of *Dorchester*, and found that a moderate Dose of the infusion of *Crocus Metallorum* did not much move the Dog, to whom it was given: but once that he injected a large Dose (about two Ounces or more) it wrought so soon, and so violently upon a fresh one, that within a few hours after he vomited up Life and all, upon the Straw whereon they had laid him. I afterwards wish'd, that not onely some vehemently working Drugs, but their appropriated Antidotes (or else powerful liquid Cordials) and also some altering Medicines, might be in a plentiful Dose injected. And in Diureticks, a very ingenious Anatomist and Physitian told me, he try'd it with very good success. I likewise propos'd, That if it could be done, without either too much danger or cruelty, tryal might be made upon some humane Bodies, especially those of Malefactors. And some Moneths after a foreign Ambassador, a curious Person, at that time residing in *London*, did me the Honor to visit me, and inform'd me, That he had caus'd tryal to be made, with infusion of *Crocus Metallorum*, upon an inferior Domestick of his that deserv'd to have been hang'd; but that the fellow, as soon as ever the Injection began to be made, did (either really or craftily) fall into a Swoon; whereby, being unwilling to prosecute so hazardous an Experiment, they desisted, without seeing any other Effect of it, save that it was told the Ambassador, that it wrought once downward with him, which yet might, perhaps, be occasion'd for fear or anguish: But the
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tryals of a very dexterous Physitian of my acquaintance in humane Bodies, will, perhaps, when I shall have received a more circumstantial account of them, be not unwelcome to you. And in Dogs, you may possibly from our own Observations, receive a further Account of an Experiment, of which, I now chiefly design'd but to relate to you the Rise and first Attempts.



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ESSAY III.





ESSAY III.

*Containing some Particulars relating to the
Semiological Part of Physick.*

THe *Semiological* part of the Physicians Art, seems capable of the least improvement by Natural Philosophy. In which yet, *first* the Naturalist may, by illustrating the Anatomical and Pathological parts, assist the Physician to make more certain conjectures from the signs he discovers of the constitution and distempers of his Patient. For you will easily believe that *ceteris paribus*, he that better knows the nature of the parts and juices of the Body, will be better able to conjecture at the events of Diseases, than he that is less skill'd in them. And *secondly*, The Naturalist by improving the *Therapeutical*, may, at least, much change and alter the Prognosticks of the duration, ferocity and event of Diseases. For, *Pyrophilus*, it would be considered, that the Predictions hitherto current in Authors, and commonly made by Physicians, suppose the use of the received Remedies, and the dogmatical method of Physick; but if there were discovered such generous and commanding Medicines, as, by powerfully assisting Nature, or nimbly proscribing the Morbifick Matter that doth either produce or (though produc'd by them) cherish Sicknesses, might enable Nature to hinder the Disease from continuing its course, and acting almost all the
Scenes

Scenes of its Tragedy in the Body; Physicians need not, in acute Diseases, wait so often for a *crisis* to instruct their Prognosticks, and the threatening Symptoms of Chronical Distempers would often prove false Prophets.

To illustrate this but with a not ignoble instance, give me leave to tell you, That when that *Peruvian* Bark, that now begins to be somewhat taken notice of, under the name of *The Jesuits Powder*, had scarce been so much as heard of in this part of *Europe*, I went to visit a *Virtuoso*, who had been for some Moneths afflicted with a Quartan Ague, so violent and stubborn, that it had frustrated the skill, and almost tyred the indeavors of the most eminent Doctors of this Nation; of one of which, who was then accidentally with his Learned Patient, I enquired how my Friend did, and was answered, That he hoped he would recover when the Season would give him leave; but in the Winter he knew no Quartanes cured. Yet the Gentleman acquainting me with his having procured some of the *American* Bark against Agues, which we mentioned in a former Essay, and I (after having tasted and considered it) having encouraged him, as I have others, to make Tryal of it; as the strange Effects I have observ'd of it, hath divers times invited me to do: The candid and learned Doctor, not onely oppos'd not my Perswasions, but added his own to them. And my Friend taking two Doses of this Powder'd Bark, though it were at the unhopfullest Season of the Year (the Winter Solstice) and though he scarce found any sensible operation (unless a little by sweat) of the *Peruvian* Medicine, had by the first Dose his Fit very much lessen'd, and by the second quite remov'd. And though through some irregularities of Dyet (to which that keen Appetite, like that of recovering Persons, which I have observ'd this Powder to be wont to produce, tempted him) he did, as I then foretold him he would, after missing eight or ten Fits, relapse; yet by the

repeated use of the same Remedy, he again recover'd, and hath continu'd so ever since. Having also lately perswaded the use of the same Medicine, in the same Disease, to one of the greatest Ladies in this Nation, she told me the other day, That it immediately, and in unlikely weather, freed her from those Fits, from whence she despair'd to be deliver'd till the Spring. Having likewise sent some of it to a couple of Gentlemen, sick of the like Malady, I had word brought me; That the one had miss'd his Fits for a Moneth, though in the midst of Winter; and the other was by the first Dose cur'd, and continues so. And divers eminent Physitians, to whom I have commended this Specifick, have us'd it with such success, that one of the severest of them, though he had formerly despis'd it, confess'd to me, that in a short time he try'd it upon eight or nine several Persons, without finding it to fail in any, though one of them especially, were, before he was call'd, judg'd irrecoverable; the obstinate Quartan being complicated with other almost as dangerous Distempers. And I confess, I somewhat wonder that Men have not the Curiosity to try the efficacy of this powerful Bark, in other Diseases then Agues: It being highly probable, That a Medicine, capable to prevail so strongly against so obstinate a Disease, as a Quartan (wherein most commonly divers of the considerabler parts of the Body are much affected) cannot be useless to several other Distempers. I deny not that those that have taken this Powder, have divers of them, after having miss'd six or seven Fits, relaps'd into them (as it likewise happen'd to one of the Gentlemen I sent it to) yet (as I have elsewhere told you) it is much, and more then any common Remedy does to stop the Fits so long. Nor is it a small matter to be able to give the Patient so much breathing time, and allow the Physitian the opportunity of imploying other Remedies. And the Relapses we speak of are commonly cur'd by

by the same Powder: And we have known them prevented, when the Medicine hath been administred, not by unskilful Persons, but by a prudent Physitian who knows how to assist it, by opening and gently purging Physick. Wherefore that which I should the most gladly be satisfied of, about this Remedy, is, whether or no it do indeed either proscribe the Morbifick Matter, or so alter its Texture as to make it harmless; or else, whether it doth secretly leave such noxious Impressions upon the Spleen, Guts, or some other important Part, as may shorten Life, by producing in process of time, either the Scurvy, or the Dropsie, or some other formidable Disease. But because the Resolution of this Doubt must be a work of time, we must at present refer it to future Observations, And therefore shall now subjoyn, that if the famous *Riverius* have not, in his learned Observations, flatter'd his own *Febrifugum*, whatever be resolv'd touching this *Indian* Bark, there will not want a safe Remedy which may allow Physicians to make more cheerful Predictions about the lastingness and event of Quartains, then have hitherto been usual.

*Riverius in
Observat.*

How painful and stubborn a Disease, the Kings Evil is wont to prove, is scarce more known, then that 'tis seldom cur'd without a tedious course of Physick: And yet, by the Herbs mention'd in one of the former Essays, the yong Gentleman there spoken of, was cur'd in a short time, and with little or no pain or trouble. And that these are not the onely Diseases in which Observations, tending to our present purpose, may be made, the following part of this Treatise will afford you opportunity to observe.

I might adde, *Pyrophilus*, that I was lately visited by an ancient Chymist, ennobled by divers eminent cures, who promises to me an Experiment of making very unusual, and yet rational Predictions in some abstruse Diseases, by a peculiar way of examining the Patients Urine. But because some
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Chymists have written extravagantly enough upon a like subject; and because I have not yet made or seen the Experiment of it my self, I dare not yet give this new method of foretelling, for an instance of the Usefulness of Natural Philosophy to the Semiotical part of Physick. Though I dare not deny but by precipitations, and some other ways not yet vulgarly practiced of examining the Urine, made by the same Patient at several times, before, in, and after some notable alteration in his Body, divers things (especially in Feavors, and other acute Diseases) relating to the state of it, may be discover'd, especially if thereto be added a skilful and seasonable Chymical *Examen* of the other Excrements, and vitiated Substances of the Patients Body.

You will perchance expect, *Pyrophilus*, that on this occasion I should handle that controverſie which is so hotly agitated, betwixt the *Paracelsians* and their Adversaries, concerning the curableness of all Diseases: But, for ought I can perceive, the difference betwixt the more sober Men of both parties, is more about Words then Things, and might be reduced to a much less distance, if Men could but calmly consider, That 'tis one thing to dispute, *Whether all Diseases be curable*; and another, *Whether all Persons be recoverable*: For a Disease may be call'd incurable, either in its own Nature, or by accident; that is, either because such a Disease is not to be cur'd in any Patient, or that it is so circumstantiated in this or that Patient, as not to be naturally curable in him. Now this distinction, duly consider'd, may conduce much to reconcile the two Opinions, if not the Parties that maintain them: For neither would a sober *Paracelsian* affirm (though *Paracelsus* himself doth somewhere seem to do so) That every Disease is curable in every Patient; there being some Palsies, Gouts, or Blindnesses, or the like, so obstinate, that (especially if they are born with a Man, or inherited from his Parents)

rents) the tone of some necessary or considerable part of the Body, being thereby rather abolished, then barely vitiated, it were a folly to promise recovery to such a Patient. And on the other side, a moderate *Galenist*, that is not unacquainted with the Discoveries which these latter Ages have made, of the power of Nature and Art, will not be forward to pronounce (as others do, and as the *Paracelsians* tax the *Galenists* too indiscriminately for doing) That the Gout (for instance) the Dropsie, the dead Palsie, the Stone, are Diseases universally incurable: Since, in the Writings of *Erastus*, and in the Observations of *Schenkius*, and others, there are Instances recorded of some Cures performed of the Dropsie, and one or two more of those stubborn Diseases, even by *Galenical* Remedies.

But, *Pyrophilus*, though we cannot but disapprove the vain-glorious Boasts of *Paracelsus* himself, and some of his Followers, who, for all that, lived no longer then other Men; Yet I think Man-kinde owes something to the Chymists, for having put some Men in hope of doing greater Cures, then have been formerly aspir'd to, or even thought possible, and thereby ingage them to make Tryals and Attempts in order thereunto. For not onely before Men were awaken'd and excited by the many Promises, and some great Cures of *Arnoldus de villa nova*, *Paracelsus*, *Rulandus*, *Severinus* and *Helmont*; Many Physitians were wont to be too forward, to pronounce Men, troubled with such and such Diseases, incurable, and rather detract from Nature and Art, then confess that those two could do what ordinary Physick could not. But even now, I fear there are but too many, who though they will not openly affirm, that such and such Diseases are absolutely incurable; yet if a particular Patient, troubled with any of them, be presented, they will be very apt to undervalue

dervalue (at least, if not) deride those that shall attempt and hope to Cure him.

And I am apt to think, that many a Patient hath been suffered to die, whose Life might have been saved, if Physitians would have but thought it possible to save it. And therefore I think it were no ill piece of service to Mankind, if a severe Collection were made of the Cures of such Persons as have recovered after having been judg'd irrecoverable by the Doctors: That Men might no longer excuse their own Ignorance by the impotency of Nature, and bear the World in hand, as if the Art of Physick, and their skill, were of the same extent. And the Cures that seem performed by Nature herself, need not be left out of such a Collection: For still they shew what is possible to be done by Natural means, to evacuate the Morbifick matter, or alter its Nature (how dangerous soever it is grown) Or how far the tone of a part or strength of the Body may be vitiated or impaired, and yet be capable of some restitution. And such an observation I receiv'd from our most experienced *Harvy*, when, having consulted him about my weak Eyes, he told me, among other things (as a very remarkable one) that he had once a Patient (whose Name and Profession he told me, but I remember not) that had a confirm'd Cataract in his Eye, and yet upon the use of Physick, to which he could not ascribe so wonderful an effect, that Cataract was perfectly dissipated, and the Eye restored to its wonted Function. Which brings into my minde another Observation, imparted to me, a while since, by that excellent and experienc'd Lithotomist, Mr. *Hollyer*, who told me, that among the many Patients sent to be cured in a great Hospital (of which he is one of the Chirurgions) there was a Maid of about eighteen Years of age, who, without the loss of motion, had so lost the sense of feeling in the external parts of her

her Body, that when he had, for tryal sake, pinn'd her Handkerchief to her bare Neck, she went up and down with it so pinn'd, without having any sense of what he had done to her. He added, That this Maid having remained a great while in the Hospital without being cured, Dr. Harvey, out of Curiosity, visited her sometimes; and suspecting her strange Distemper to be chiefly Uterine, and curable onely by *Hymeneal* Exercises, he advised her Parents (who sent her not thither out of poverty) to take her home, and provide her a Husband, by whom, in effect, she was according to his Prognostick, and to many Mens wonder, cur'd of that strange Disease. That in acute Sickneses, Persons given over by the Physitians, may recover, the more judicious, even of those *Galenists* that are of a dispondent temper, will not deny. For not onely *Celsus* gives us this sober admonition, *Neque ignorare oportet in acutis morbis fallaces magis notas esse & salutis & mortis*; But even *Hypocrates* himself, who was so skilful in Prognosticks, confesses, that *Morborum acutorum non in totum certa sunt prænunciationes neque salutis neque mortis*: Whence the French have a Proverbial saying, that *Il vaut mieux estre condamné par les Medecins, que par le Prevost des Marechaux*, as if in English we should say, *It is better to be condemn'd to die by the Doctor, then by the Judge*. And even in Chronical Diseases, where Events are wont much better to answer Physitians Predictions, there are sometimes such Cures performed, as may encourage humane Industry, and keep a sick Mans friends from forsaking the Cure of him, till Life it self have unquestionably forsaken him. For not onely it hath been not unfrequently seen, that divers Persons, who have been given over by some Physitians, have been cur'd by others, perchance rather more lucky then more skilful: But those that have been given over, and that too (sometimes rather upon the believ'd incurableness of the Disease, then the

personal Condition of the Patient) even by judicious and experienced Physitians, if such as are acquainted but with the ordinary Remedies, have been recover'd by the use of extraordinarily powerful, and especially, Chymical Physick. Of such Cures I have sometimes met with a few, which, because I may elsewhere relate, I shall now onely mention, on this occasion, what I have heard concerning the cures of Cancers, performed by Dr. *Haberfeld*, one of the principal Physitians of *Bohemia*. And among other relations, of this kinde, made me by credible Persons, I cannot omit one, that was, Of a certain English Woman, of sixty and odde Years of age, who had long lain in an Hospital in *Zeeland*, sick of a Cancer in the Brest, and by this Doctor was, with one single inward Remedy, perfectly cured in the space of three Weeks. For this relation was made me by persons of very strict veracity; the one a Doctor of Physick, who was an Eye-witness of the Cure; the other a Childe of *Cornelius Drebell's*, who not onely saw the Cure, but knew the Woman before, and out of Charity brought her to him that heal'd her. The same Persons likewise inform'd me, That the Chymical Liquor the Doctor constantly made use of, does, in the Dose, of about a spoonful or two, work suddenly and nimbly enough by Vomit, but hath very quickly ended its operation, so that within an hour, or less, after the Patient hath taken it, he is commonly well again, and very hungry. And they having presented me some spoonfuls of this Liquor, I finde the taste to be offensive enough, and not unlike that of Vitriol, which, by the taste and emetick operation, I guess to be, at least, its principal Ingredient, however it be prepared. The same Persons assured me, that having obtain'd of Dr. *Haberfeld* a good quantity of his Specifick, they had been (in *England*, as well as elsewhere) partly Eye-witnesses, and partly Performers of wonderful Cures by the help of it alone, under God,

God, in the Kings Evil. Infomuch that an eminent Gentleman of this Nation, now alive and healthy, hath been cured by it, when the Kings Evil had brought his Arm to that pass, that the Chirurgions had appointed a time to cut it off. And with the same Liquor, onely taken inwardly, they profess themselves to have seen and done divers Cures of inveterate external Ulcers, whose proud Flesh, upon the taking of it, is wont to fall off, and then the Ulcer begins to heal at the bottom; but of the recent effects of this Liquor, we may elsewhere, perhaps, further entertain you. That Suffusions or Cataracts, may, by a manual operation, be cured even in a Patient that was born with them, I formerly told you, when I related the Cure done by my Ingenious Acquaintance, Mr. *Stepkins*, on a Gentlewoman of about eighteen Years of age, that brought a couple of Cataracts with her into the World. And I remember I was sometime since in the company of another Woman, who told me, She was brought to Bed of five Children (if I much mistake not the number) successively; of which, she saw not any in a long while after, by reason of a couple of Suffusions, that had many Years blinded her; and yet now, by the help of a Dutch Oculist of my Acquaintance, she sees, and reads well, and hath freely enjoyed the restored use of her Eyes for some Years already.

But these are rather Chirurgical, then Medicinal Cures, and therefore we shall subjoyn the Mention of a very memorable Observation of the Learned *Petronius*, which being collated with that a little above recited, from Dr. *Harvey*, they may serve to keep each other from passing for incredible: *Quidam* (says our Author) *qui antequam Morbo Gallico afficeretur, altero oculo cecus erat, suffusione densissimâ (vulgus Cataractam vocat) oculum occupante, Hydrargyri inunctione à Morbo Gallico, & à suffusione, quod maximè mirum est, evasit. Neq; à ratione alienum est inunctione illa Cataractas posse dissolvi, cum*

Alexand:
Trajan Pe-
tronus, lib.
5. De Mor:
Gallico, c.
1. apud
Skenkium.
in Observ:
lib. 1.

fre-

*frequens Experientia doceat praeduros tumores ex pituita crassa
& concreta, genitos, illitu Hydrargyri potenter dissolvi.*

I need not tell you what sad Prognosticks Physitians are wont to make of Dropsies, especially of that sort which they call *Ascites*: And indeed the Event does but too frequently justify their Predictions, when none but ordinary Remedies are employ'd. But I remember, that being acquainted with an Ingenious Person that was very happily cured of a Dropsie, and inquiring who it was that had perform'd the Cure; I was inform'd, that that, and a multitude of the like had been wrought by a *Germane* Physitian, of whom, and of his Remedy, I had heard much Commendation in *Holland*, where he liv'd: And though on divers occasions I found him a modest Man; and accordingly, when I ask'd him concerning his Cures of the Dropsie, he answered me, That he neither did, nor would undertake to cure so formidable a Disease; yet he scrupled not to tell me, That as far as he had hitherto try'd, he had one Remedy which had not fail'd him, though he had try'd it upon persons of differing Ages, Sexes, and Complexions. But of this Specifick more hereafter. For, at present, I must proceed to take notice, that as incurable a Disease as the radicated Gout is thought to be (especially in Patients not very temperate) and as tedious a course of Physick as one would expect to be requisite to the Cure of it, in case it can be cur'd; Yet I have been several times visited by an honest Merchant of *Amsterdam*, who was there noted for his Wealth, and his skill in *Arte tinctoria*: This Man, ten or twelve Years ago, had been for a long time so tormented with the Gout, both in Hands and Feet, that his Fits would sometimes vex and confine him for a great part of the Year, and not leave him without hard Knots, as unwelcome Pledges of their Return: But once, that he was tortur'd to a degree that made him much pity'd, one came and inform'd him of an Emperick, who had receiv'd

receiv'd from a great Chymist who had lodg'd in his House, a Secret, with which he had already thoroughly cur'd many, in a short time: Whereupon sending for this Person, and offering him any thing for some relief; the other refus'd to take above ten Crowns, which, as it seems, was the usual rate for the Cure; and would not receive that neither, till the reality of it had been evinc'd by the Patients continuing above six Moneths well: And accordingly, with a very few Doses of a certain Powder and Tincture, the Merchant was quickly free'd, not onely from his Pains, but from his Gouty *Tophy*: And though he indulge himself the drinking of Rhenish Wine very freely, yet he never had a Fit since, as himself assur'd me one Morning, wherein, for Exercise sake, he walk'd five or six Miles to give me a Visit; adding, That the Man that cur'd him, dying suddenly, never could discover what the Secret was, wherewith so many had been freed from a Disease that does so often mock the skill of the greatest Doctors.

I might, perhaps, if I had leisure, relate to you some other strange Stories, which may invite you to think, That as the Naturalists skill in Chymistry, and other Arts retaining to Physiology, may much assist him to discover more generous Remedies than are yet usual; so the Knowledge of such Remedies may, in divers cases, make a happy Change in the Rules of Prognosticating what will prove the Course and Event of a Sickness. But I shall not, at present, particularly consider any more than one Disease, namely, The Stone in the Bladder. For whereas it is by most, even of the judicious Physicians, unanimously pronounc'd incurable by Physick, in what Person soever, if it deserve the name of a Stone, and be too big to be voided whole, the Remedilessness of this Disease may be justly question'd. I remember the famous *Morhardes*, treating of the Seed of a *Peruvian* Plant, which they call *Chalchoos*, tells us, That it is highly esteemed by the Inhabitants

habitants of the Country it grows in, and affirmed not onely to be diuretick, and to bring away Gravel, but to break the Stone in the Bladder it self, if it be not too much hardned: *Ejusq; rei* (adds he) *tam multa proferunt exempla ut admirationem mihi pariat*: He tells us indeed, that he is of opinion that nothing but Section can cure the Stone of the Bladder. *Aiunt tamen* (saith he) *illius semen* (of the Calchoos) *tritum, ex aquâ aliquâ ad eam rem idoneâ sumptum, calculum in lutum dissolvere, quod excretum denuo concrevit & in lapideam duritiem convertitur.* *Adolentem vidi cui hoc obtigisse scio, is cum vesicâ calculo torqueretur, idq; à Lithotomis qui calculum deprehenderant intellexissem, & ex Symptomatis quæ patiebatur agnoscerem, hominem, veris initio, ad fontem, qui à Petro nomen habet, ablegavi, ubi cum duos menses hæssset à calculo liberatus redit & lutum omne quod paulatim ejecerat denuo in lapidum fragmenta concretum in charta secum retulit.* Which passage I wonder such a Writer should immediately annex, to the Declaration of an Opinion that must appear confuted by it, to a Reader that considers not so much what is thought, as what is proved.

The very learned and experienced Dr. *Gerard Boot*, of whose skill, you, *Pyrophilus*, have found very good effects in your Self, and who was one of the two Professors that writ the *Philosophia naturalis reformata*, had a very famous Remedy (which (now he is dead) I intend, God willing, to communicate) against the Stone; and with it he told me that he had very often cured that Disease in the Kidneys: but for the Stone in the Bladder, he thought it impossible to be dissolved, which circumstances I recite, that you may the more readily believe what he told me a little before his death, namely, That he had cured lately one Mr. *Moulin* of a real Stone in the Bladder; adding, That he could not brag of being the Inventor of that Remedy he had imployed, having but lately learned it of a
Country

Country Gentleman, whom going to visit last Summer, he saw a Load of *Perficaria*, or *Arsmart*, brought to him by some of the Country People; and desiring to know what he intended to do with so vast a quantity of it, the Gentleman replied, That he yearly used as much, having by the Water of it, made by bare distillation in a common Rose-water Still, cured so many of the Stone, even in the Bladder, that he was usually solicited by Patients, numerous enough, to exhaust all the Liquor which he yearly prepared.

What we, *Pyrophilus*, have observed concerning this excellent Liquor, of which we use to prescribe a draught every morning for some Moneths together, we may elsewhere have occasion to relate. But now we shall go on to tell you, that being some Years since in *Ireland*, I met with an ancient Emperick, who was very famous in those parts, for cutting of the Stone of the Bladder, and for curing sore Eyes: This Man having given (in the Parts where I then was, and whilest I was there) some good proof of his skill, I sent for him to me, upon the account of a suspicion I long had of the Stone in the Bladder, which, upon search, he assured me I was free from, and so (God be praised) I have afterwards found it. He was more a Traveller then a Scholar, and yet finding him, to my wonder, very modest and sober, I inquired of him, Whether he had never any where met with a Remedy that could dissolve the Stone in the Bladder; offering him much more for a Cure of that kinde, then he would require as a Lithotomist: He answered me, That he could cure no Man of a confirmed Stone, but by the help of his Knife; but if the Stone consisted of a lump of Gravel not very firmly cemented together, he had, by a certain inward Remedy he used, and a dexterous way of crushing the Stone from without with his Fingers, so broken the Stone, partly by crumbling it, and partly by dissolving the Cement, as to make it voidable by Urine. And he

he added, That he had formerly cured a Citizen of *Cork*, of a good large Stone of the Bladder (for where I then was, he gave proof of his skill, in telling before-hand those he was to cut, the bigness and shape of the Stones that troubled them.)

Passing afterwards by *Cork*, I sent an intelligent Servant to inquire after this Citizen, but he being casually absent, his Wife sent me, by my Man, a Relation very agreeable to that which he had made me: The Receipt I purchased of him, and, though it seem not very artificial, yet I suppose you will not quarrel with me for annexing so experienc'd a one, to the end of this Essay. But because this Remedy needed the assistance of a manual operation, We shall further proceed to tell you, That *Cardan*, as he is quoted by *Helmont* (for I have not now his Works by me) relates, That in his time there rambled a Man over *Lombardy*, who did commonly, and in a few days, by a certain Liquor which he administred to his Patients, safely, speedily, and certainly, cure those that were troubled with the Stone in the Bladder: Adding (saith *Helmont*) his Judgement, That he doubted not of this Mans being in Hell, for having, when he dyed, envyed Mortals so excellent an Art.

De Lib:
c. 7. num:
14.

I insist not on the Testimony that the same *Helmont* gives to *Paracelsus* of his curing the Stone, though he often handle him very severely in other places of his Writings, because that the Epitaph of *Paracelsus* (out of which he labors to prove his having cured the Stone) makes no express mention of it. Nor shall I enumerate those Passages from whence the same *Helmont's* Followers collect, That he himself was able to cure that Disease, by the resolution of *Paracelsus* his *Ludus*; but this experience hath evinc'd to me, that a much slighter preparation of that Stone, then was mention'd by *Paracelsus* and *Helmont*, hath been able to do more in that Disease then a wary Man

Man would readily believe. But to detain you no longer on this subject, I shall onely adde, That *Wilhelmus Laurembergius*, a learned Physitian, and Professor at *Rostoch*, hath told the World how he cured himself of a confirm'd Stone of the Bladder, by the use of prepared *Millepedes* (by some in English call'd *Woodlice*) and other Remedies, which he hath particularly recorded in the History which he hath publish'd, and I have seen of this admirable Cure: which having been epitomized by *Sennertus*, and other eminent Physicians, I shall not need to insist on it. And the Arguments alledged (even by the most Judicious) against the curableness of the Stone, though very plausible, seem not to me unanswerable; for whereas first, they appeal to the innumerable fruitless attempts that have been made to cure great Princes, and rich Men, without cutting, that Argument drawn from experience, may, by the former Experiments, be answered; especially since *Horatius Augenius* (upon whose account *Laurembergius* tryed *Millepedes*) tells us, not onely that he cured a young Man at *Rome*, that was going to be cut for the Stone, but that the Jesuite that chanced to confess this Youth, and perswaded him to the use of *Millepedes*, had experimented their efficacy both upon himself and others: And indeed, we our selves have found them to be highly Diuretick and Aperitive.

And whereas it is next objected, That Medicines must necessarily loose their efficacy before they can reach the Bladder, I confess, that for the most part, it is very true: But yet that it is possible for some Medicines to retain their Nature, after many alterations and digestions we have elsewhere declared. And in our present Case, we not onely finde that Turpentine and Asparagus, do manifestly affect the Urine (as I have often observed in my own, and almost any Man may observe it

in his) But that which is most to our purpose, *Rubarb* tinges the Urine of those that have taken any quantity of it. And lastly, whereas it may be yet further alledged, That not only there hath not been yet a Liquor found capable of dissolving so solid a Body as a Stone; but if there were, it must necessarily be so corrosive as to destroy the Patient, by fretting his Stomach, or Guts, or Bladder, which are parts so much more tender. To the first part of this plausible Objection it may be replied, That even good Viniger will dissolve, not onely those stony Concretions, call'd *Lapides Cancrorum*, which, like the *Calculi* we treat of, are formed in the Bodies of Animals; but even the more hard and solid Body of Coral, which will loose but little of its weight, in a Fire that would waste a great part of the *Duelech*: And that the bare Juices of Vegetables (such as Lemmons and Barberies) will readily dissolve both Pearl and Coral, is known even to the Apothecaries Boys. Indeed what *Paracelsus* and *Helmont* relate of their *Alkahest*, with which they prepare their Specifick against the Stone, and with which the later of them, if not both, pretend to be able to reduce, not onely the Stone they call *Ludus*, but all other Stones, Vegetables, Minerals, Animals, &c. into insipid Water, is so strange (not to say incredible) that their Followers must pardon me, if I be not forward to believe such unlikely things, till sufficient experience hath convinced me of their truth.

But yet I must not conceal from you, That a Chymist, whom you have often seen, advised with me several times about the way of preparing this immortal Liquor (as *Helmont* calls it) and that, when we had agreed that such a way was the most promising, he prosecuted it so long, and so industriously, that at length he obtain'd, and shew'd me a Liquor, which (though it seemed to me far short of the *Alkahest*) I confess I ad-

admired; and not I alone, but our Ingenious Friend Dr. C. (who had been imployed into several parts of *Europe*, by a rich and curious Prince, to purchase Rarities) agreed with this Chymist, to give Two hundred Crowns for a Pint of this *Menstruum*; and confessed to me withal, That he saw him, with this Liquor, not onely dissolve common *Sulphur*, and bring it over the Helm, but reduce Antimony into sweet Chrystals; with a few of which it was, that he (I mean Dr. C.) to the wonder of many, did, without Purge or Vomit, cure our good Friend Sir C. C. of a very radicated and desperate Disease, as the restored Patient soon after told me. And to the second part of this Objection it may be answered, That if we knew and considered well, how many of the operations of Natural Bodies depend upon the suitableness and difference of the Figures of their Parts, and the Pores intercepted between them, the number of impossibilities would not, perhaps, be thought so great, as by many Learned Men it is.

That it is very possible for a Body to have an effect upon another determinate Body, without being able to operate, in like manner, upon a multitude of other Bodies, which may seem more easie to be wrought on by it; may appear by the Load-stone, which will draw and work onely upon Iron, and (which is but refined Iron) Steel, but not upon wood or straws, or any of those innumerable Concrets that are lighter, and of a more open texture then the heavy and solid Body which it attracts. And to give you an instance that comes nearer to our case, Quick-silver, that will not corrode our skin, nor so much as taste sharp upon our tongue, will yet readily dissolve that most compact Body of Gold, which even *Aqua fortis*, that can insinuate it self into all other Mettals, and corrode them, will not meddle with; though the same Quick-silver will not dissolve Iron, which yet *Aqua fortis* will very nimbly

fret asunder. So that although I dare not confidently believe all that I have found averr'd even by eminent and learned Chymists, of their having made or seen Liquors, which, without appearing any way sharp to the Tongue, would dissolve Gold and Silver, and other hard compact Bodies; because I have not yet, my self, seen any severe and satisfactory tryal made to evince the efficacy of insipid Dissolvents: yet, by reason of divers things I have read and heard, and of some things too I have seen, I dare not peremptorily deny the possibility of such *Menstruums*. And who knows, but that in Nature there may be found, or by Art there may be prepared, some Liquor, whose parts may have such a sutableness to the Pores of a humane *Calculus*, as those of Quick-silver have to the Pores of Gold, and yet may as little work upon therest of the Body, as we have observed the same Quick-silver to do upon Iron (which yet is a much more porous and open Metal) even when it hath been distill'd in Iron Vessels? And as to that part of the Objection wherein the strength of it chiefly lies, let me tell you, *Pyrophilus*, that I have sometimes, for curiosity sake, taken an Egge, and steep'd it in strong Vineger for some days, and by taking it out, and shewing that the shell was so eaten away, that the Egge could be squeez'd into unusual Forms, but the thin skin that involves the white continu'd altogether unfretted, I convinc'd an Ingenious Man, that the operations of Dissolvents are so determin'd by the various textures of the Bodies on which they are imploy'd, that a Liquor, which is capable to corrode a more hard and solid Body, may be unable to fret in the least, an other more soft and thin, if of a texture indispos'd to admit the small parts of the *Menstruum*. And I must confess to you, *Pyrophilus*, That one thing, among others, which hath made me backward to affirm with many Learned Men, that there can be
no

no potent Dissolvent that is not corrosive enough to fret in pieces the parts of a humane Body, hath been a Story, which I divers years since chanc'd to meet with in the Learned *Sennertus's Paralipomena*, where, though he relates it to another purpose, yet it is so pertinent to our present design, and in it self so singular, not to lay matchless, that I cannot forbear to mention it here on this occasion. He tells us then, That in the end of the Year, 1632. *Johannes Nesterus*, an eminent ^{Medicus} Physitian, and his great Friend, inform'd him, That there <sup>Rochlitzer-
sis.</sup> liv'd at that time in the Neighborhood, and belonging to a Noble Man of those Parts, a certain *Lorainer*, whom he also call'd *Claudius*, somewhat low and slender, and about 58 Years of age: *Hic* (saith he) *nihil fœtidum, nihil injucundum abhorret; Vitra; Lapides, Ligna, Carbones, Ossa, Leporinos, & aliorum animalium pedes cum pilis, lineos, laneosq; pannos, viva animalia & pisces adhuc salientes, imò etiam Metalla, patinas & orbes stanneos à dentibus confringere & vorare sæpißime visus est; Vorat præterea lutum servum & candelas sebaceas, integras testas cochlearum, animalium stercora, cum primis bubulum calidum adhuc, prout è matrè venit: potat aliorum Urinas cum Vino & cerevisia mixtas, Vorat fœnum, stramen, stipulas & nuper duos mures viventes adhuc deglutivit, qui ipsius ventriculum ad semihoram usq; creberrimis moribus lancinarunt, & ut brevibus complectar, quicquid illi à Nobilibus devorandum offertur, vilissimâ mercede propositâ, dictum ac factum, ingurgitat, ita ut intra paucos dies integrum vitulum crudum & incoctum cum corio, & pilis se estaturum promiserit. Testis inter alios quamplurimos ipse ego sum, quippe qui, &c.*

To this, and the following part of the Letter, *Sennertus* addes, That not having, during some Years, heard any thing concerning this *Claudius*, he sent about four Years after to the same Physitian, *Dr. Nesterus*, to enquire what was become of him; and that

that the Doctor sent him back a Letter of the Minister of the Church of that place, by way of confirmation of all the formerly mention'd particulars, and answered himself, That the *Lorainer* whom he had long hop'd to dissect, was yet alive, and did yet devour all the things mention'd in his former Letter; but not so frequently as before, his Teeth being grown somewhat blunter by age, that he was no longer able to break Bones and Mettals. Some other examples of this nature, though none so strange, we have also met with in Writers of good credit, and especially that of the Glass-eater, recorded by *Columbus* in his excellent Anatomical Observations; of which also *Sennertus* makes mention, as we shall see by and by, and with which we may elsewhere entertain you to another purpose. And not long agoe there was here in *England* a private Souldier (who, for ought I know, is yet alive) very famous for digesting of Stones: And a very inquisitive Man, that gave me the accuratest account I have met with concerning him, assures me, That he knew him familiarly, and had the curiosity to keep in his company for 24 hours together to watch him, and not onely observ'd that he eat nothing in that time, save Stones (or Fragments of them) of a pretty bigness, but that his grosser Excrement consisted chiefly of a sandy Substance, as if the devour'd Stones had been in his Body dissolved and crumbled into Sand. But let us not omit, that to the second Epistle above-mention'd, *Sennertus* addes this Reflection, not impertinent to our purpose: *Causam* (says he) *hujus voracitatis, etiam in cadavere, invenire proculdubio erit difficillimum. Posset quidem ad illud, quod in cadavere Lazari Vitri voracis observavit Columbus, quidam confugere; & statuere quartam illam nervorum conjugationem, qua gustus gratia in hominibus à natura producta est, neq; ad Palatum, neq; ad Linguam pertendere. Verum hoc modo saltem gustus aboliti causa redderetur,*
non-

*nondum vero causa daretur, cur res tam miras assumere sine ventriculi laesione, imo concoquere potuerit. Quæ proculdubio in idioCryxacia & peculiari constitutione ventriculi & intesti-
norum querenda esset: quæ tamen oculis investigari non potest sed saltem ex effectu patet.* And indeed this memorable Story seems to argue, not onely what we have already alledg'd it to prove, but also that a *Menstruum*, not so corrosive as to fret the Body, may dissolve Stones, Metals, and other compact Substances. And since one Liquor, prepar'd by Nature onely, could in this Mans Stomack dissolve that great variety of Bodies above enumerated, why should it be thought that the Alkahest, or some other *Menstruum* wherein Nature is skillfully assisted, and to the utmost highten'd by Art, should not be able to dissolve Concretes of very differing Textures. For though Chymists must acknowledge that such common *Menstruums* as will dissolve one Body, will not oftentimes meddle with another; as *Aqua fortis* will dissolve Silver, and not Gold, and if by *Sal armoniack* you turn it into *Aqua Regis*, it will indeed dissolve Gold, but then it will not Silver: Yet since that may be suppos'd to proceed rather from our want of skill to prepare the most potent *Menstruum*, then from the impossibility of one *Menstruum* dissolving great variety of Bodies; Why may not Nature and Art afford a *Menstruum*, whose variety of Parts, and Figures, and (perhaps also) Motion, may give it ingress into Bodies of very differing Textures? as in our former Instance, though *Aqua Regalis* will dissolve Gold, not Silver; and *Aqua fortis* Silver, but not Gold; yet Quick-silver will dissolve both, and Copper, Tin, and Lead to boot.

If I were not at present under some restraint, I might tell you, some things, that you would, perhaps, think no weak Confirmations of the past Discourse: And however, since I
have

have observ'd it to be the main thing, that keeps judicious Men from seeking, or so much as hoping for nobler Dissolvents, that they are scarce to be perswaded there can be considerably piercing *Menstruums*, that are not proportionably corrosive: I will here acquaint you with a Liquor, that may, I presume, assist you to undeceive some of them. We take then ordinary household brown Bread (I like that of Rye, but I have divers times us'd that of Wheat) and when it is cut into slices, and somewhat dry'd, we almost fill a glass Retort with it, and placing that in a sand Furnace, by degrees of Fire, we draw off what will be made to come over, without much difficulty: The Oyl, as useless to our purpose, being by a Tunnel, or a Filter, sever'd from the rest of the Liquor, we also, by a gentle heat, free the Spirit from some of its Phlegm, which yet sometimes we finde no great necessity to do. And yet this Spirit, which you will easily believe is no such Corrosive as *Aqua fortis*, or other distill'd Liquors of Mineral Salts, will work upon the hardest sorts of Bodies, and perform things that Chymists counted of the judiciousest, would not have us expect from the most sharp and corrosive *Menstruums* now in use. For with this we have, in a short time, and that in the cold, drawn Tinctures (w^{ch} is done by the solution of the finer parts of the Concrete) not only from crude Corals, and some of the more open Minerals, but likewise from very hard Stones, such as Blood stone, and Granates (even unpowder'd) Nay, and though Ruby's seem to be the hardest Bodies yet known, save Diamonds (for I have learned from those that cut precious Stones, that they can grinde other Gems with the Powder of Rubies, but not these with any Powder, save their own, and that of Diamonds) yet have, even these, afforded me in the cold, a not ignoble Tincture. And not to anticipate what I may elsewhere have occasion to tell you concerning the

the efficacy of this *Menstruum*, which is the same that I have intimated, without naming it, in the last, and another of the former Essays. I shall now onely adde, That an expert Chymist assures me, he hath, but tells me not how, done greater matters with it, or the like; and that to satisfy my self that these high Tinctures, proceeded not from the standing or digestion of the *Menstruum* (as we elsewhere observe concerning some other Liquors) I not onely tryed, that from some Minerals it will draw a much higher Tincture then from others, and from some scarce any at all, but that it would, if kept by it self, for many Moneths continue clear and limpid. What further use I have made, or think others may make of this odde *Menstruum*, I must not, as I said at present, express; but returning to what I was discoursing concerning the cure of the Stone, annex, That besides what hath been objected against the possibility of making a Liquor, which, without being highly corrosive, can be able to work upon Stone; It may indeed be also alledg'd against the hopes we seem to countenance, that what hath cured the Stone in one Mans Bladder, may be unable to do the like in anothers: But first, the truth of that hath not been proved; and next, we highly value those Specificks that can remove Agues, Fluxes, and the like Diseases, though scarce any of them do alike succeed in all Patients, especially so as to secure them, during their whole lives, from ever relapsing into the like Disease; and besides all this, it will be no small matter to finde that the Disease, in its own nature, is not incurable; and it would recompence Mens Industry to be able to free, even a few Patients, from so painful and stubborn a Disease. Which I have rather then any other, choïen to insist upon, because it is so generally believed not to be curable by inward Remedies in any Person whatever.

But I have entertained you so long on this subject, that I must reserve, for some other opportunity, what I have to say to you concerning the Dropſie, and ſome other Diſeaſes, commonly put into the Catalogue of the incurable ones, and therefore ſhall now onely tell you in general, That as on the one ſide I think the Arguments which *Helmont* and others draw from the Providence of God, for the curableneſs of all Diſeaſes are not very cogent, and ſomewhat irreverent (For God being not oblig'd any more to continue Life or Health to ſinful Man then to Beaſts that never offended Him, we ought humbly to thank Him, if He hath, among His Creatures, diſperſ'd Remedies for every Diſeaſe, but hath no right to accuſe Him if He have not) ſo on the other ſide, I am not much convinc'd by the grand Argument alleadg'd againſt *Paracelſus*, and the Chymiſts, that hold all Diſeaſes to be in their own Nature curable; namely, That they themſelves, many of them (no nor even their very Maſter) lived not to the Age attain'd by many Strangers to Chymiſtry.

For this, That many of them (not deſtroy'd by War, or outward accidents) died young enough, and conſequently by Sickneſs; and that *Paracelſus* himſelf out-liv'd not the 47th Year of his age, is a much ſtronger Objection againſt the Men, then againſt their Opinion; for it infers indeed plauſibly, that they had not ſuch Remedies as they boasted of (ſince probably, had they had any ſuch, they would have cured themſelves with them) but concludes not that no ſuch Remedies can be prepar'd by any other. And this you will be the leſs apt to think irrational, if you conſider, how much more learned, ſober and experienc'd, it is poſſible for many a Man to be, then *Paracelſus* appears to have been: For he ſeems not by his Writings to have been any great Logician
or

or Reasoner; he manifestly despis'd many parts of Learning, useful to a Physitian; he lived not many Years, and spent divers of those few which he lived, in an unsetled and disadvantageous course of life; and yet this *Paracelsus* attain'd to some such Remedies, as both in his own, and after times, have made him a very considerable Person, in spite of all his indiscretions and deficiencies. And among his other Remedies, his famous *Laudanum* did such wonders, that *Oporinus* himself, in that short account, which seems to be rather a Satyr than a Narrative of his Life, hath this Passage of it: *De Laudano* (saith he) *suo (ita vocabat pilulas instar murium stercoris, quas impari semper numero, in extrema tantum morborum difficultate, tanquam sacram medicinam exhibebat) ita gloriebatur, ut non dubitavit affirmare ejus solius usu se è mortuis vivos reddere posse; idque aliquoties dum apud ipsum fui, re ipsa declaravit.* So signal a Testimony coming from one whom the *Paracelsians* call his fugitive Servant, hired by his Enemies to slander him, under pretence of writing his Life, deserves not to be slighted: and though it manifestly contains an *Hyperbole*, yet I do the less wonder at the *Hyperbole*, by reason of those strange things which your Mother, and divers other of your Friends, can tell you, they have seen performed in *England* by *Helmont's Laudanum opiatum* (though much inferior to that of *Paracelsus*.) And I remember, that a Friend of yours and mine, that is a great enemy to all kindes of Chymical Remedies, and was before also to Chymistry, having begg'd of me a little Bottle of it, which I had obtain'd from a Friend of the younger *Helmont's*, to whom he communicated the Preparation, gave me awhile after, an account of such Cures that had been perform'd, with that small quantity, upon almost dying Persons, as I think it not discreet for me, that was not

an Eye-witness of them, to relate. And I remember too, that the same Friend of young *Helmont's*, being, at the persuasion of one Woman whom he had cured of a dangerous Consumption, call'd to another that was thought to be dying of an *Asthma*, came to advise with me whither he should meddle with so desperate a Patient; telling me, That she had been many Years sick of that stubborn Disease, which, in process of time, passing into an *Orthopnea*, had at last put her, by want of sleep (from which the violence of her sickness had very long kept her) into a Fever, and so desperate a condition, that it was scarce expected she should live till the next morning. But I, representing to him that her condition being avowedly desperate, he might exercise his Charity without danger to his Reputation; and persuading him to try *Helmont's Laudanum*, together with the Spirit of Man's Blood (which we elsewhere teach you to prepare) he gave her that Night a Dose of those Remedies, which made her both sleep and breath pretty freely; and a Week after, he coming to visit me, told me, he had casually met his Patient well and abroad in the Streets. But these are trifles to the Cures which *Helmont* relates to have been performed by our *Irish Butler*, for he tells us, That this Man, by slightly plunging a little Stone, he had, into Almond Milk or Oyl, imbued those Liquors with such a sanative efficacy, that a Spoon-full of the former cured (and that without acquainting him with what was given him) a *Franciscan Frier* (a very famous Preacher) of a very dangerous *Erysipelas* in the Arm, in one hour; and one drop of the latter, being apply'd in his presence, to the Head of an old Laundress, that had been sixteen Years troubled with an intolerable *Hemicrania*, the Woman was presently cured, and remained so, to his knowledge, for divers Years. He adds almost as strange a Cure done in one Night,

*Helmont in
the Treas-
ure which
he entitles
Butler.*

Night, upon a Maid of his Wife's, by anointing the part affected with four drops of that Oyl: He further tells us, That the Master of the Glass-house at *Antwerp*, being troubled and made unweildy with too much fat, begg'd some relief of *Butler*; who, having given him a little fragment of his little Stone, with order to lick it nimbly with the tip of his Tongue once every Morning, I saw (saith *Helmont*) within 3 weeeks, the compass of his waste lessned by a span, without any prejudice to his health. And to these, *Pyr*: he adds some other Narratives, which, though I confess I know not well how to believe, yet there are Circumstances which keep me from daring to reject them: For first, as he well observes, that which was most stupendous in this Remedy, was but the smalness of the quantity. Next, a Gentleman in *France*, being not long since reported to have a fragment of this Stone, and to have cured several Persons (and especially one very dignified) of inveterate Diseases, by leting them lick it; my Noble Friend Sir *Kenelm Digby*, then in *France*, was solemnly requested from hence to inquire into the truth of that Report, and answered, That he could not, upon examination, finde it other then true. Besides, *Helmont* not onely relates these Cures as an Eye-witness of them, but tells us, how upon an occasion that he mentions, he once suspected the efficacy of the Oyl, and that, without expecting that it should do any thing, he anointed it on the right arm and the ancles of his own Wife, who had for some Moneths been tormented with great pains in the former, and very great tumors in the latter of those parts; and that almost in a trice, motion was restored to her arm, and all the *œdema* of her legs and feet vanished; adding, That at the time of his writing she liv'd healthfully, and had done so since that recovery, during nineteen Years: And this Story, she, long after her Husbands death,

death, confirm'd to our ingenious Friend Dr. C. who is acquainted with her, and much extolls her: These Circumstances, may be assisted by two more very considerable ones; the one is, That *Helmont* is the more to be credited in these Relations, because mentioning Cures not perform'd by himself, but by another, and that by Remedies unknown to him, he seems by these Narrations, out of loyalty to truth, to eclipse his own Reputation: And the other is, that in a memorable Story which we may elsewhere relate to you (it being not here proper to insert so long a one) you'll finde an eminent and strange testimony given to *Butler's* Secrets, by our famous Country man, Dr. *Higgins*, whose confession you will not doubt, if you consider how rare a Physitian and Chymist he was, how familiarly he lived in the same House with *Butler*; and how studiously, at last, they endeavored to take away each others Life.

De Medi-
cina, lib. 3.
cap. 10.

But whatever be to be thought, *Pyr*: of *Helmont's* Relation, we may well enough make this reflection on the other things that have been delivered concerning formidable Diseases, that since the power of Nature and Skill may reach much farther then many distrustful (not to say lazy) men have imagin'd, it will not be charitable to rely too much upon the Prognosticks, even of famous Writers, when they tell us, That such and such Diseases, or Patients in such and such conditions cannot possibly be cured. But rather to follow the sober counsel of *Celsus*: *Oportet* (saith he) *ubi aliquid non respondet, non tanti putare Authorem quanti agrum, & experiri aliud atque aliud.* And this great Physicians authority I therefore make the most use of in the ensuing Essays, because he is accounted very judicious by the Lord *Verulam*, and other Writers that are unquestionably so themselves.

ESSAY IV.

*Presenting some things relating to the
Hygieinal Part of Physick.*

THat the Dietetical part of Physick, *Pyrophilus*, may, as well as the others, be improved by Natural Philosophy, were not uneasy to manifest, if my haste would permit it: For 'tis known, that Drinks make a very considerable part (sometimes, perchance, amounting almost to the one half of our Aliments) and most Drinks, as Wine, Beer, Ale, Mead, &c. consist of fermented Liquors: Now as on the one side the ignorance of the Doctrine of Fermentation, and of the wholesome way of both preserving Liquors and making them pleasant, doth questionless occasion more then a few Diseases, which in divers places may be observed evidently to proceed from the unwholesome quality of either ill made, or sophisticated Drinks; so on the other side, the distinct knowledge of the true nature and particular *Phanomena* of Fermentation, would enable Men to prepare a great variety of Drinks, not onely as harmless, but as beneficial, as pleasant.

How much preparation may do to correct and meliorate both hard and liquid Aliments, is notably instanced by the account that we receive from both the French and English that inhabit the *Barbados*, *St. Christophers*, and other *Caraibes* Islands,

Islands, who solemnly inform us (what is attested also by *Piso*, and other Learned Travellers that write of it) that the Plant *Mandioca* (whose prepar'd Root makes *Cassavy*, and which we have also seen flourishing here in *Europe*) to which the *Indians* are so much beholden, is a rank Poyson. And though I shall not too resolutely affirm it, to be a Poyson properly so called; yet in confirmation of its being very noxious, I shall tell you, That having purposely enquired of a very intelligent Gentleman, who commanded an Army of *Europeans* in *America*, what experience he had seen of the qualities of this Plant, he told me, That between thirty and forty of his Soldiers, having on a time (whilst they were unacquainted with the Countrey) either through ignorance or curiosity, eaten of it unprepared, it cost most of them their Lives. And yet this pernicious Root, which some Herbarists call *Yucca*, by the rude *Indians* ordering, comes to afford them both almost all their Bread, and no small part of their Drink: For this Root being grated, and carefully freed from its moisture, by being included in Bags, and very strongly pressed till all the Juice be squeezed out; it is afterwards dried in the Sun, and so made into the Meal of which they make their Bread: And this very Root, though (as we said) it be poisonous, they cause their old, and almost toothless Women, for the better breaking and macerating it, to chew and spit out into Water. This Juice will, in a few hours, work and purge it self of the poysonous quality, affording them a Drink which they esteem very wholesome, and at the *Barbado's* call *Perino*, and account it to be the likest in taste to our English Beer, of any of those many Drinks that are used in that Island.

This nasty way of preparing Drink, *Pyrophilus*, may seem strange to you, as it did to me when I first heard of it; but

History of
the *Barbado's*,
pag. 29, 30, 31,
32.

but besides the consenting relations both of French and English concerning it, it may be confirmed by the strange assertion of *Gulielmus Piso*, in his new and curious *Medicina Brasiliensis*, where, having spoken of several of the *Brasilian* Wines, he tells us, That they make Liquors of several Plants, besides the Root of *Mandioca*, after the same nasty manner. *Idem fit* (saith he) *ex Mandioca, Patata, Milio, Turcico, Oryza & aliis, quæ à vetulis masticantur, masticatæque, multa cum salira expuuntur, hic liquor mox vasis reconditur donec ferveat, facesque ejiciat.* Voyage de Muscovie & de Perse, p.m. 23.

In *Muscovia* it self, notwithstanding the unskilfulness of that rude People, *Olearius* informs us, That the Embassadors, to whom he was Secretary, were presented at one time with two and twenty several sorts of Drink. And at a Country House here in *England* (where I was, by a very Ingenious Gentleman that is Master of it, presented with divers rare Drinks of his own making) I was assur'd that he had lately, at one time in his House, at least the former mentioned number of various Drinks, and might easily have had a greater, if he had pleased.

And on this occasion, I am not willing to pretermitt what is practised in some of our *American* Plantations, as I am informed by the Practisers themselves, where, finding it very difficult to make good Mault of Maiz, or Indian Corn (by reason of hinderances not to be discoursed of in few words) they brew very good Drink of it, by first bringing the Grain to Bread; in which operation, the Grain being both reduced into small parts, and already somewhat fermented, is disposed to communicate easily its dissoluble and Spirituous parts to the Water it is boyled in: To which I shall adde, That I have to think, that the Art of Malting may be much improved by new & skilfully contriv'd Furnaces, and a rational management of the Grain.

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Nor

Nor are we alone defective in the knowledge of fermenting Drinks, but even in that of the Materials of which Drinks may be prepar'd.

History of
China, par.
3. Cap. 1.

Linscho-
ten's Voy-
ages, Book
2. Chap. 26

In that vast Region of *China*, which is enriched with so fertil a Soil, and comprizeth such variety of Geographical parallels, they make not (as *Semedo* informs us) their Wine of Grapes, but of Barley; and in the Northern parts, of Rice, where they make it also of Apples; but in the Southern parts, of Rice onely: yet not of ordinary Rice, but of a certain kinde peculiar to them, which serves onely to make this Liquor, being used in divers manners. And of the Wine there drank, even by the vulgar, our Author gives us this character: The Wine used by the common People, although it will make them drunk, is not very strong or lasting; 'tis made at all times of the Year, but the best onely in the Winter: It hath a colour very pleasing to the sight, nor is the smell less pleasing to the sent, or the savor thereof to the taste; take altogether, it is a vehement occasion that there never wants Drunkards, &c. And of the Inhabitants of the Kingdom of *Japan*, I remember also, *Pyrophilus*, that *Linschoten*, in his description of those Islands, tells us, That they drink Wine of Rice, wherewith they drink themselves drunk.

We have here in *England*, at the House of our experienced Mint-master, *Dr. Gordon*, tasted a Wine, which he made of that sort of Cherrys which are commonly call'd *Morellos*, that was, when we drank of it, about a Year and a half old, but it was somewhat sower, and needed Suger; And therefore I shall rather take notice to you of my having since drunk Wine made of the Juice of good, but not of extraordinary Kentish Cherrys, which, with the help of a *Tantillum* of Suger added in the Fermentation, kept so well, that though it

it were above a Year old when I tasted it, I found it a strong and pleasant Wine, not inferior to many Wines that are brought us from foreign parts. But this is nothing to what is averr'd upon his own experience, by a Learned Divine (to whom you, *Pyrophilus*, and I, am related) who affirms himself to have made out of some sort of wilde Apples and Pears, by bare Fermentation, such Liquors, as though at first somewhat harsh, will not onely keep divers years; but at the end of two or three, attain such strength, and so pleasingly pungent a taste, that they may compare even with choice out-landish Wines, and excel those that are not of the very best sorts of them.

But till we have in another Essay an opportunity of presenting you something out of the Observations of *Olearius*, the newly mention'd Divine, and our own, concerning Fermented Liquors, we shall content our selves to manifest our want of curiosity about the materials of which Drinks may be prepar'd, by this, That the Drinks of one whole Country, are oftentimes unknown to the Inhabitants of another: That the Wine made of Rice, which we lately mention'd to be of frequent use in the Kingdoms of *China* and *Japan*, is of little or none in *Europe*, I need not prove to you. I have been in divers places where Beer and Ale, which are here the common Drinks, are greater rarities, then the medicated Liquors sold onely in Apothecaries Shops. In divers parts of *Muscovie*, and some other Northern Regions, the common Drink is *Hydromel*, made of Water fermented with Honey: And indeed, if a due proportion betwixt those two be observed, and the Fermentation be skilfully ordered, there may be that way, as experience hath assur'd us, prepar'd such a Liquor, both for clearness, strength, and wholesomeness, as few that have not tasted such a one, would readily believe.

Lib. 4.
Cap. 1.

The French and English Inhabitants of the Canibal Islands, make, by Fermentation, a Wine of the dregs collected in the boiling of Suger. A like to which *Piso* tells us, That they make in *Brasil*, and commonly call *Garapa*, which, though made by the mixture of Water, the Inhabitants are very greedy of; and when it is old, finde it strong enough to make them drunk. And how also in these colder Countrys, a good Wine may be made of onely Suger and Water, we may elsewhere have occasion to teach you.

Lib. 4.
Cap. 6.

And in *Brasil* they likewise, as the same Author informs us, make a Wine (unknown to most other Regions of the World) of the Fruit of *Acaju*, which yet, upon his experience, he much commends; telling us, That it is strong enough to inebriate, and may, he doubts not, be kept good many Years; and that though it be astringent, yet both in himself and others he found it diuretical.

In the *Barbada's* they have many Drinks unknown to us; such as are *Perino*, the Plantane-drink, *Grippo*, *Punch*, and the rare Wine of Pines, by some commended more then the Poets do their Nectar; some of which we therefore make not, because the Vegetables whereof they are produc'd, grow not in these colder Climats: But others also they have, which we have not, though they are made of Plants to be met with in our Soil; as for instance, the drink they call *Mobbie*, made of *Potato's* fermented with Water, which, being fit to drink in a very few days, and easie to make as strong almost as the maker please, would be of excellent use, if it were but as wholesome as it is accounted pleasant.

In the *Turkish* Dominions, where Wine, properly so call'd, is forbidden by *Mahomet's* Law, the Jews and Christians keep, in their Taverns, a Vinous Liquor made of ferment-
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ed Raifons, after a manner, which (when we shall elfewhere acquaint you with it) you will eafily difcern to be capable of much improvement from the knowledge of Fermentation. And indeed, by the bare fermenting of Raifons and Water in a due proportion, without the help of Barm, Leaven, Tartar, or other additament to fet them a working, we have divers times, in a few days, prepar'd a good Vinous Liquor, which having for tryals take diftilled, it afforded us greater ftore, then we expected, of inflammable Spirit, like that of other Wine.

But I have fometimes wondered, that Men had no more curiofity to try what Drinks may be made of the Juices obtainable, by wounding or cutting off the parts of feveral Trees, and fome other Vegetables: For that in the *East Indies*, their *Sura* is made of the Liquor dropping from their wounded *Coco* Trees, we have not long fince out of *Linscoten* informed you. And fober Eye-witneffes have affured us; That in thofe Countrys they have but too often feen the Seamen drunk, by the ufe of Liquors weeping out of the Incifions of wounded Vegetables, and afterwards fermented.

And that even in *Europe*, the Alimental Liquor, drawn by Trees from the Earth, may receive great alterations from them before it be quite affimulated by them, may be gathered from the practice of the *Calabrians* and *Apulians*; who, betwixt *March* and *November*, do by Incifions obtain from the common *Afh* Tree, and the *Ornus* (which many Botanifts would have to be but a wilde *Afh*) a fweet Juice, fo like to the *Manna*, adhearing in that Seafon to the Leaves of thofe kinde of Trees, that the Natives call it in their Language, *Manna del corpo*, or *Trunk-manna*; and leaft we fhould think they draw all this fweetnefs from the Soil of that particular part of *Italy* where they grow, you may be fatisfied by the
 Learned

De Manna
cap. 18.

Learned *Chrysostomus Magnenus*, in his Treatise *De Manna*, that it is to be met with in several other places. And he adds, That in the Dukedom of *Milane*, where he professeth Physick, there is no other Manna used then that which is (as he speaks) *Vel è trunco expressum* (which he somewhere calls *Manna Truncinum*) aut in ramis stiriatim concretum; and that yet it is safely and prosperously used.

I had communicated to me, as a rarity, a secret of the King of *Polands*, which is said to do wonders in many Diseases, and consists onely in the use of the Liquor which drops about the beginning of the Spring, from the bar'd and wounded Roots of the Walnut-tree: but because I have not yet made tryal of it my self, I shall pass on to observe to you, that in some Northern Countries, and even in some parts of *England*, bordering upon *Scotland*, the almost insipid Liquor that weeps in *March*, or the beginning of *April*, out of the transversly wounded Branches (not Trunks) of the Birch-tree, is wont to be used by Persons of Quality as a preservative from the Stone; against which cruel Disease, *Helmont* highly extols a Drink made of this Liquor and *semen dauci*, and *Beccabunga*, and I think not without cause. For not to mention all the commendations that have been given me of it by some that use it, I have seen *such* strange relief, frequently given among others, to a Kins-man of mine, to whom hardly any other Remedy (though he tryed a scarce imaginable variety) was able to give ease (and in whose dissected Bladder, after another Disease had kill'd him, a Stone of many Ounces was found) that I usually every Spring take care to provide a quantity of this Water, with which alone, without the other Ingredients mentioned by *Helmont*, my Kins-man used to be relieved as long as he could keep it, which you may do the longer, by pouring upon the top of it

it a quantity of Sallet Oyl, to defend it from the Air; and perhaps also by Distillation: By which (last named) way, I know an Ingenious Man that is wont to preserve it for his own use, and says, he findes it not thereby impair'd in virtue. But the most effectual way that ever I yet practiced, *Pyrophilus*, to preserve both this and other Liquors and Juices, is dexterously and *sufficiently* to impregnate them with Fume of *Sulphur*, which must be at divers, and *often* times as it were, incorporated with the Liquor by due agitation; the manual Operation belonging to this Experiment, I may hereafter have occasion to describe more fully, together with the particular Effects of it in several Bodies. And therefore it may here suffice to tell you, that if you practice it carefully, you will, perhaps, think your self oblig'd to thank me for the discovery of it, though a heedful Reader may finde it, not obscurely, hinted in *Helmont's* Writings.

I might here annex the great commendation which I have found given to this Birch-water, by eminent Writers, against the hot distempers of the Liver, and divers other affections; and especially how *Freitagius* commends it very much to dilute Wine with: and adds, *Hac est dulcicida & grati saporis, sitim sedat viscerum & sanguinis fervorem temperat, obstructions reserat, calculum pellit.*

*In consilio
Medicinali
in catarrho
calido pro
Principi
quodam.*

But I suppose you will think it high time for me to proceed to another subject; and indeed I should not have spent so much time in discoursing of Drinks, but that I am apt to think, that if there were greater variety of them made, and if they were more skilfully ordered, they might, by refreshing the Spirits, and insensibly altering the mass of Blood, prevent and cure (without weakning or much troubling the Patient) almost as many Diseases as the use of our common, unwholesome, and sophisticated Wines is wont to produce.

For

For in Fermentation, the Sulphurous (as Chymists call them) the Active, and the Spirituous parts of Vegetables, are much better loosened, and more intirely separated from the grosser and clogging parts, in most Mixts, then they are by the vulgar ways of Distillation, wherein the Concrete is not open'd by previous Fermentation. And these nobler parts being incorporated with our Aliments, are with them received freely, and without resistance carryed into the mass of the Blood, and therewith, by circulation, conveyed to the whole Body where their Operation is requisite. And I remember, that discoursing one day with an eminently learned and experienced Physitian, of the Antinephritical virtue of our common wilde Carret-feed, fermented in small Ale; he smilingly told me, that he found its efficacy but too great: For having prescrib'd it to some of his rich Patients, who were wont frequently to have recourse to him in their Nephritical distempers, after the use of this drink for a pretty while, he seldom heard of them any more. And for your encouragement, *Pyrophilus*, to make tryals of this nature, we will adde, That though the Seed it self be not over-well tasted, yet being fermented in a due proportion with the Liquor (we used an Ounce and half of the Seed, to a Gallon of the Ale) the Drink compos'd of both tasted pleasantly, almost like Lemmon beer.

And that you may the less wonder at the efficacy of fermented Liquors, it is worth considering, what virtue is ascribed to the bare decoction of that Herb, which the *French* and we call *Thé*, or *Té*, which is much magnified here; and as far as my little experience in my self, and others (of which more hereafter) reaches, not altogether without cause: But among the *Chineses* and the *Japonians*, it is the common Drink of Persons of Quality, by whom it is so highly prais'd, that

that the experienced *Tulpinus*, in the new Edition of his Observations, tells us, That one pound of the Japonical *T'chia* (as the Natives call it) is not unfrequently sold for one hundred pounds of Silver; which is not to be wondred at, if they justly ascribe to it, that in those Countrys Men are not subject to the Stone, or the Gout, and if but one half of the Virtues he there attributes to it, be for the most part to be found in it.

Obs: Lib. 4.
Cap. ultimo.

I might, when I told you of the variety of Materials not used among us, have added one strange Drink, which a Chyrurgion, that a while since lived at *Indies*, told me, he saw much used thereabouts: They make it of the raw Flesh of Goats, Capons, and the like, which, together with Rice and *Molossos* (or black course Suger) they put into a quantity of Water, and distil it in an Alim-bick till the Liquor be stronger then Brandy (as they call common weak Spirit of Wine or of Lees of Vinous Liquors) And this *Rack* (as the extravagant Liquor is call'd) is often drunk in hot weather, and found very comfortable: those that use it, prizing it much, as supposing it draws a nutritive and cherishing virtue from the Flesh; as indeed, if any quantity of the nobler parts of that, do concur to the constituting of the Liquor, it may probably be, at least to divers Bodies, very wholesome in that Country, where they finde strong Drinks necessary to recruit their Spirits, exhausted by the excessive heat of the Climate. As I remember, the experienced *Bontius*, in his *Medicina Indorum*, tells us, That the Merchants travelling through the scorching Deserts of *Arabia*, *Persia*, or *Turkey*, finde it best to quench their thirst by a draught of the Spirit of Wine, or else of the strongest *Persian* or *Spanish* Wine.

Dialogo 3.

And of the great use, if not necessity of either Brandy,

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or such other strong and Spirituous Drinks in the hot Climats of the *Indies*, divers intelligent Persons of our own Country, have, upon their own experience, sufficiently satisfied us.

Nor, *Pyrophilus*, is Natural Philosophy able onely to improve our Drinks, but the rest of our Aliments also: For not to mention, that Experience hath assur'd us, that by skilfully contriv'd Ovens (wherein the heat plays every way about the Bread, without yet suffering any of the smoke or steams of the Fire to come at it, and wherein what degree of heat you please may be continu'd from first to last) better Bread may be bak'd, then in our common Ovens, where the Bread rests upon the Harth, and the heat is continually decaying. Not to mention this, I say, Physiologie can enable us to confer a very grateful taste on very many of the things we eat, barely by a skilful and moderate untying and exciting the formerly clogg'd Spirits, and other sapid parts contain'd in them. It can teach us to make better Bread then is commonly eaten: And by discovering to us a better Art of Cookery, then *Apitius* and his Successors have left us, and by substituting innocently sapid things, instead of those unwholesome ones, their deliciousness endears to Men; It can teach us to gratifie Mens Palates, without offending their healths: & in preserving of fresh Meats, Fruits, &c. beyond their wonted seasons of duration, the Naturalists skill may perform much more then you will readily believe.

And yet to incline you not to be too diffident in this particular, let me inform you, That much hath been already perform'd, as to the preservation of Aliments, even by those that have not troubled themselves to make Philosophical enquiries after the Causes and Remedies of Putrefaction in Bodies, but onely have been taught by obvious and daily Observations, that the Air doth much contribute to the corruption
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of some Bodies, and the exclusion of Air to the hindring it. I remember, the inquisitive and learned Mr. *Borreel*, assur'd me some while since, That he had in his Country, *Holland*, eaten Bisket that was yet good, after it had been carryed from *Amsterdam* to the *East Indies*, and brought back thence again (in which Voyage, between two and three Years are wont to be spent) And to confirm my conjecture of the way of preserving this Bread so long: He told me, that the curious Merchant whose it was, used no other Art, then the stowing his Bisket, well baked, in Casks exactly calk'd; and besides, carefully lin'd with Tin, for the more perfect exclusion of the Air. Adding, That to the same end the Biskets were so placed, as to leave as little room as possibly might be in the Cask, which also was not opened, but in case of absolute necessity, and then presently and carefully closed again.

I may elsewhere tell you of an eminent Naturalist, a Friend of yours and mine, that hath a strange way of preserving Fruits, whereby even *Goose-berries* have been kept for many Moneths, without the addition of Sugar, Salt, or other tangible Bodies; but all that I dare yet tell you, is, That he assures me his Secret consists in a new and artificial way of keeping them from the Air.

But it seems more difficult, as well as more useful, to be able to preserve Meat long without Salt; for 'tis sufficiently known to Navigators, how frequently, in long Voyages, the Scurvy, and other Diseases, are contracted by the want of fresh Meat, and the necessity of feeding constantly upon none but strongly poudred Flesh, or salted Fish; and therefore, he is much to be commended that hath first devised the way to keep Flesh sweet, without the help of those fretting Salts Men are wont to use to make it keep. This way is not un-

known to some ingenious Persons in *London*: One of the most noted of whom, upon my conjecturing how it may be perform'd, confess'd to me, that I had hit upon the way in general: But the most satisfactory account I could get of it, was from an English Man, that lately practis'd Physick in the *East Indies*, who, finding I was no stranger to what I asked him about, told me freely, that he had seen both Goats-flesh, and Hens, so well preserved by this way, that though it were put up in the *East Indies* awhile before he came thence, yet he eat of it, and found it good and wholesome, between the Islands of *Cape Verd* (as the Sea-men call them) and *England*; so that this Meat continued sweet above six Moneths, notwithstanding the heat and closeness of the Ship, the excessive heat they met with in their Passage under the Line, and consequently through the Torrid Zone: and that the way was onely this, That the Meat being well roasted, and cut in pieces, was carefully and conveniently ranged in a very close Cask, into which, afterwards, there was poured as much Butter melted, skimmed, and decanted from the grosser and ranker Parts, as would fill up all the intervals left between the several pieces of Flesh, and swim about them all, and thereby keep out the Air from approaching them; and then the Cask, being exactly closed, was stow'd up in a convenient place in the Ship, and kept unopen'd till the Meat was to be eaten. And it must not be omitted, that the Relator, and others that had the care of making Provision for the Voyage, were fain, instead of Butter made of Cows Milk (which could not be had where they took in their Lading) to make use of that made of Goats, or Ews Milk, which is not (as the *Indians* make it) so good, and to whose rankness he ascribed that which he had observed in some of the Meat buried in it, which he thought might have been preserved longer,
and

and *better tasted* (for *wholsome* and *incorrupt* he said it was) in our *European* Butter, whose power to preserve Meat bury'd in it, after due Coction, hath been confirmed to me upon their own observation, by an experienc'd Officer of the English Fleet, that had the over-sight of the Provisions, and by others that had opportunity to observe it.

But how much the Naturalists skill may advance the Dietetical part of Physick, by enabling Men to make Aliments much lasting longer than naturally they are, I must not here labor to convince you by other instances, that I may not anticipate what we have elsewhere to acquaint you with, from other Mens Experiments, and our own, about the conservation of Bodies. Onely I shall at present tell you in general, That I hope there will be ways found out to preserve even raw Flesh it self (for of the keeping of roasted, we have just now given you an instance) with things that do not so much fret it, nor give it so corrosive a quality, when eaten, as our common Salt doth. For not to mention what several curious Persons have practised, of salting Neats Tongues with Saltpeter, which though done onely to make them look red, shews that a Body, not corrosive like common Salt, may preserve Flesh: I have, for tryal sake, kept an entire Puppy of pretty bigness, untainted for many Weeks (and that in the midst of Summer) and that without flaying, drying (by Fire or otherwise) or so much as exenterating him, or cleansing him, or doing any thing towards the preserving of him, save the keeping him immersed in a well stoppt Vessel, under Spirit of Wine (from whose taste, I presume, Meat may be easily freed by Water) and there seemed small cause to doubt, that the onely thing that hindred me from keeping him much longer, was the want of time to pursue the Experiment, and take notice of its success: For I remember, I have the same way

way kept a soft Substance, taken raw from an Ox or Cow, for many Moneths (if I mistake not, eighteen or twenty) and found no putrefaction or ill sent in the immersed substance, which, for ought I know, might have been preserved divers Years together the same way, or at least, by an easie improvement of this method, of which, as I lately intimated, I intend you hereafter an account.

And I shall further adde on this occasion, That if we reflect upon *Suger*, which is (at least in these Western Regions) but an almost recent discovery, and consider how many Bodies are with it, by Confectioners and others, not onely preserv'd, but rendred exceeding grateful to the taste; that single instance may suffice to make us think it probable, that expedients yet unthought of, may, by an insight into Nature, be found out, for the preservation of Bodies; especially, if our ingenious Friend, Mr. *W.* would shew us, how out of divers other Concreats, besides the *Suger Cane*, a Substance not unlike *Suger* (though of different taste, according to the nature of the Vegetable that affords it) may, by a peculiar industry, be prepar'd: which, that you may not

* *Linscotens* Voyages, chap. 56.— think unfeazable, let me mention to you (for perhaps he hath not yet taken notice of it) what even *Indians* have done of this nature. And first, let me inform you of what we are told by *Linschoten* * concerning that Drink, which in the *East Indies* they call *Sura*, and made of the Liquor dropping from the Blossoms, that they cut away from the *Indian Palm Tree* which bears the

Coco Nut. For of this *Sura*, he tells us, That amongst other things, they make *Suger* (which is called *Fagra*) which is made

made by boiling that Liquor, and setting it in the Sun, where it congeals to Suger.

And though I must not conceal from you, that our Author adds, that it is not much esteemed by reason of its brown colour, and for that (to use his words) they have so great quantity and abundance of white Suger throughout all *India*, yet the latter reason, of the cheapness of *Jagra*, seems to be the principal. For probably, if other Suger were scarce, the melioration of this would be attempted; and 'tis very likely, That if a skilful Naturalist had the ordering of that sweet Juice, of which the *Indians* make their *Jagra*, he might very well make of it a Suger of no small use; and such a Suger would be very convenient in many cases, and to many Persons, for its being different from the common Suger, though it should not be better. *Garcilassus* also (a much applauded Apud Job: de Laët. descrip. Ind. die, l. 10. c. 3. Writer concerning the *West Indies*) treating of the Fruits of a *Peruvian* Tree, call'd by some *Molle*, and by others *Mulli* conficiunt (saith he) *ex eo potum confricando blande inter manus in aquâ calidâ donec dulcor omnis defricetur: Percolant hanc aquam servantque dies tres quatuorve donec subsideat. potus est limpidissimus, &c. Aquae eadem cocta convertitur in optimum mel:* And of the same Plant, *Petrus de Cieza* hath this confirming Passage, *Ex hujus fructu cum aquâ decocto, pro coctura modo, fit aut vinum sive potio admodum bona aut acetum aut mel.* Apud eundem eodem loco. And that there is a great affinity betwixt such Vegetable Hony's and Suger, especially if the Juices be ordered with a design of turning them rather into Suger than Honey, you may easily gather from the next and more memorable instance which we are to mention, and which is afforded us by the diligent Describer of the *Brasilian* Plants, who treating of the *Caraguata*, or *Erva Babosa* (or as some would have it, *Herba innominata caule portulacæ*) hath these words

words to our present purpose: *Porro* (saith he) *radendo novacula petrosa stolones, emanat ex concavitate liquor quidam tantâ copiâ ut ex unâ solummodo plantâ (Mirabile dictu) interdum 50. aut plures aroba effluent è quo liquore fit vinum, acetum, mel & saccharum: liquor quippe per se dulcis coquendo redditur multo suavior & spissior, ita ut tandem in saccharum congelascat.*

Since the writing of these last Lines, being visited by an ancient *Virtuoso*, Governor to a considerable Colony in the Northern *America*, and inquiring of him, among other particularities touching his Country, something in relation to the thoughts I had about the making of several kinds of Sugar, he assur'd me, upon his own experience, that there is in some parts of *New England*, a kinde of Tree, so like our Walnut-trees, that it is there so called, whose Juice that weeps out of its Incisions, &c. if it be permitted slowly to exhale away the superfluous moisture, doth congeal into a sweet and saccharine substance; and the like was confirmed to me, upon his own knowledge, by the Agent of the great and populous Colony of the *Masachusetts*. And very lately demanding of a very eminent and skilful Planter, why, living in a part of *America*, too cold to bare Sugar-Canes, he did not try to make Sugar of that very sweet Liquor, which the Stalks of *Maiz*, by many called *Indian Wheat*, affords, when their Juice is expressed; he promised me he would make tryal of it: Adding, That he should do it very hopefully, because that though he had never been solicitous to bring this Juice into a saccharine form, yet having several times, for tryal sake, boild it up to Syrup, and employed it to sweeten Tarts, and other things, the Guests could not perceive that they were otherwise sweetned then with Sugar. And he farther

farther added, That both he and others, had, in *New England*, made such a Syrrup with the Juice of Water Melons.

Nor, *Pyrophilus*, is it onely by teaching Men to improve the wholesomness and tastes of the Aliments, or to keep them long uncorrupted, that the Naturalist may contribute to the preservation of Man's health: For from the ingenious attempts of *Sanctorius*, in his *Medicina Statica*, we may be invited to hope, that there may be ways, as yet unthought of, to investigate the wholesomness or insalubrity of Aliments; as he, by the weight of Bodies, after having fed on such and such Meats, findes that Swines Flesh, Melons, and some other things that he names (in the third Section) do much hinder insensible Perspiration, and consequently are unwholsome; though, as I take it, it were not amiss, that before such Observations be fram'd into general and establish'd Aphorisms, they were carefully made in Bodies of differing Ages, Sexes and Complexions, and with variety of Circumstances: But then again, presuming these Maximes to be judiciously fram'd, the same *Statica Medicina* makes it hopeful, that there may be unthought-of Methods found, whereby, by ways different from those formerly used by Physitians, a Man may be much assisted in the whole manner of ordering himself, so as to preserve health, and to foresee and prevent the approach of many Distempers. And perhaps by such unthought-of ways, divers Paradoxes of concernment to Mans health may be made out, as the diligent *Sanctorius* to that Observation proposed in these words *Semel aut bis in mense facto excessu in cibo & potu, die sequenti, licet sensibiliter non evacuet, minus solito perpendit annexus* (in the following Aphorism) addeth this important Corollary: *Victus uniformis caret beneficio illorum qui semel vel bis in mense excedunt*

Sect. 3.
Aphorism
96.

sedunt: expultrix enim à copia irritata excitat tantum perspiratus, quantum sine statica nemo crederet. And indeed, experience hath informed us, that the promoting or suppressing of insensible transpiration, by which, in a day, the Body may discharge it self of four or five pound of excrementitious Matter, hath a much greater power to advantage or prejudice health, then is wont to be taken notice of; so that we see that the Staticks, which, though long known, were thought useles to Physick, may afford several important directions in reference to the preservation of Mans health; to which there are likewise other ways whereby the Naturalist may contribute. For he may also devise means, whereby to judge of the qualities of Aliments, especially Drinks in their respective kindes; and likewise of the temperature of the Air in this or that place assign'd, we shall, in one of the following Essays, describe to you a small flight Instrument, by the help of which, one that is acquainted with this or that particular sort of Wine, may give a near guess whether it be embased with Water or not. And whereas in most hot Countrys, where Water being the common Drink, 'tis of great concernments to Mans health to be able to make a good estimate of the salubrity of it; And whereas Physitians are wont to think Water *ceteris paribus*, the better and purer the lighter it is, this Instrument presently manifests, without any trouble of weighing in Scales, what among any Waters propos'd is the heaviest, and which the lightest, and what difference there is of gravity betwixt them: And this disparity may sometimes be so great, that I remember some of our English Navigators tell us, That upon bringing home a sort of Water out of *Africa* into *England*, they found, by the common way of ponderation, the *African* Water in the same bulk, to be about four Ounces in the pound lighter then
the

the *English*. And as the thickness or lightness of Waters may be thus presently discerned by this *Hydrostatical* way, so 'tis possible, by some Chymical Experiments, easily enough to discover some other qualities, wherein Waters, that are thought to be of the same nature, differ from each other; as we finde that very many Pump-waters will not bear Soap, as Rain-waters, and the generality of Spring-waters will do: some Water will not well dye Scarlet, or some other particular colour, because they are secretly imbued with some kinde of saline Substance, that hath an operation it should not have upon the Ingredients imployed by the Dyer. And I have sometimes discovered a latent Sea-salt in Water, where others suspected no such matter, by pouring into it a solution of good Silver, made in *Aqua fortis*: For as common Salt, as well as the Spirit of it, will precipitate the Metal out of such a solution, in the form of a white Calx; so it seem'd rational to conceive, that in case the Water I suspected had been imbued in its passage through the Earth with a saline quality, though not conspicuous enough to be taken notice of by the taste; these saline Corpuscles diffused through the Water, would, though faintly, act their parts upon the dissolved Silver, and accordingly I found, that upon the mixtures of such Waters, and the Metalline solution, there would immediately be produced a kinde of whiteness (from some parts of the Metal precipitated by the Salt:) to avoid which, I have often been fain to use, in places where I met with such Waters, either Rain-water, or that which is freed from its common Salt, by a slow Distillation.

And as for the temperature of the Air, which is acknowledged to be of exceeding great consequence, both as to health, and as to the prolongation of life; and which is possibly yet of greater moment to both then most Men imagine,

the skilful Naturalists sagacity, if it were employed to that purpose, might probably finde divers ways of discovering the qualities, and consequently the salubrity and unhealthfulness of the Air in particular places. For the diligent *Sanctorius* (in the second Section of his *Medicina Statica*) teacheth us how to estimate the healthfulness and insalubrity of the Air, by the weight of those Mens Bodies that live in it. And besides this (nice) way, we see, that by the late Invention of Weather-Glasses, 'tis easie to discern which of two Neighboring Houses, and which of two rooms in the same House is the colder. And I remember, I have sometimes bethought my self of a slight way (to be mention'd in one of the following Essays) by the help of which, it is not hard to determine in which of two places proposed, the Air is *ceteris partibus*, the dryer or the moister; And to give also some guess, both how much at the same time the Air of one place exceeds that of the other, and how the temperature of the Air changeth in the same place at several times, either of those qualities. And that the differing operations of several Airs, upon certain sorts of Flesh hung in them, upon some fading colours, upon Bodies subject to gather rust, or to be tarnish'd; and in a word, upon divers other subjects, may be more considerable then Men seem yet to have taken notice of, I shall think it sufficient to have intimated in this place, being desirous to hasten to the following Essay (wherewith I am to conclude, what I have to offer to you concerning Physick) that I may have the more time to employ on it.

ESSAY



ESSAY V.

Proposing some Particulars wherein Natural Philosophy may be useful to the Therapeutical part of Physick.

ANd now, *Pyrophilus*, the method that we formerly prescrib'd to our selves (a little after the beginning of the first Essay) requires, that we consider awhile the *Therapeutical* part of Physick, which is indeed that, whose improvement would be the most beneficial to Mankind; and therefore I cannot here forbear to wish, That divers Learned Physitians were more concern'd, then they seem to be, to advance the Curative part of their Profession; without which, three at least of the four others may prove indeed *delightful* and *beneficial* to the Physitian, but will be of very little use to the Patient, whose *relief* is yet the principal end of Physick: whereunto the *Physiological*, *Pathological*, and *Semiotical* parts of that Art ought to be referred. There was, awhile since, a witty Doctor, who being asked by an Acquaintance of mine (himself an eminent Physitian, and who related this unto me) why he would not give such a Patient more *Generous Remedies*, seeing he grew so much worse under the use of those *common Languid ones*, to which he had been confin'd, that he could not at the last but dye with them
in

in his Mouth? briskly answered, *Let him die if he will, so he die secundum artem.* I hope there are very few of this Man's temper, but it were to be wished, that there were fewer Learned Men that think a Physitian hath done enough, when he hath learnedly discoursed of the seat and nature of the Disease, foretold the event of it, and methodically employed a company of safe, but languid Remedies, which he had often before found almost as unable to *cure* the Patient, as unlikely to *kill* him. For by such an unprofitable way of proceeding, to which some lazy or opinionated Practizers of Physick (I say *some*, for I mean not *all*) have, under pretence of its being safe, confined themselves; they have rendered their whole Profession too obnoxious to the Cavils of such Empericks, as he that (as the Lord *Verulam* reports) was wont to say, Your *European* Physitians are indeed Learned Men, but they know not the particular Cures of Diseases; and (unreverently enough) to compare our Physitians to Bishops, who had the Keys of *binding and loosing*, and nothing else: Which brings into my minde, what Monsieur *De Balsac* relates (in his witty French Discourse of *the Court*) of a Physitian of *Millain*, that he knew at *Padua*, who being content with a Possession of his Science, and (as he said) *The enjoyment of the Truth*, did not onely not particularly enquire into the Cure of Diseases, but boasted, That he had kill'd a Man with the fairest Method in the World: *Emorto* (said he) *canonicamente, è contutti gli ordini.* And such Scoffs and Stories are readily enough entertain'd by the major part of Men, who send for Physitians, not so much to know what ails them, as to be eas'd of it; and had not rather been methodically kill'd, then Empirically cured. And it doth indeed a little lessen even my esteem of the great *Hippocrates's* skill, to finde mentioned in his Writings so many of his Patients,

tients, of whom he concludes, that they dyed : And I had much rather, that the Physitian of any Friend of mine, should keep his Patient by powerful Medicines from dying, then tell me punctually when he shall die, or shew me in the opened Carcase why it may be supposed he lived no longer. But, *Pyrophilus*, my concern for Mankind, and for the reputation of many excellent Physitians, whose Profession suffers much by the want of either Industry or Charity, in such as we have been speaking of, hath diverted me longer then I thought, from telling you, That I suppose it will not be very difficult to perswade you, that this so useful *Therapeutical* part of Physick is also capable of being much improved by a knowing Naturalist, especially if he be an intelligent and expert Chymist, as in this Essay we will suppose him.

CHAP. I.

SOME *Paracelsian* would, perhaps, set forth, how much more easie to be taken Chymically prepared Medicines are wont to be, then those loathsome and clogging *Galenical* Portions *Bolus's*, &c. which are not onely odious to the Takers, but (which is much worse) are to many so offensive, that either the Patients cannot get them down, or the incensed Stomack returns them, by Vomit, before they have stayed long enough in the Body to do any more then distemper it. But I shall not much insist on this, because I think wholesomeness to be much more considerable in a Remedy then pleasantness : though, I confess, I could wish that Physitians were more careful to keep Patients from being almost as much troubled by Physick, as by the Disease, and to cure according to the old Prescription, not onely *cito* and *tuto*, but *jucundè* too :
Especially

Especially considering that, as we were saying, the loathsomeness of some Medicines maketh the Stomack reject them, before they can have performed their Operations. And it is, I presume, on this account as much as on any other, that at *Oxford* Learned & Practical Physitians, of your Acquaintance, make very frequent use (on Patients not Feverish) of the *resin* of *Jalap*, barely drawn with Spirit of Wine; since as we have tryed six, eight or ten, or more Grains, of this almost insipid Resin, being cleanly prepared, according to Art, and with a little *Gum-tragacanth*, and half its weight of powdred Cinamon, or some such thing, made up, may be taken in the Morning, in form of Pills, instead of a Potion; and is wont to evacuate plentifully enough, and yet gripe the Patient much less then common Purges. But, as I said, I shall not insist on this. I might better commend the usefulness of Chymistry to the *Therapeutical* part of Physick, from hence, That it is probable, that even emptying Medicines may, by the *Spagyrist's* Art, be so prepared, as not onely to be less offensive then common Purges or Vomits in the taking, but to be less painful in the working: As I have often observed, both in my self and others, that upon the taking of the clear, and not loathsome Mineral *Waters of Barnet*, though the Medicine wrought with me ten or twelve times in a Morning, yet it did not either pain me, or make me sick, or disorder me for the remaining part of the day, any thing near so much as a common Pill or Potion that had wrought but once or twice would have done. And I shall elsewhere (God permitting) teach you a preparation of Silver, whereof about three or four Grains being made up (with any proper Conserve) into a little Pill, is wont to make a copious evacuation of *Serum* especially (in Bodies that abound with it) without making the Patient almost at all sick, or griping him: Insomuch that

I know

I know some Persons, both Physitians and others, with whom though this Medicine work frequently in a day, and though (which is stranger) once taking of it will with some Persons work so for two or three, or more days successively, yet they scruple not to go abroad and follow their business; and some that take it, tell me, That when it works not with them (as for the most part, when it hath freed the Body from superfluous *Serum*, it will cease, and in some Bodies will scarce purge at all, it neither puts them to pain, nor makes them sick.)

And now I am speaking of the painless ways of relieving the sick, I shall adde, That there is another way, whereby 'tis to be hop'd, many Patients may be rescued from a great deal of pain, and that is by finding out Medicaments, that may in several Distempers, that are thought to belong peculiarly to the Chirurgions hand, excuse the need of Burning, Cutting, Trepaning, and other as well painful as terrible manual Operations of Chirurgery. *Helmont* tells us, That he knew a Country Fellow, who cur'd all fresh Wounds by a Drink made (as I remember) of burnt *Tilia*. I have inform'd you in another Essay, of the Cure I observed to be made of the exulcerated Tumors of one sick of the Kings Evil, by the use of Beer, altered by a little Plant, that did not at all disturb the Taker. If we may believe, *Helmont's* and *Paracelsus's Precipitatus Diaphoreticus*, taken at the Mouth, doth cure, to use his own Words, *Carcinoma, Lupum & quodlibet Aethiomenum cacoethes ulcus, sive externum sive internum*. And if there be any truth in what hath been affirm'd to me by several Eye-witnesses, as well Physitians as others, concerning the *Weapon Salve*, and *Powder of Sympathy*, we may well conclude, That Nature may perform divers Cures, for which the help of Chirurgery

Helmont, De Febris, c. 14. See also the same Author, in Tractat: quem vocat Arcana. Paracels: & Lib. de Febr. cap. 14.

gery is wont to be implor'd, with much less pain to the Patient, then the Chirurgion is wont to put him to. I know a very ingenious Man, that is Famous as well for his Writings as for a Remedy, wherewith he undertaketh to cure constantly the exulcerated Cancers of Womens Breasts, without any considerable pain: But having not yet had opportunity to make tryal of that which I have lying by me, I shall onely tell you, he assures me, That his Medicine is indolent, and mortifies the ulcerous parts as far as they are corrupted, without disordering the Party troubled with them; which I the less doubt, because, that (to adde thus much on this occasion) partly by the colour, &c. of his Powder, and partly by his own confession to me, it seems to be a dulcification of *Arsenick*, first fixt with *Nitre*, and then carefully freed from its corrosiveness, by very frequent Distillations of fresh Spirit of Wine. I shall ere long have occasion to teach you a Drink, whereby exulcerated (but not Cancerous) Breasts have been very happily cured. The learned *Bartholinus*, in his late Observations) mentions the cure of some hurts in the Head, done without Trepaning, in cases where that formidable and tedious Operation is wont to be thought necessary. As for the terrible way of stopping the violent Bleeding in great Wounds, by seering the Orifices of the Vessels with hot Irons, it would be little needed, if we knew such Remedies as that which the Inquisitive *Petrus de Osma*, in his curious Letter to *Monardes* from *Peru*, mentions in this Passage, which I finde among his other Observations: *Anno* (saith he) 1558. *in urbe D. Jacobi quæ est in Provincia Chyle, quidam Indi captivi suras sibi amputarunt, & eas assas præ fame ederunt & (quod mirabile dictu) cujusdam Plantæ folia vulneribus imponentes, ilicò sanguinem sistebant.* I knew a rich Man, extreemly corpulent, who having long had a strange kinde

*Apud Mo.
nard: de
simplic:
Medic. pag.
84.*

kinde of *Fistula* in his Breast, and having travelled from one Country to another, to consult with the ablest Chirurgions, was at length brought to that pass, that at a Consult they resolved, by opening his Breast, to try if they could track the winding *Fistula*, and save his Life: And as the Instruments, for this sad operation, lay upon the Table, another famous Chirurgion casually coming into the House, told the Patient that he had an art of curing *Fistula's* without cutting them open, and without any considerable pain or trouble: Whereupon the rich Man offering him what he pleased for the Cure, the Chirurgion quickly perform'd his Promise, as the Patient himself, who shew'd me his Breast, confess'd to me, and that by the use of an almost indolent Remedy, which he purchas'd of the Chirurgion, and which by his favor came to my hands: And that even very ill-condition'd *Fistula's* may be cured without Chirurgical Operations, by Medicines taken at the Mouth, I shall ere long have occasion to shew you by a notable Example.

In the mean time I shall adde, That a Man, whom I suppose you have often seen, having a while since received such a kick of a Horse, as made the Doctor and Chirurgion that tended him, to conclude the part gangrenated, and the Patients condition, by the accession of a violent Feaver, so desperate, that they desired to meddle with him no longer; a large Dosis of Sir *Walter Rawleigh's* Cordial, sent him by an excellent Lady you are nearly related to, not onely freed him from his Feaver, and the *Delirium* that attended it, but, to the wonder of all that observed it, restored the Limb that was concluded gangrenated to its former soundness.

And to bring credit to all these Relations, I shall crown them with that memorable Passage of *Gulielmus Piso*, of as great things that he saw done by the illiterate *Indians* themselves:

selves: *Memini* (saith he) *in castris membra militum globulis sclopetorum icta, & jamjam ab Europæis Chirurgis, tam Lusitanis quam Batavis, amputanda, barbaros recentibus gummi succis & balsamis à ferro & igne liberasse & feliciter restituisse. Oculatus itidem testis sum in Nosocomiis relictæ ulcera & gangrenas ab illis vel solo succo Tabaci curata.*

But, *Pyrophilus*, That the making of divers Helps to Recovery less distateful, or less painful to the Patients, is not the *onely*, nor perhaps the *greatest* service that Chymistry may do him that attempts the Cure of Diseases, I shall now endeavor to manifest in some Particulars.

CHAP. II.

ANd *first*, The skilful Naturalist, especially if a good Chymist, may much assist the Physitian to discover the Qualities of Medicines, whether *simple* or *compound*; That the Experiments of the Spagyrist's may much contribute to the examining those many things themselves prepare, you will, I presume, easily grant: That also divers Mineral Waters are of the nobler sort of Medicines, is sufficiently confessed on all hands; and 'tis known too, that the Industry of Chymists hath produced some good directions towards the discovery of the Minerals predominant in divers Medicinal Springs: But I am much mistaken, if they have not left much for others to do, which may be easily done. And I scarce doubt, but that by the various ways that might be propos'd, of trying what such Waters hold, and what saline or other Qualities are predominant in them, not onely the nature of those Medicinal Waters that are already used, might be more thoroughly understood; but undetected Properties, might in many other s that are now not taken notice of, be discovered;
of

of some of which ways of examining Mineral Waters, I may elsewhere give you an intimation. And I have made several tryals that have, I confess, much inclin'd me to think, that the fault is rather in us, then either in Nature or Chymistry, that Men do not, by the help of Chymical Experiments, discover more of the nature of divers Medicaments, then hitherto they seem to have so much as aim'd at: For though the abstruse Endowments of Specificks will not, I fear, be learn'd in haste, otherwise then by particular Tryals and Observations; yet many Simples have other Qualities, which seem chiefly to reside, though not in an Elementary Salt or Sulphur, yet in a part of the Matter that seems of kin to a Salt or Sulphur: such as sowerness, saltness, a caustick or a healing faculty, absterfiveness, and the like, upon whose account such Remedies seem chiefly to work in a multitude of cases. And towards the Investigation of such Qualities, a Chymist may oftentimes do much, without making all his Tryals in humane Bodies. But though, to illustrate this matter, I have sometimes made several Experiments, yet not having now my Notes and Observations at hand, I shall only mention a few things as they offer themselves to my memory, reserving the more distinct handling of this subject to another opportunity: And the rather, because that till such *Phænomena* have been more diligently observ'd, and reduc'd to their distinct sorts, I would have them look'd upon but as hints to further Enquiries, not as sufficient Authority to ground general Rules on.

There are some Plants, whose Juices, especially when the superfluous moisture is exhal'd or abstracted, will, some by the assistance of a gentle Heat and Filtration, and some, even of themselves, in time (which I remember hath in some succulent Plants amounted but to a very few hours) coagulate
in.

in part into a kinde of Salt, which, if you please, you may call Essential: And by this *Nitro-Tartareous* Salt (as it seems to be) those Vegetables, whose Juice affords it (such as are, if I mistake not their names, *Parietaria*, *Borrage*, *Bugloss*, &c.) may be discriminated from those many others, from whence it is not (at least by the same way) to be obtain'd. And possibly also these Salts may, to a heedful Surveyor of them, appear to differ enough from each other in shape, taste, or other obvious Qualities, to deserve to be sorted into differing kinds.

If likewise we compare the Essential Salts and Spirits of these Plants, with those of *Scurvy-grass*, *Brook-lime*, and other Vegetables that are counted *Antiscorbutical*, and abound in Volatile and Saline parts: And if we also examine other Plants, by divers Chymical Operations, and observe not onely their disposedness or indisposition to yield Spirits or Oyls by Fermentation, or without it; but those other Particulars wherein they will appear to agree with, or differ from each other: there is little doubt but such Tryals will make them discover, to a considering Naturalist, much of their Nature and Properties, and especially of such as depend chiefly upon the plenty or paucity of the saline, unctuous, sower, spirituous, lazy, tenacious or volatile Parts.

It may be also observ'd, that the Infusion or Decoction of some Plants, as of *Brazil*, *Senna*, &c. will be heighten'd into a redish colour, by putting *Alkalizate* Salts, as of *Tartar*, or of Pot-ashes, in the Water that extracts their Tinctures: Whereas acid Spirits, at least some of them, will much impair, if not destroy their colour; as a little *Aqua fortis* will immediately turn a red Tincture of *Brazil*, made in fair Water, into a pale yellow: Whereas on the other side, I have observ'd, that a small quantity of a strong Solution of Pot-ashes,

ashes, drop'd into an Infusion of red Rose-leaves, hath presently turn'd it into a muddy colour, that seem'd to partake of green and blew, but was dark and dirty; whereas a little *Aqua fortis*, or good Spirit of Salt pour'd into the same simple Solution, did immediately turn it into a fine red, and so it would do to the muddy Mixture lately mention'd, if it were put to it in a far greater quantity. I observ'd also, that with a very strong (though clear and well filtrated) *Lixivium* of Pot-ashes, I could precipitate some parts of the Infusion or Decoction of red Roses, which grosser parts, when the Mixture was filtrated through Cap-paper, remain'd like a dirty colour'd (though somewhat greenish) Mud in the Filtre; the fluid and finer part of the Mixture passing through, in the form of a Liquor high coloured, almost like *Muscadine*.

And on this occasion, I remember, that as Galls, a very stiptick Vegetable excrescence, will yield a Decoction, with which, and *Copperis*, the common Ink is made; so divers other Plants, of notably astringent parts, may be employed to the like use: For, by casting *Vitriol* into a Decoction either of Oaken Bark, or red Roses, or even a bare Infusion of either Log-wood, or *Sumach*, to name now no other Plants of the like nature, I have presently made a Mixture that might make a shift to serve for Writing Ink; but whether all stiptick Plants, or they onely, will with *Vitriol* make an Ink, I refer to further Enquiry: And as a Solution of *Vitriol*, and the Decoction of the above-mention'd Plants, do precipitate each other to make Ink; so I remember I have try'd, that by dissolving the Crystals of pure Silver (made the common way with *Aqua fortis*, or Spirit of *Nitre*) in a good quantity of fair Water, that the Liquor having no colour of its own, the colours it produceth in other Bodies may be the better observ'd, I found that I could with this Liquor precipitate out
of

of the Infusions alone of several Vegetables, Substances differing in colour'd, according to their respective dispositions: And so I have found, with less cost, that *Saccharum Saturni*, which seems to be a kinde of *Vitriol* of Lead, whilst it lyes dissolved in the same Spirit of Vinager which extracted it from the Metal, being put to the bare Infusion of Log-wood, *Lignum Nephriticum*, red Roses (to name those I now remember I made tryal of) they will precipitate each other.

I might farther adde, That I have try'd that sulphureous Salts, such as Oyl of *Tartar*, made *per Deliquium*, being drop'd into the expressed Juices of divers Vegetables, will, in a moment, turn them into a lovely Green, though the Vegetables were of colours differing from that, and from one another (as I remember one of those Vegetables, in which I expected, and found that change, was of a fine Carnation) And I could tell you, that though it be disputed whether Quick-lime have any Salt dissoluble in Water, and of what sort it is, the *Examen* of that Question may be much furthered, by trying, as I have done, that the Water of Quick-Lime, well made, will precipitate a Solution of sublimate made in fair Water, and will presently turn Syrup of Violets (which is Blew) if well mix'd with it, into a fair Green. Experiments I say of this nature I might easily annex; but having already set down divers of them in what I have written concerning colours, I shall refer you thither: And now onely adde this Observation, that the Investigation of divers Medical Qualities, even of Animal Substances, may be much assisted by the Naturalist, especially a Chymist; as we elsewhere have by the Distillation of the *Calculus humanus* shewn, how much it differs from the Stones that are found in the Earth. And if you take those hard Concretions, found at certain times in the Heads of Craw-Fishes, that are wont
to

to be call'd *Lapides Cancrorum*, and commit some of them to Distillation, and infuse some in Vinager, and others in old Rhenish-Wine, or strong White-Wine, you will probably discover some thing of peculiar in the nature of this Concrete, of which I may possibly elsewhere make further mention to you: And not onely so, but in some Animal Substances, you may, by fit Experiments, discover notable Changes to be made, and their Qualities to be much heighten'd, when the Eye scarce perceiveth any Change at all, as I have purposely observ'd, in keeping Urine in close Glasses, and a moderate heat for many Weeks: For at the end of that time, the Virtues that depend upon its volatile Salt will be so heighten'd, that whereas upon putting Spirit of Salt to fresh Urine, the two Liquors readily and quietly mix'd, dropping the same Spirit upon digested Urine, there would presently ensue a Hissing and Ebullition, and the volatile and acid Salts would, after a while, concoagulate into a third Substance, somewhat of the nature of *Sal Armoniack*. And whereas the Syrup of Violets, formerly mention'd, being dissolv'd in a little fresh Urine, seem'd to be but diluted thereby; a few drops of the fermented Urine, temper'd with it, did presently turn it into a deep Green: And the same digested Urine being drop'd upon a Solution of Sublimate made in fair Water, presently turn'd it white, by precipitating the dissolved Mercury. With what (various) success we have likewise made upon some other parts of a humane Body, as well consistent as fluid, some Tryals, analogous to what we have recited of Urine, I may *elsewhere* perchance take notice to you: But of such kinde of Observations I must give you but this Hint at *present*.

CHAP. III.

S*Secondly*: By these and other ways of investigating the Medicinal Qualities of Bodies, the Naturalist may be enabled to adde much to the *Materia Medica*: And that two several ways.

For, he may by his several ways of tryal, and by his Chymical preparations discover, that divers Bodies, especially of a Mineral nature, that are as yet not at all employed by Physicians, at least internally, may be brought into use by them; and that others that are naturally so dangerous, as to be us'd but in very few, and for the most part extream cases, may with safety be more freely employ'd. Some Modern Chymists (as particularly *Glauberus*) have of late prepar'd Remedies not unuseful out of *Zinck* or *Spelter*. And I have already mention'd unto you an excellent Medical use of Silver, of which, prepared (as is there intimated) I have now this to adde, That since I began to write of it to you, I met with a considerable Person, who assures me, That she her self was by the use of it, in a short time, cured of the Dropsie, though, by reason of her having a Body very corpulent, and full of humors, she have been thought more then ordinarily in danger of that stubborn Disease. I have sometimes wondered, that there hath been so little care taken by Physicians, and even by Chymists, to investigate the Qualities of Mineral Earths, and those other resembling Bodies, that are, or may be, plentifully enough digg'd up in most Countries, though not the self-same in all; for however Men are pleas'd to pass them slightly over, as if they were but Elementary Earth, a little stain'd, or otherwise lightly altered: I have seen great variety of them, that have been digg'd sometimes within

within the compass of a little spot of Ground: and the differences of divers of them, both as to colour, taste, consistence, and other Qualities, have been too great, not to make me suspect they were of very differing natures. And the true *Bolus Armenus*, and the *Terra Lemnia*, which is now brought us from the Island that gives it that name (mark'd with a Seal, which makes many call it *Terra sigillata*, though that name be for the same reason apply'd to the *Terra Silesiaca*, and other Medical Earths) have been so esteemed, both by Ancient and Modern Physitians, as well against Malignant Diseases, and the Plague it self, as against divers other Distempers; that 'tis the more strange, that (since the greatest part of those two Earths, that are now brought into our Countrys, have not, as the more skilful complain, the true marks of the genuine Earths, whose names they bear) Physitians have not been more careful to try whether their own Countrys could not furnish them with the like, or as good, especially in regard some of the few attempts of that nature, that have of late times been made, may give them much encouragement. For, not to believe the boasts of the *Silesian Johannes Montanus* (who passeth for the Inventor of the *Terra Sigillata Silesiaca Strigoniensis*) in the Writing he published of the vertues of it, That 'tis Gold prepared and transmuted, by provident Nature, into an admirable Medicine; I finde that Learned Physitians prefer it before the *Lemnian* Earth, that is now brought from *Turky*: And the experienced *Sennertus* gives it this commendation, *Experimentis* (saith he) *multis jam probatum est, ejus insignes esse vires contra pestem, febres malignas, venenatorum animalium morsus, diarrhoeam, dysenteriam*: What he adds, that the Chymists name it *Axungia solis*, brings into my minde (what I shall hereafter have occasion to mention more particularly to you)

*Epitome
scientia
naturalis,
lib. 2. c. 1.*

that I had'once brought me a certain Earth, by a Gentleman that digg'd it up in this, or some neighboring Country, which, though it seem'd but a Mineral Earth, did really afford, to a very expert tryer of Metals of my acquaintance, a not despicable proportion of Gold. They have also found in *Hungary*, an Earth, which they call *Bolus Tockaviensis*, which is affirmed by *Crato* (in *Sennertus*) to melt in the Mouth like Butter, and to have all the other proofs of the true *Bolus Armenus*, and therefore is, by that Judicious Physician, preferred before the Modern *Bolcarmony*, even that which was brought out of *Turky* to the Emperor himself; and he relates, not onely its having succeeded very well against *Catarrhs*, but his having experimentally found it of great efficacy in the Plague, that reign'd in his time at *Vicenna*. To which I shall adde, That a very Learned and Successful English Doctor, now dead, did, some Years since during a great Plague that then rag'd in the City where he liv'd, finde a vein of red Earth, not very far from that Town, and prescrib'd it with very good success in Pestilential Feavers, as I was inform'd by an Ingenious Friend of his, that us'd to administer it, and shew'd me the place where he digg'd it.

I remember also, the experienc'd Chymist *Johannes Agricola*, in his Notes upon what *Poppius* delivers of *Terra Sigillata*, after having much commended the *Terra Silesiaca* in divers Diseases, and equall'd it to the best of *Turky*, where he had travelled, relates one strange thing of it, with many Circumstances, and in a way as if he spoke upon his own tryal, namely, That the Spirit of *Terra Sigillata*, by which I think he means the *Strigoniensis*, doth, though slowly, dissolve Gold as well as an *Aq. Regis*, and that into a red Solution; whence in two or three days, the Gold will fall of it self into a very fine and subtil Powder. And the same Author

thor tells us, That he hath seen another Earth digg'd at the *Rheinstran*, not far from *Westermaldt*, which was more inclinable to white then to yellow, which is preferable to the *Silesian*, and gives more Salt then it, and dissolves Silver better then other *Menstruums*; since, as he saith, the Silver may thereby be easily made potable, and be prepar'd into a very useful Medicine for the Diseases of the Head. And for my part, I do not much wonder at the efficacy of these Earths, when I consider, that divers of them are probably imbu'd, as well as dy'd, with Mineral Fumes; or tinged with Mineral Juices, wherein Metals or Minerals may lie, as the Chymists speak, *in solutis principiis*; in which form, having never endured the Fire, many of their usefulest parts are more loose and volatile, and divers of their Vertues less lock'd up, and more dispos'd to be communicative of themselves, then they are wont to be, in a more fixed or coagulated state, or when they have lost many of their finer parts by the violence of the Fire.

Besides, there are several Mineral Bodies, which though perhaps they may not be of themselves fit for the Physitians use, may, by addition of some other convenient Body, or by sequestration of the more noxious parts, or by some such other Chymical Preparation, as may alter the Texture of such Minerals, be rendred fit to encrease the *Materia Medica*. As I have known, that by a preparation of *Arsenick*, with Salt Peter, whereby some of the more volatile and noxious parts are driven away, and the remaining Body somewhat fixed and corrected by the *Alcali* of the *Nitre*, it hath, by a farther dulcification with Spirit of Wine, or Vinegar, been prepared into a kinde of *Balsamum fuliginis*, which wonderfully cured a Physitian of my acquaintance, as he himself

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confess'd to me, of dangerous Venereal Ulcers (divers of which penetrated even to the *Meatus Urinarius*) which had reduc'd him to great extremity.

'Apud
Shröderum
in
Pharmaco-
poe. lib. 3.
cap. 18.
Dr. J. C.

And though *Bismutum* have not, that I know, till very lately been used, unless outwardly, and especially for a Cosmetick (hereafter to be taught you) yet the Industrious Chymist, *Samuel Clossens*, by calcination and addition of Spirit of Vinegar, and *Cremor Tartari*, makes two Medicines of it, which he highly extols in the Dropfie; and (to reserve for another place, what I have tryed upon Tin-glass) a very expert Chymist of my acquaintance, doth, by preparing it with common Sublimate (carry'd up, by which I remember it hath afforded a very prettily figur'd Body) make it into a white Powder (like *Mercurius vita*) which he assures me he findes, in the Dose of a few Grains, to purge very gently, without being at all (as *Mercurius vita* is wont to prove, violently enough) emetick.

2. But the Naturalist may adde to the *Materia Medica*, not onely by investigating the Qualities of unheeded Bodies, but also by gaining admittance for divers, that, though well enough known, are foreborn to be us'd upon the account of their being of a Poisonous nature; for by digestion with powerful *Menstruums*, and some other skilful ways of Preparation, the Philosophical Spagyrist may so correct divers noxious, nay poisonous Concrets, unfit in their crude simplicity for the Physitians use, at least in any considerable quantity, as to make them useful and effectual Remedies. *Helmont*, who though frequently extravagant in his Theory of Physick, doth often make no bad estimate of the power of Remedies, after having told us, That he ador'd and admir'd the Clemency and Wisdom of God, for creating Poysons, gives this account of his so doing: *Nam venena* (saith he) *noluit*

noluit nobis esse venena aut nocua. Nec enim mortem fecit, nec *Helmont*
Medicamentum exterminii in terra: sed potius ut parvo nostri *in Phar-*
studio, mutarentur in grandia amoris sui pignora, in usuram *mac: &*
mortalium, contra futurorum morborum savitiem. In illis *dispens:*
nempe latitat subsidium, quod benigniora & familiaria simpli- *Modern.*
cia recusant alias. Ad majores & heroicis medentum usus ve- *numero 46.*
vena tam horrida servantur. And though I would not forbid you, *Pyrophilus*, to think there is some *Hyperbole* in the *Encomiums* he here and elsewhere gives Poysonous Simples; yet when I consider, what great things are oftentimes performed by *Antimony*, *Mercury* and *Opium*, even in those not over-skilful ways of preparing them, that are divers of them vulgarly us'd by Chymists, especially when the preparations are (which doth seldom happen) rightly and faithfully made: I can scarce think it very unlikely, that those active Simples may, by a more skilful way of ordering and correcting them, be brought to afford us very noble Remedies. And the same Examples may in part prevent the main Objection that I can foresee in this case, which is, That whatever corrects Poysons, must, with their virulency, destroy their activity; for the above-named Simples, though so prepared as to be Medicines safe enough, have yet activity enough left them to let them be very operative, their energy being, by preparation, not onely in part moderated, but in part so over ruled, as to work after a more innocent manner; as in *Bezoardicum Minerale*, skilfully prepared (for it very seldom is so) the laxative and emetick virulency of the *Antimony*, is changed into a diaphoretick, resolving and deopplative power; which probably made the experienced *Riverius* (though counted a *Galenist*) so particularly recommend this Medicine to Physitians, which, if I be not mistaken, may well be prais'd without being flattered: And *Helmont* supplies.

Helmont
Tractat:
supra alle-
gato. Nu-
mero 46.
47.

plies me with an easie Experiment to our present purpose, by telling us, That *Asarum*, which when crude, doth, as is well known, provoke Vomits, by a slight preparation (presently to be mention'd) is so altered, that its virulency is changed, to use his expression, *in deoppilans, diureticum tardarum februm remedium*; which I the rather take notice of, because I finde, upon enquiry purposely made of some Ingenious Physitians of my acquaintance, that upon tryal, they commend this preparation of *Helmont's*, and confets, that by it the *Asarum* looseth its emetick, and acquires a diuretical Quality.

Helmont
pag.
466.

Helmont de
Lithiasi.
lib. 7.
cap. 32.

Now that all other Animal and Vegetable Poysons may be corrected, without loosing their force with their virulency, is the affirmation of *Helmont* concerning *Paracelsus's* and his *Sal circulatum (majus.)* And as for Vegetables, he elsewhere tells us, That the *Lapis Cancrorum* resolv'd in *formam*, as he speaks, *Pristinae lactis, habet remedium contra inclementias multorum vegetabilium vi laxante infamium.* And I remember that I knew two Physitians, the one of which affirmed to me, his having seen tryal made (by the help of a noble *Menstruum*) of what *Helmont* here teacheth, and found it true; the other a person severe, and apt enough to dissent from *Helmont*, assur'd me, That with the volatile Salt of *Tartar*, he had seen Vegetable Poysons, and particularly *Napellus*, so corrected by a light digestion with it, that it lost all its Poysonous Qualities; for proof of which, he freely offered me, to take himself as much of that fatal Herb as would kill three or four Men (but at that time, and in that place, I could not get any of the Plant to make the Experiment with.) And though I shall say nothing now concerning *Helmont's Sal Circulatum*, yet as to the volatilization of the Salt of *Tartar*, what I have seen, scarce permits me to doubt that it

it is possible. And if I could now clearly acquaint you with my reasons, you would, perchance, not wonder to finde me inclinable to think, that some such Methods (perhaps a *Menstruum*) may be found to correct poisonous Simples, without rendring them ineffectual: And though it must be some very, powerful corrective, whether Salt or Liquor, that shall be able to correct any store of differing Poysons; yet 'tis not irrational to think, that divers particular Concretes may be prepar'd without any such abstruse or general corrective, some by one way of handling it, and some by another: And in such cases, skill, in the natures of particular Bodies to be mannag'd, or lucky hits, may supply the place of a meliorating Dissolvent, of which *Helmont* affords me a considerable instance, where he teacheth (in the place lately quoted) That the emetick property of *Asarum* may be taken away, and the Plant turn'd into a noble diuretick, onely by boiling it awhile in common Water. And whereas a wary Man would be apt to suspect, that this change is made but by the avolation of some subtile parts, driven away by the heat of the boiling Water, I finde that our Author affirms, that though it be boil'd with the like degree of Fire in Wine, instead of Water, it will not so loose its violence. I have known white *Hellebor*, *Opium*, and some other noxious Bodies, so prepared, as to be given not onely harmlesly, but successfully in such quantities, as were they not skilfully corrected, would make them pernicious. We daily see, that the violent emetick and cathartick properties of *Antimony*, may singly, by calcination with *Salt-peter*, be destroyed. And (which is though a known, yet a notable Experiment among Chymists) *Mercury* sublimate may be deprived of its deadly corrosiveness, and prepar'd into a Medicine inoffensive even to Children, by bare resublimations with fresh *Mercury*. And to

*Helmont in
Pharmacop.
& dispens.
Modera.
N. 46, 47.*

give you one instance more of what the knowledge of the effects of Chymical Operations, and of the disposition of a particular Body, may enable a Man to do, in changing the pernicious nature of it; I shall adde, that the violently vomitive Flowers of *Antimony*, which our wonted, though sumptuous and specious Cordials are so unable to tame, I can shew you (which perhaps you will think strange) so corrected, without the addition of any thing besides *heat* and *skill*, that in a treble Dose, to that wherein they are wont to be furiously emetick, we have not found them to work otherwise then gently by sweat: But some more Particulars applicable to our present pupose, you will meet with by and by.

CHAP. IV.

T*Hirdly*, And now, *Pyrophilus*, that I am speaking of the service that the Naturalist may do Physick, I must not pretermitt that he may assist the Physitian to make his Cures less chargeable: For though to cure cheaply, be not properly, and in strictness, any part of the end of the Art of Physick, which considers Mens Health, and not their Purse; yet it ought in Charity, if not also in Equity, to be the endeavor of the Physitian, especially when he dealeth with Patients that are not rich. For not now to say any thing of the Fees of Physitians, which in some places are not very moderate, 'tis certain that the Bills of Apothecaries, especially in Chronical Diseases, do often prove so chargeable, that even when the Remedies succeed, by that time a poor Patient is recovered, he is undone, and pays for the prolongation of his Life, that which should have been his lively-hood: Whence it comes to pass, that the more necessitous sort of People are either fain to languish unrelieved, for want of being able to purchase

purchase health at the Apothecary's rates; or are deterred from applying themselves to the Physitian, till their Diseases have taken too deep root to be easily, if at all, eradicated: And this oftentimes, not more through the fault of the Apothecary, then of the Doctor, who in his Prescriptions might, for the most part, easily direct things that would be much more cheap, without being much less efficacious.

Now there are several Particulars, wherein it may be hop'd, that the Naturalist may assist the charitable Physitian to lessen the charge of his Patients.

And first, He may perswade the Physitian to decline that more frequent, then commendable custom, of stuffing each *Recipe* with a multitude of Ingredients: 'Tis not that I approve the practice of some Chymists, who too freely censure the compounding of Simples; for I know, at some times, a complicated Distemper requires in its Remedy more Qualities, then are, perhaps, to be met with in any of the known Simples that the Physitian hath at command (though one and the same Simples may sometimes answer divers Indications; as a Plant that is hot and dry, may serve for a Distemper that is cold and moist:) And I know too, that in some cases to that Ingredient, that is as it were the Basis of the Medicine, other things must be added either to correct its noxious Qualities, or to allay its vehemence, or to serve for a Vehicle to convey it to the Part affected, or to make it easier to be taken by the Patient, or to preserve it from corruption, or for some such like reason. But yet I think Physitians may well be more sparing, as to the number of the things prescribed, then most of them use to be, both to save charges to their Patients (upon which account it is that I here mention it) and for other considerations. For the addition of needless Ingredients adding to the bulk of the Medicine, makes it but the

more troublesom to be taken, and the more apt to clog the Stomack: And oftentimes the Efficacy of the more useful Ingredients, as well as their Quantity in each Dose, is much abated, by their being yok'd with those that are less appropriated, or less operative. Besides, it seems a great impediment to the further discovery of the Vertues of Simples, to confound so many of them in Compositions: For, in a mixture of a great number of Ingredients, 'tis so hard to know what is the operation of each, or any of them, that I fear there will scarce in a long time be any great progress made in the discovery of the vertues of simple Drugs, till they either be oftner employed singly, or be but few of them employed in one Remedy. And besides all this, whereas when one of these Mixtures is administred, the Physitian expects but such operations as are suitable to the Quality which he conceives will be predominant in the whole Compound; several of the Ingredients may have particular Qualities that he dreams not of, which working upon a Body, that the Physitian considers as subject onely to the Sicknes he endeavors to cure, may therein excite divers latent Seeds of other Distempers, and make new and unexpected commotions in the Body. On which occasion I remember, that whereas Parsley is a very usual Ingredient of aperitive and diuretick Decoctions and Apozems, a famous and learned Oculist tells me, he hath very often observ'd, That when he hath unawares, or for tryal-sake employ'd Parsley, either inwardly, or even outwardly to those that were troubled with great Distempers in their Eyes, he found the Medicines wherein that Herb was but one Ingredient among many, to cause either great pain or inflammation in the Eyes. In confirmation of which, I shall adde, that awhile after having a slight Distemper in my Eyes, I one day found it upon a suddain strangely encreased, without being

ing able to imagine whence these new Symptoms proceeded; till at length, recalling to minde all I had done that day, I remembred, that at Dinner I had eaten Sawce wherein there was a pretty deal of Parsley, mixt with other things. And whereas in divers of these Compositions some noxious Ingredients are allow'd, upon a supposition that their ill Qualities will be lost, by their being, as it were, tempered with the rest; though this may sometimes happen, yet it would be considered, that in Treacle (especially at one age of it) the *Opium* doth not, considering the small proportion of it to the rest of the Ingredients, loose much, if any of its power, by being mingled with sixty odde other Drugs, which Composition possibly ow's much of its vertue to that little *Opium*. And perhaps one reason why those that accustom themselves to be ever and anon taking Physick, though they often escape dangerous Diseases (by preventing the accumulation of humors, and taking their Sickneses at the beginning) are yet almost ever troubled with one Distemper or other, may be, That by the multiplicity of Medicines they take into their Bodies, divers things are excited to disorder them, which otherwise would have lain quiet. I am not ignorant that it may be alledg'd, That in compounded Medicines, as *Treacle* & *Mithridate*, how many soever the Ingredients be, they do so clog & temper one anothers activity in the composition, that there results from them all, one or more Qualities fit for the Physicians turn, and which is the thing he considers and makes use of. And I confess, that in some cases this Allegation doth not want its weight: For I consider, that a decoction of Galls, and a solution of *Copperas*, though neither of them apart be blackish, will, upon their mixture, turn to Ink: And that when Brimstone, Salt-Peter, and Coals are well mingled together in a due proportion, they make Gun-Powder, a
mixture,

mixture, that hath Qualities much more active then any of the sever'd Ingredients. But I fear, that when a multitude of Simples are heap'd together into one compound Medicine, though there may result a new *crasis*, yet 'tis very hard for the Physitians to know before-hand what that will be; and it may sometimes prove rather hurtful then good, or at least by the coalition the vertues of the chief Ingredients, may be rather impaired then improved: As we see that crude *Mercury*, crude *Nitre*, and crude *Salt*, may be either of them safely enough taken into the Body in a good quantity; whereas of sublimate, consisting of those three Ingredients, a few Grains may be rank Poyson. As for those fam'd Compositions of *Mithridate*, *Treacle*, and the like, though I cannot well, for the mention'd Reasons, commend the skill of those that first devised them, and though I think that when one or two Simples may answer the same Indications, they may for the same Reasons be more safely employed; Yet I would by no means discommend the use of those Mixtures, because long experience hath manifested them to be good Medicines in several cases. But 'tis one thing to employ one of these Compositions, when tryal hath evinced it to be a lucky one, and another thing to think it fit to rely on a huddle of Ingredients, before any tryal hath manifested what kinde of Compound they will constitute. And, in a word, though I had not the respect I have for *Matthiolus*, and other famous Doctors that devised the Compositions, whereinto Ingredients are thrown by scores, if not by hundreds, yet however I should not reject an effectual Remedy, because I thought that it proved so rather by chance, then any skill in the Contriver: And I think a wise Man may use a Remedy, that scarce any but a Fool would have devis'd.

Another

Another thing, upon whose account the Naturalist (whom we here suppose an expert Chymist) may assist a Physitian to lessen the expensiveness of his Prescriptions, is by shewing, That in very many Compositions, several of the Ingredients, and oftentimes the most chargeable, whether they be proper or no for the Disease, are unfit for the way of management prescrib'd, and consequently ought to be left out. I need not tell you, that since Chymistry began to flourish amongst us, very many of the Medicines prepared in Apothecaries Shops, and commonly the most chargeable, are distill'd Waters, Spirits, and other Liquors: And he that shall survey the Books and Bills of Physitians, shall finde, that (very few perhaps excepted) the most usual Prescription is to take such and such Ingredients (for the most part numerous enough) and pouring on them either Water or Wine, if any Liquor at all, to distil them in *Balneo*, rarely in Ashes or Sand. But I confess I have not without wonder, and something of indignation, seen in the Prescriptions of Physitians, otherwise eminently Learned Men, and even in the publick Dispensatories, I know not how many things ordered to be distill'd, with others, in *Balneo*, which in that degree of heat will yield either nothing at all, as the fragments of Precious Stones, Leaves of Gold, prepar'd Pearl, &c. Or if they do yield any thing (for that hath not been yet, that I know of, evinced) do probably yield but a little nauseous Phlegm, or at least some few loose parts, far less efficacious then those that require a stronger heat to drive them up: such are Sugar, Rayfins, and other sweet Fruit, Bread, Harts-horn, Flesh prepar'd by Coction, &c. which though wont to be thrown away with the *Caput Mortuum*, oftentimes there retain their pristine Texture and Nature, or at least are almost as much more considerable, then that which they yielded in Distillation: as a
boyl'd

boyl'd Capon is, then the Liquor that sticks to the Cover of the Pot. And though as to some of these Ingredients it may be thought that they may yield even in *Balneo* some of their useful parts, yet this can, with any probability, be suppos'd but of some of such Ingredients: And even as to them it is but suppos'd that they may yield Something in so milde a heat, and how that Something will be qualified, is but presum'd: at least, by the Analogy of the Experiments vulgarly made, there seems so small cause to expect, that these more fix'd Ingredients will adde half so much to the vertue of the Medicines, as they will to the cost; especially since though it could be prov'd, or were probable, that fix'd Substances may communicate their vertues to Wine or Water, yet it would not follow that those impregnated Liquors, distilled in *Balneo*, will carry those vertues with them over the Helm. All which I have more largely prov'd in another Discourse, where I shew both that the nobler parts of many Ingredients wont to be distill'd in *Balneo*, do commonly remain in the *Caput Mortuum*, and that 'tis very unsafe to conclude always the Vertues of distill'd Liquors from those of the Concrets that afforded them.

But there is another way of putting unfit Ingredients into Medicines, by confounding those in one Composition, which, though perhaps they might apart be properly enough employed, do, when mixed, destroy or lock up the Vertues of one another; and of this fault, even famous Chymists themselves are but too often guilty. I know not how many Processes I have met with, wherein saline Substances, of contrary natures, are prescrib'd to be mingled, as if because they were all of them saline, they must be fit to be associated; whereas 'tis evident to any Man, that considers as well as employs the Operations of Chymistry, that
there

there are scarce any Bodies in the World betwixt which there is a greater contrariety, then betwixt acid Salts : and as well those that the Chymists call volatile, as the Spirits and Salts of Harts-horn, Blood, Flesh and the like, as those others which are made of Incineration, as Salt of *Tartar*, and of all burnt Vegetables. So that oftentimes it happens, that by an unskilful Mixture, two good Ingredients are spoil'd ; as when Vinegar, Juice of Lemmons, Juice of Barberies, and the like, are prescrib'd to be distill'd with other Ingredients, whereof the Salt of Wormwood or some other Plant makes one, for then the *acid* and *alcalizate* Salts, working upon one another, grow more fix'd, and yield in *Balneo* but a Flegm : and so Spirit of Urine, which is highly volatile, and Spirit of Salt, which is also a distill'd Liquor, being mingled together, will, by their mutual Operation, constitute a new thing, which in such a heat as that of a Bath, will yield a Flegm, leaving behinde the nobler and active Parts concoagulated into a far more fix'd Substance, much of the nature of *Sal Armoniack*. And indeed where Salts, especially active ones, are made Ingredients of Mixtures, unless they be skilfully and judiciously compounded, it often happens that they spoil one another, and degenerate into a new thing, if they do not also spoil the whole Composition, and of divers useful Ingredients compose one bad Medicine.

CHAP. V.

ANother way by which the Naturalist (skill'd in Chymistry) may help to lessen the chargeableness of Cures, is by shewing, that as to divers costly Ingredients, wont to be employ'd in Physick, there hath not yet been sufficient proof given of their having any Medical Vertues at all, or that at
f least

least as they are wont to be exhibited, either crude, or but slightly prepared in *Fuleps*, *Electuaries*, &c. there is not any sufficient evidence to perswade us, that their efficacy is as much greater, then that of many cheap Ingredients, as their price is. I am not altogether of their minde, that absolutely reject the internal use of Leaf-Gold, Rubies, Sapphyrs, Emeralds, and other Gems, as things that are unconquerable by the heat of the Stomack: For as there are rich Patients that may, without much inconvenience, go to the price of the dearest Medicines; so I think the Stomack acts not on Medicines barely upon the account of its heat, but is endow'd with a subtle dissolvent (whence so ever it hath it) by which it may perform divers things not to be done by so languid a heat. And I have, with Liquors of differing sorts, easily drawn from Vegetable Substances, and perhaps unrectified, sometimes dissolv'd, and sometimes drawn Tinctures from, Gems, and that in the cold. But though for these and other Considerations, I do not yet acquiesc in their Reasons, that laugh at the administration of crude Gems, &c. as ridiculous; yet neither am I altogether of their Adversary's minde. For though I deny not that the Glas of *Antimony*, which looketh like a kinde of Gem or Ruby, will easily enough impart to Liquors an emetick Quality; yet I know too, there is great odds betwixt Ruby's and other Gems (which will endure violent Fires, and remain undissolved in divers strongly corrosive Liquors) and the Glas of *Antimony*, which is a Body so far less compact and fix'd, that Spirit of Vinegar it self will work upon it, and a strong Fire will, in no long time, dissipate it into smoke. But that which I chiefly consider on this occasion, is, That 'tis one thing to make it *probable*, that 'tis *possible* Gold, Ruby's, Sapphyrs, &c. may be wrought upon by a humane Stomack; and another thing, to shew both that they

they *are wont* to be so, and that they *are* actually endow'd with those particular and specifick Vertues that are ascrib'd to them: Nay, and (over and above) that these Vertues are such, and so eminent, that they considerably surpass those of cheaper Simples. And I think, that in Prescriptions made for the poorer sort of Patients, a Physitian may well substitute cheaper Ingredients in the place of these precious ones, whose Vertues are not half so unquestionable as their Dearness.

What strange Excellency there may be in the *Aurum Potabile*, made by a true *Adeptus*, or by a Possessor of the Liquor *Alcahest*, I shall not now dispute, not knowing what powerful and radical Dissolvents the profound skill of such Men (if any such there be) may furnish them with, to open the Body of Gold. But as for the attempts and practices of the generality of Chymical Physitians to make Gold potable, besides that, their attempts to make their Solutions volatile, succeed so seldom, that even Learned Physitians, and Chymists, have pronounced the thing it self unfeasible; I confess, I should much doubt whether such a potable Gold would have the prodigious Vertues its Encomiasts ascribe to it, and expect from it: For I finde not that those I have yet met with, deliver these strange things upon particular Experiments duly made, but partly upon the Authority of Chymical Books, many of which were never written by those whose Names they bear. And others, I fear, commend *Aurum Potabile*, prepared after another-guess manner than that we are now speaking of, partly upon a presumption that if it be made volatile, it must be strangely unlock'd, and exalted to a meer Spiritual Nature; and partly upon rational Conjectures (as they think them) drawn from the nobleness and preciousness of Gold. But for my part, though I have

long since bethought my self of a way, whereby I can, in a short time, and a moderate Fire, make my *Menstruum* bring over crude Gold, in quantity sufficient to make the Liquor look at the first or second Distillation, of a high golden colour; yet finding that I could, by an easie Art, quickly recover out of this volatile Liquor, a corporal and malleable Gold, I dare not brag that my Tincture (as an Alchymist would call it) must needs do strange feats, because there is so noble a Metall brought over in it. And if this or other preparations of *Aurum Potabile* prove good Medicines, it would be further enquired, whether the Vertues may not in great part be rather attributed to the *Menstruum*, then the Gold (that requiring a very subtile Liquor to volatilize it) or to the association of the Corpuscles of the Gold, with the saline Particles of the *Menstruum*, into a new Concrete, differing enough from Gold, though never so well open'd. And as for the nobleness and pretiousness of this Metal, That depends upon the Estimation of Men, whence in *America* the *Indians* that abounded with it, had not such a great value for it; And in divers Countries, at this day, it is postponed to Iron or to Copper, and hath rather a Political (if I may so speak) then a Natural Vertue. Nor will it follow, that because it is the fixedst and pretiousst of Metals, that therefore it must be an admirable Medicine: For we see that Diamonds, though they be the hardest of Bodies, and very fix'd ones, and in much greater esteem, *ceteris paribus*, then Gold, are yet so far from being accounted highly Medicinal, that they are commonly (though, perhaps, not so deservedly) reckon'd among Poysons. But I see I have digress'd, That which I chiefly aim'd at, being to inculcate, that whether Gold and Gems, and the like pretious Ingredients, may be good Medicines or no, 'twere a good work to substitute cheap ones for the poorer
 sort

fort of Patients; and that Physitians are much to blame, who prize Simples, as Drugsters do, according as they are brought from remote Countries, and are hard to be come by, and cannot imagine that what doth not cost much Money in the Shops, can do much good in the Body; as if God had made Provision onely for the Rich, or those People that have Commerce with *China* or the *India's*: whereas indeed it may oftentimes happen, that what the Chymists call their *Caput Mortuum*, and perhaps throw away as an useles *Terra Dam-nata*, may have as great Vertues as those nobler Parts, as they call them, which they have extracted from it; and a despised Simple, nay, even an Excrement or an Insect, may in some cases prove nobler Remedies, then those that Men call and think very noble Bodies, not to say then, I know not how many Extracts and Quintescences.

I shall not trouble you with many Instances to prove this Doctrine, having more fully discoursed of it in one part of another *Treatise: But yet some Instances I suppose you will here expect, and therefore I shall present you with a few of those that at present come into my minde.

When the Distillation of *Aqua fortis* is finished, the *Caput Mortuum*, as deserving that name, is wont, by common Distillers, to be thrown away; and I have seen whole heaps of it thrown by, as useles, by those that make *Aqua fortis* in quantity to sell it: And yet this despised Substance doth, in common Water it self, yield a Salt, which being onely depurated by frequent Solutions and Filtrations, is that famous *Panacea Duplicata*, or *Arcanum Duplicatum*, which that great *Virtuoso* and knowing Chymist, The Duke of *Holstein*, whose name it also beareth, thought worth purchasing at the rate of Five hundred Dollars; and of which the Princes experienced Physitian thus writes to the Industrious

Schroder,

* Of the efficacy of unpromising Medicines.

Schroder
Pharmacop.
lib. 3. c. 23.

Schroder, *Mille experimentis salis huius Efficaciam Aula nostra comprobavit in melancholicis affectibus, febribus quibuscunque continuis & intermittentibus, calculo, scorbuto, &c. Quin & somnū conciliasse praesertim in Melancholicis non semel notavimus. Dosis à scrup: 1. ad scrup: 2. Libras aliquod quotannis absumimus.* And another very skilful Physitian that frequented that Excellent Princes Court, confirm'd to me the same Medicin's diuretick and deoppilative Vertues: (But upon my own Experience I can say little of it, having casually lost a great quantity I caus'd to be prepar'd to make tryal with, before I had opportunity to employ it.)

But whereas in the *Caput Mortuum* of *Aqua fortis* there remains pretty store of easily soluble Salt; In the *Caput Mortuum* of *Vitriol*, when not onely all the Oyl is forc'd away by the Fire, but all the fix'd Salt is exactly separated by Water, There seems to remain nothing but a worthless *Terra Damnata*: And yet 'tis of this, that, as I shall teach you ere long, I make those *Colcotharine* Flowers, which are possibly a nobler Medicine then either the Oyl, the Spirit, or the Salt of *Vitriol*.

As for the *Bezoar-stone*, which is so often prescrib'd by Physitians, and so dearly paid for by Patients, the experienc'd *Bontius*, a very competent Witness in this case (and whose account of the manner of its generation, agrees the best of any I have seen with that I receiv'd from an Intelligent Person, that was employ'd into *Persia* by the late King) hath in one place a Passage concerning it; and elsewhere writes such things of the Stone cut out of a Mans Bladder (though that, whilst crude, be despis'd as a thing vile and useless in Physick) as may be justly applicable to our present purpose:

Bontius in
cap. 45.
Garcia ab
Orta.

Ceterum (saith he, speaking of the *Bezoar-stone*) *quantum ad hyperbolicas huius lapidis virtutes & facultates portentosas non*

*non tantos in eo mille experiētiis edoctus inveni: And else-
 where speaking of those contemptible and excrementitious
 Stones that are found in humane Bladders: Nil porro (saith
 he) de his lapidibus addo ne videar eos elevare & lithotomos
 monere ut vel cum periculo plures mortales fecent: Hoc certe
 compertum habeo lapidem in vesica hominis repertum urinam
 & sudores probe ciere quod tempore ingentis illius pestis quæ
 Anno 1624 & 1625 Leydam patriam meam & reliquas Hol-
 landiæ Civitates miserandum in modum vastabat, in penuria
 lapidis Besoartici nos exhibuisse memini & sudorificum (ausim
 dicere) melius & excellentius invenisse, &c.*

Idem cap.

46.

Gartia ab

Orta.

Soot is generally look'd upon as so vile a thing, that we
 are fain to hire Men to carry it away; and yet, as I elsewhere
 shew that 'tis a Body of no ignoble Nature, so I must here
 tell you, that 'tis no unuseful one in Physick. And not to
 mention that *Riverius* commends it crude, to the quantity of
 a Drachme, in Plurifies: I have try'd, with the Spirit of it
 well drawn, some things, that make me look upon it as a
 considerable Liquor. And I know by their own confessions,
 that some Medicines, even of eminent Physitians, that pass
 under other Names, have the Spirit of Soot for their prin-
 cipal Ingredient. I knew, a not unlearned Emperick, who
 was exceedingly cry'd up for the Cures he did, especially in
 difficult Distempers of the Brain, by a certain Remedy,
 which he call'd sometimes his *Aurum Potabile*, and sometimes
 his *Panacea*; and having obtain'd from this Man, in ex-
 change of a Chymical Secret of mine he was greedy of, the
 way of making this so celebrated Medicine, I found that the
 main thing in it was the Spirit of Soot, drawn after a some-
 what unusual, but not excellent manner; in which Spirit,
 Flowers of *Sulphur* were, by a certain way, brought to be
 dissolv'd, and swim in little drops that look'd of a golden co-
 lour.

You

You will easily grant, *Pyrophilus*, that there are not any Medicines to be taken into the Body, more cheap and contemptible then the Excrements of Men and Horses, and then Insects: And yet that even these want not considerable Medical Vertues, we elsewhere shew. And (not to meddle with such nasty things as the grosser sort of humane Excrements, though they outwardly apply'd, either in Powder or otherwise, do sometimes perform strange things) the Juice of Horse-dung, especially of Stone-horses, being strongly express'd (after the Dung hath been awhile steeped in Ale, or some other convenient Liquor, to facilitate the obtaining the Juice and to afford it a *Vehicle*) doth oftentimes so powerfully relieve those that are troubled with the stoppage of Urine, with Winde, Stitches, and even with Obstructions of the Spleen and Liver, that You, *Pyrophilus*, and I, know a great Lady, who though very neat, and very curious of her Health, and wont to have the attendance of the skilfullest Physitians, scruples not, upon occasion, to use as I have known her do, in Silver Vessels, this homely Remedy, and prefer it to divers rich Cordials, and even to what some Chymists are pleas'd to call *Essences* or *Elixirs*: And with the same Remedy very many poor People were cur'd of the Plague it self, when it lately swept away so many thousands in *Ireland* (and the Doctors with the Patients) as I was assur'd by a Person who cur'd so many, as to invite men to secure themselves that assistance, by refusing the Party the liberty to leave the Town. But (to adde that upon the by) this Person, in exchange of a Secret of mine, confess'd to me, That the *Arcanum*, which had cur'd such numbers, and to which the Juice of Horse-dung was a *Succedaneum*, was onely a good Dose of the Powder of fully ripe Ivy-berries, which did usually, as also the Horse-dung, work plentifully by

by Sweat, and which I presently remembred to be one of those few things that *Helmont* commends against the Plague.

The Medical Vertues of Man's Urine, both inwardly given, and outwardly apply'd, would require rather a whole Book, then a part of an Essay to enumerate and insist on: But referring you to what an industrious Chymist hath already collected touching that subject, I shall now onely adde, That I knew ancient Gentlewoman, who being almost hopeless to recover of divers Chronical Distempers (and some too of these abstruse enough) was at length advised, instead of more costly Physick, to make her Morning-draughts of her own Water; by the use of which she strangely recovered, and is, for ought I know, still well. And the same Remedy is not disdain'd by a Person of great Quality and Beauty, that You know; and that too, after she hath travelled as far as the Spaw for Her healths sake. And I remember on this occasion, that passing once through one of the remoter Parts of *England*, I was visited by an Emperick, a well-wisher to Chymistry, but a Novice in it, who pressing me, to communicate to him some easie and cheap Preparation, that he might make use of among the Countrey People; I directed him to Distil, with a gentle heat, a Spirit out of Urine, putrified for six or seven Weeks on a Dung-hill, or some analogous heat, but in well clos'd Glasses, or other glaz'd Vessels; and having rectified this Spirit once or twice, that it might be rich in volatile Salt, to give ten, twenty, or thirty drops of it in any convenient Liquor for the Plurisie, for most kinde of Coughs, and divers other Distempers, as a *Succedaneum* to the Essence of Harts horn: And awhile after this Emperick return'd me great thanks for what I had taught him; and I found by him and others, that he had

cured so many with it, especially of Plurifies (a Disease frequent and dangerous enough in that Country) that this slight and seemingly despicable Remedy had already made him be cry'd up for a Doctor, and was like to help him to a comfortable Subsistence.

Great store of healthy Mens Blood is wont to be thrown away, as altogether useless, by Chirurgions and Barbers, that let Men Blood (as is usual in the Spring and Fall) for prevention of Diseases; and yet from a Man's Blood skilfully prepared, though without addition of any thing, save Spirit of Wine to keep it at first from putrifying, may be easily obtain'd a Spirit, and volatile Salt, that have much the same Vertues, with those of the newly mention'd Spirit of Urine, but more noble (as far as I can guess) then either that, or even Spirit of Harts-horn, as having perform'd in Consumptions, Asthma's, and other obstinate cases, such things as I, as well as others, could not but admire. But in this place, mentioning humane Blood onely *in transitu*, I shall pretermit what I have observed about the preparation of it; yet leaving you a liberty to call for my Observations upon a Medicine, which is perhaps nobler, then the most costly and elaborate Chymical Remedies that are wont to be sold in Shops, and which hath been almost alone excepted out of the Censure made by a Learned Modern Writer, of the Medicines found out by Chymistry.

I shall adde but one Instance more, of the efficacy that may be found in the most obvious and abject Creatures; and this Instance is afforded me, by those vile Insects commonly called in English, Wood-lice, or Sows, and in Latine *Millepedes*, which I have often both recommended to others, and taken my self: What their Vertue is against the Stone, the World hath been informed by *Laurembergius*, who

who hath published a Narrative, how by the use of them he was cured, even of the Stone in the Bladder; and he was invited to use them by credible information, that others had been cured of that Disease, by the same Remedy. And of late Years, in *England*, an Emperick being much resorted to, for the relief he gave in that tormenting Sicknes, a Physician, famous for his Learned Writings, wondering at what was done, was very curious (as himself afterwards told me) to finde out the Emperick's secret, and at length was so industrious as to discover, That 'twas a slight preparation of *Millepedes*. But my having found them in my self very diuretical and aperitive, is not that which chiefly recommends them to me; For I knew, and liv'd in the same House with a pious Gentlewoman, much better skill'd in Physick, then her Sex promised, who having lost the use of one Eye by a Cataract, and being threatned by the Oculists with the speedy loss of the other, especially in regard of her being very aged and corpulent, she nevertheless did, for some Years, to my wonder, employ her Eye to read and work with, without finding, as she told me, any decay in it, or any encreasing danger of a suffusion: And she assured me, that her Medicine was to bruise first five *Millepedes*, then ten, then fifteen, then twenty, &c. (daily encreasing the number by five, till it had reach'd, if I mistake not, fifty or sixty) in White-wine (or Small-ale) and to drink upon an empty Stomack, the strongly express'd Liquor; And when I desired to know how she came by this Specifick, she answered me, That having made enquiries among all those, both Oculists and others, that she thought might assist her against so sad a Distemper, she was advised to the use of *Millepedes*, by a Woman, that not onely much magnified their vertue in such cases as hers, but assured her (if I much mis-remember not) that she her self

had been cured by them, of no less then an incipient suffusion in one or both of her Eyes.

[Since the writing of the former part of this Page, relating what I newly told you to a very Ingenious Physitian, he assures me, That being some Years since in *Holland*, he there met with a Woman who was cured, as her self confessed to him, of a real Cataract, by the juice of *Millepedes*, beginning with that of three at a time, and so encreasing to nine at once, and then gradually lessening the Dose by one Insect each day, till she were come back to three at a time; after which, she gradually increas'd the Dose as before: And he adds, That this Woman was advised to this Medicine by an Emperick, that was said to have performed divers Cures with the same Medicine.]

[What strange things these same *Millepedes* have done in the sore, and even exulcerated Breasts of Women (provided they be not cancrus) though they be given without preparation onely, to the number of three first, and so on to nine at once (whch number may perhaps be usefully encreased) stamp'd with a little White-wine or Beer, that the Liquor strain'd out may be drunk in a draught of Beer, Morning and Evening; during which time, Linnen clothes dipp'd in White-wine, and apply'd warm, are to be kept upon the Breast, I may elsewhere have a fitter opportunity to relate. I shall now onely subjoyn, as a further proof of the great Vertue that may be even in vile and costless Insects, and that without any elaborate or Chymical Preparation, this memorable Story; That after all the tryals I had made about these *Millepedes*, I met with a yong Lady, who by divers strangely winding and obstinate *Fistula's*, that had made themselves Orifices in many places of her Body, was not onely lam'd, but so consum'd and weakned, that she was scarce able to turn
her

her self in her bed; and this, notwithstanding the utmost endeavors of the eminentest Chirurgions, both English and Foreigners, that could be procur'd: But when both the hopes of her Friends, and those that endeavored to cure her, were lost, shewas in a short time not alone freed from her *Fistula's*, but recovered to a thriving condition of Body, by the frequent use of an internal Medicine, which, as both her Parents and the Person that taught it them informed me, was onely a Drink (to be taken twice or thrice a day) made of a small proportion of a couple of Herbs (very common, and not much more likely to do Wonders in this case, then Wormwood and Mint) and of Three hundred of these *Millepedes* well beaten (when their Heads are pull'd off) in a Mortar, and tun'd up with the Herbs, and suspended in four Gallons of small Ale, during its fermentation. The wonderful efficacy of this Medicine in this and many other cases, which by occasion of this Cure were related to me, being almost wholly ascrib'd to the *Millepedes*, by the Illustrious Imparter of it, whose leave I have not yet, by naming him, to disclose, that this is the Secret He makes use of.]

CHAP. VI.

ANother way there is whereby the Naturalist may assist the Physitian to make the *Therapeutical* part of Physick less chargeable, and that is, by shewing those that are wont to employ most Chymical Remedies, that much of the cost and labor in many cases might be spared. I am not altogether of their minde, that indiscriminately cry down Chymical Preparations as excessively dear: For of many of those that seem very dear, when bought by the Pound or the Ounce, a Dose may be cheap enough; as if for instance, an Ounce of precipitate

pitate of Gold and *Mercury* cost ten times its weight of Silver, under which rate I have bought it of honest Men, that make it themselves, yet that Ounce containing 480 Grains, (of which three or four may be a Dose) a taking of this dear Powder, may cost far less then a Dose of many *Galenicall* Medicines, where the quantity that is taken at once, makes up what is wanting in the costliness of the Ingredients. But though this be the case of *some* Chymical Remedies, yet we must not deny, that *many* others are chargeable, and though perhaps not more so then many *Galenicall* ones employ'd for the same purposes: Yet if those be dearer then they need be, that grievance ought to be redress'd in Chymical Medicines, how justly soever the same thing may be imputed to *Galenicall* ones.

Now there are two Particulars, wherein the Chymists, and those Physicians that imitate them, are wont to be blameable in reference to this matter; The one, their employing Chymical Preparations on all occasions, even where Simples or slight Compositions might serve the turn: and the other is, Their making many of their Preparations more laborious, and consequently more chargeable then needs.

As for the first of these: 'Tis known there are divers Chymists, and others that practise Physick, who so dote upon the Productions of their Furnaces, that they will scarce go about to cure a cut Finger, with less then some *Spagyricall* Oyl or Balsam: And in slight Distempers have recourse to Chymical, and perhaps to Mineral Remedies, which being, for the most part, such as vehemently alter the Body, especially by heating and drying it, they do often more harm then good, when employed in cases that need not such active Medicines. And methinks those that practise, as if Nature presented us nothing worth the accepting, unless it be cook'd and

and perfected by *Vulcan*, might consider, That *Paracelsus* himself oftentimes employeth Simples for the cure even of formidable Diseases. And though for particular Reasons I be inclinable enough to think, that such searching and commanding Remedies, as may be so much of kin to the Universal Medicine, as to cure great numbers of differing Diseases, will be hardly obtain'd without the help of Chymical Preparations, and those perhaps of Minerals: Yet as to most particular Diseases, especially when not yet arriv'd to a deplorable height, I am apt to think, that either Simples, or cheap, or unelaborate *Galenical* Mixtures, may furnish us with Specificks, that may perform much more then Chymists are wont to think, and possibly be preferable to many of their costly *Magisteries*, *Quint-essences* and *Elixirs*. *Helmont* himself, a Person more knowing and experienced in his Art, then almost any of the Chymists, scruples not to make this ingenious Confession: *Credo* (saith he) *simplicia in sua simplicitate esse sufficientia, pro sanatione omnium morborum*: And elsewhere he truly affirms, That there may be sometimes greater Vertue in a Simple, such as Nature affords it us, then in any thing that the Fire can separate from it. And certainly the specifick Properties of divers, if not most Simples, are confounded and lost by those Preparations, wherein that Texture, which is the foundation of those Properties, is either destroyed by the Fire, or chang'd by the taking away of some of the Parts; or the adding of some other Substance to it, with which compounded, it may constitute a new thing. The more Judicious of the Chymists themselves do several of them now acknowledge, that the bare reducing of Pearls to fine Powder, affords a Medicine much richer in the Vertues of the Pearls, then the *Magistery*, prepar'd by dissolving them in acid Spirits, and precipitating them with Oyl

Helmont,
Pharmacopoeia
Dispensat:
Nov. p. 458.

of

of *Tartar*, and afterwards scrupulously edulcorating them. And one may easily observe, that by making the *Magistery* of Harts-horn the same way, the Vertues seem to be more lock'd up then they were in the crude Horn, which may easily enough impart its Vertue in the Body, since fair Water will reduce a good part of it into a Jelly; whereas the *Magistery* remains a fix'd Powder, not easily dissoluble, even in acid *Menstruums*; and, which thrown upon hot Iron, will scarce send forth that stinking Smoak, which argues the avolation of the saline and sulphureous Parts. I never knew any of the vulgar Chymists *Essences* or *Elixirs* half so powerful a Remedy to stanch Blood, as a slight Mixture of two Drachmes of *Hyosciamus*, or Henbane-seed, and the like weight of white Poppey-seeds, beaten up with an Ounce of Conserve of red Roses, into a stiff Electuary; with which, given in the quantity of a Nutmeg, or Wall-nut, I have snatch'd some, as it were, out of the Jaws of Death; and with which an eminent Physitian, now dead, affirm'd, That he, and the Inventor of the Remedy, had very frequently cured profuse bleedings at the Nose, and in Women, at other Parts besides. Nor did I ever see, to give an instance in a resembling Disease, such wonderful Effects against spitting and vomiting of Blood, of the most elaborate Chymical Preparations, as I have of a slight Syrrup, made onely of a convenient quantity of fine Sugar, and the strongly express'd Juice of twelve handfulls of Plantain-leaves, and six Ounces of fresh Cumfrey-roots, well beaten together; with which Syrrup, besides what I have try'd my self, two eminent Physicians perform'd in that Disease unusual Cures, though (for reasons elsewhere mentioned) I forbear to name them, otherwise then by telling you, That one of them is that Ingenious and Friendly Dr. T. C. to whose skill both You and I owe so much.

But

But I consider further, that as oftentimes those I am reasoning with make use of Chymical Remedies, when much more easily parable ones may suffice; so in divers cases, where Spagyricall Medicines are proper enough, their Preparations of them are more tedious and expensive then is necessary. There are more then a few who seldom prescribe, and seldomer esteem a Chymical Process, that is to be perfected in less then many Weeks; as if a Chymical Medicine, like an *Embryo*, must needs be an Abortive, if it be produc'd in less then so many Moneths. And as if in Preparations, the Vertue depended less on the skilfulness, then the elaboratness, they seem to estimate the efficacy of Remedies by the time and pains requisite to prepare them, and dare not think, that a Medicine can quickly cure, that was not long a making; as indeed theirs (especially those where Cohobations and Digestions, till they have such and such effects upon the Matter to be wrought on by them, are prescrib'd) are many of them far more toilsom and tedious, then those that have but read such Processes, without working them, are apt to suspect. And this is the humor of divers, not onely as to those stable Medicines, that ought always to be found ready in Apothecary's Shops, but even as to those that are design'd for particular cases, and perhaps acute Diseases; in which Emergencies, if a Physitian had no other Remedies then those he must make according to such Processes, it would, I fear, too often happen, that before the Medicine could be ready, the Patient would either be past the need of it, or past the help of it. And that which oftentimes encreaseth the tediousness of Chymical Processes, is the unskilful Prescriptions of those that devise them. 'Tis not unusual in Chymists Writings to meet with Processes, wherein the Matter to be prepar'd, is expos'd to I know not how many

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several

several successive Operations: But if you should ask why such a thing should be, for instance, rather precipitated, then exhal'd *ad siccitatem*, or why such and such an Operation is to be us'd after such another, rather then before it; nay, perhaps, if one should demand why some of those Operations should be used at all, the Devisers of those unskilful Processes would possibly assoon be able to finish their Operations, as to give a satisfactory answer. Nay, sometimes they lengthen their Processes by Operations, so injudiciously prescrib'd, that they cross one another; And the Chymist vexeth himself, and the Matter he works upon, to leave it at last no better, if not a worse, Medicine then he found it; of this we have already given an instance in the common *Magisteries*.

But I lately met with another Example of it, in the Writings of a Famous, Modern Chymist, where to purifie the fix'd Salts of Vegetables, to the height, after I know not how many Solutions, Filtrations and Coagulations (which alone would abundantly serve the turn) he prescribes the dissolving them in *Aqua fortis*; after which, he saith, they will become very pure and chrystalline, and not so easily resoluble in the Air: Of which I make no doubt, for divers Years before I met with this Process, I have, with the fix'd Salts of more then one kinde of Vegetable, by joyning them with *Aqua fortis*, and after awhile exhaling the superfluous moisture, made good inflammable *Salt peter*; by which you may easily guess, how judiciously the solution in *Aqua fortis* is prescrib'd onely as a further depuration, and how fit such Authors are to be credited, when they ascribe to these Chrystalline Salts the several Vertues, (& those improved too) of the respective Vegetables, from which the *Alcalies* were obtain'd. And indeed, as to those exact Depurations, which some Chymists
so

so strictly require in all their Preparations, though their Processes be oftentimes hereby made incredibly tedious, I will willingly allow, nay I assert, that in some cases, and especially in the making of powerful *Menstruums*, which by their activeness and penetrancy, are to unlock other Bodies, Chymists do rather erre in making their Depurations less exquisite than they should, then on the other hand: Yet in many other cases, such exact refining and subtiliation of a Remedy, is not so necessary as they imagine; and sometimes too, may do more harm then good, by sequestering those parts of a Simple, as *faces*, which concurr'd with the finer parts to that determinate Texture, whereon the specifick Vertues of it did principally depend; but of this more elsewhere. And therefore I shall here present you with two or three Instances, to shew you, That Remedies, at least as noble as such vulgar Chymical ones as are more tedious and costly, may be prepar'd in a shorter time, and cheap enough to be fit for the use of the Poor.

And to comply, *Pyrophilus*, with your curiosity, to know the Preparations of those Chymical Medicines, that I do the most familiarly employ, the three following Instances shall be of such, namely, The *Flores Colchotaris*, The *Balsamum sulphuris crassum*, and, The *Essentia Cornu cervini*, that you may see what slight and easie Preparations afford the Remedies, whose Effects you have so often heard of, if not also seen.

The first of these, is the same Powder, which passeth under the name of *Ens Veneris*, which appellation we gave it not out of a belief, that it equals the Vertues ascrib'd by *Helmont*, to what he calls the true *Ignis Veneris*, but partly to disguise it a little, and partly upon the account of the occasion whereon it was first found out, which was, That an

Industrious Chymist (whom you know) and I, chancing to look together upon that Tract of *Helmont's*, which he calls *Butler*, and to compare it somewhat attentively with other Passages of the same Author, we both resolv'd to try, whether a Medicine, somewhat approaching to that he made in imitation of *Butlers Stone*, might not be easily made out of calcin'd Vitriol; And, though upon tryals we found this Medicine far short of what *Helmont* ascribes to his, yet finding it no ordinary one, we did, for the Minerals sake 'tis made of, call it *Ens primum Veneris*.

The Preparation, in short, is this: Take good *Dantzick* Vitriol (if you cannot get *Hungarian* or *Goslarian*) and calcine it till the *calx* have attain'd a dark red, or purplish colour, then, by the frequent affusion of boyling, or at least warm Water, dulcifie it exactly; and having freed it as well as you can from the saline parts, dry it thoroughly, and after mix it exquisitely, by grinding, or otherwise, with an equal weight of pure *Sal Armoniack*, very finely powdered. Put this Mixture into a glass Retort, that may be but a third part fill'd with it, and subliming it in a sand Furnace, by degrees of Fire, for ten or twelve hours, towards the latter end encreasing the Fire, till the bottom of the Retort (if you can) be brought to be red hot: That which is sublim'd must be taken out, and if it be not of a good yellow, but pale (which usually happens for want of an exact commistion of the Ingredients) it may be return'd to the residue, mingled better with it again, and sublim'd once more: The yellow, or reddish Sublimate may be sublim'd a second time, not from the *Caput Mortuum*, but by it self; but if you re-sublime it oftner, you may, though you will think that strange, impair the Colour and the Sublimate, instead of improving them. The Dose is from two or three Grains, to ten or twelve (in some Bodies

Bodies it may be encreas'd to twenty or thirty, without danger) in distill'd Water, or small Beer, or other convenient Vehicles: It may be given at any time upon an empty Stomack, but I most commonly give it at Bed-time. It works, when it works sensibly, by Sweat, and somewhat by Urine. That it is a potent Specifick for the Rickets, I think I scarce need tell *You*, *Pyroph*: whose excellent Mother and Aunt, together with some Physitians, to whom I also gave it ready prepar'd, have cur'd perhaps a hundred, or more Children, of that Disease, divers of whom were look'd upon as in a desperate condition. I give it also in Feavors, and other Distempers, to procure sleep, which it usually doth where 'tis wanting: In the Head ache likewise, in which, if the Disease be inveterate, the Remedy must be long continued; with the like admonition it hath done Wonders, *in suppressione Menstrum obstinata*: In the Worms it hath sometimes done strange things; and for provoking of Appetite, I remember not that I have either taken or given it without success: And though I seldom take (for I often give more) above two or three Grains of it at a time, yet in that small Dose it usually proves Diaphoretical to me the next Morning.

But the Experiments we have had of the several Vertues and Efficacy of this Medicine, would be here too tedious to recite; and therefore I shall now pass them by, though, if you require it, I shall not be backward to set you down, by way of observations, most of the cases wherein I or my Friends have given it, and of the principal Cures that have been performed by it: In the mean time, because this exalted *Colcothar*, being given in so small a Dose, may prove, if it be rightly and dexterously prepar'd, what *Helmont* saith of his imitation of *Butlers Drif*, *A Medicine for the Poor*, and yet

yet requires more care, not to say skill, to Prepare it well, then upon the bare reading of the Proceſs you will imagin, I ſhall to gratify your Charity annex to the end of this Eſſay, (for to insert them here would make too prolix a Digreſſion) as many of the Particulars relating to the Preparation of it as I can readily meet with among my looſe Notes, And leaſt you ſhould think me a Mountebanck for want of knowing in what ſenſe it is, that I commend this and the other particular Medicins, I ſhall likewise to thoſe Observations ſubjoin a Declaration of my meaning in ſuch particulars, and of the ſenſe, wherein I deſire you ſhould underſtand what you meet with in the Praise of Remedies either in this Eſſay or any other of my Writings, which I hope it will be ſufficient to give you this Advertiſment of once for all.

The next Medicine I am to mention to you is the *Balsamum Sulphuris* which being made but with groſs Oyls drawn by Expreſſion may be called *Crassum* to diſtinguiſh it from the common and thinner Balsom of Sulphur, that is made with the Diſtil'd Oyl or Spirit of Turpentine.

This Balsom is made in an Houre or leſs, without a Furnace, onely by taking to one part of good Flower of Brimſtone, foure or five times as much (in weight) of good expreſſed Oyl, either of Olives or Nuts, or Poppey-ſeeds, and boyling the former in the latter in a Pipkin half fill'd with both, till it be perfectly Diſſolv'd into a Blood-red Balsom. But as eaſy as this Preparation ſeems (and indeed is) to them that have often made it, it will not at firſt be ſo eaſie to make it right; For the Fire which ought to be of well kindled Coals, muſt be kept pretty quick, and yet not over-quick, leaſt the Oyl boyle over, or doe not well Diſſolve the Flowers of *Sulphur*, but turn them with its ſelf into a Clotted and almoſt Liver-colour'd Maſſe: And to avoid

void these Inconveniencies, and the aduſſion of the Matter, ſpeciall care muſt be had to keep it conſtantly ſtirring, not only whil'ſt the Pot is over the Fire, but after it is taken off, till it be quite Cold. You may if you think fit Diſſolve this ſimple Baſſom in Chymicall Oyl of Anny-ſeeds, or any other Eſſential Oyl like to advance its Efficacy in this or that particular Diſtemper: But thoſe Oyls being generally very hot, I moſt commonly Preſcribe the Baſſom without thoſe Additions, eſpecially if long Diſeſtion have ſomewhat leſſened the Offeniueness of the ſmell, which though no peculiar fault of this Preparation being common to Sulphureous Medicins is yet the chief Inconvenience of it. I will not too reſolutly affirme that this is the very *Baſſamum Sulphuris Rulandi* of which that Author relates ſuch wonderful things in his Centuries; but if it be not the ſame, tis ſo like it, and ſo good, that I doubt not but by peruſing thoſe Centuries, you may find diuers uſes of it, that I have not made tryall off: And in Coughs, old Strains, Bruiſes, Aches, (and ſometimes the Incipent fits of the Gout it ſelf) and eſpecially Tumors, ſome of your friends can inform you, that it doth much greater things then moſt Men would expect from ſo ſlight and eaſy a Preparation; And indeed greater then I have ſeen done by very coſtly and commended Baſſoms and Oyntments, ſold in Apothecaries Shops: And in thoſe Obſervations, I lately told you you might command, you will find that this Baſſom outwardly applyed, hath cured ſuch obſtinate Tumours, as Men either knew not what to make off, or what to doe with them, of which ſkilful Phyſitians, to whom I gave it to make tryal off in difficult caſes, can bear me witneſs; Though it ought ſufficiently to endear this Baſſam to us both, that it was the Meanes of reſcuing your Fair and Vertuous Siſter F: from

a dangerous Consumption. In outward Applications it is to be well warm'd, and to be chaff'd into the part affected, which should be afterwards kept very warme, or else Lint dipped in it may be kept upon the place. Inwardly some drops of it may be given at any time, when the Stomach is not full; either rol'd up with Sugar, or mingl'd with any convenient Vehicle. But as for the Particulars that concern the Preparation of this Balsam, you will find, those I can readily meet with among my loose Papers, annex'd with the Notes concerning *Ens Veneris* to the end of this Essay.

And therefore I shall now proceed to mention the third Medicine, which you have often heard off, under the name of *Essence of Harts-horn*; but which is indeed onely the Simple, but well Purify'd and Dephlegm'd Spirit of it. And though Men are pleas'd to imagin by the Effects this Remedy often produces that I have some Mysterious or elaborate way of Preparing it, yet to deal ingenuously with you, the chief thing I have done to bring it into credit, is the teaching some Phyicians and Apothecaries a safe and easy way of making it: For whereas before those that went about to Distil it, commonly used, as the Apothecaries are wont to doe in what they make of the same Matter, Shavings or Raspings of Harts-horn, and Distil'd it with a strong and naked Fire, the fugitive and subtile Spirits were wont to come over in that plenty, and with that impetuosity, as to break the Glasses to pieces, whereby Apothecaries and even Chymists were discouraged from drawing the Spirit, and they not having it in their Shops, its Vertues remained unknown: Whereupon considering that if it were onely broken on an Anvil into pieces of about the bigness of ones litle finger, besides that this way of comminution would

would be far less chargeable then Rasping, the fumes would not be driven out so fast, and considering too, that a violent Fire was requisite, not to Distil the subtle Spirit, but to drive over the Grosse and heavy Oyl; I thought it was needless to take paines to force that over, which not being (that I observ'd) used in Physick, would but cost me further pains to seporate it again: And therefore, trying to Distil Hartshorn, in naked Retorts, placed but in Sand, I found I could Distil two or three pound at a time, and obtain from each of them, almost, if not quite, all the Spirits and Volatile Salt, which I afterwards separated from the redish and lighter Oyl, and freed them from Phlegm and Feculencies by a couple of Rectifications, made in tall Glasses, and with very gentle heats: (commonly of a Lamp Furnace) The Dose may be from eight, or ten Drops of the Spirit, or Graines of the Salt, to six times the quantity of either, in warm Beer, or any Vehicle that is not acid, except Milk. Finding it to be a Medicine of an attenuating, resolving, and Diaphoretical Nature, and one that much resists Malignity, Putrefaction, and acid Humours (whence being mingl'd with Spirit of Vinager, and the like soure Juyces, it destroys their acidity.) I direct it (*Premissis Universalibus*) in Feavers, Coughs, Pleurifies, Obstructions of the Spleen, Liver, or Womb, and principally in Affections of the Brain, as Stoppages of the Head, Feaverish *Deliriums*, and even in *Phrenitide*. And since I wrote a good part of this Essay, I had an Experiment of it in a Child, who being, by many violent Convulsion fits, reduc'd to a desperate condition, was recovered by one Dose of five or six Drops of this Spirit, that I sent it. 'Tis true that I have another Medicine, that is more elaborate and costly, and more properly bears the name of *Essentia Cornu Cervi*, which I

more value then this; But I cannot communicate that, without prejudicing a third Person, and an excellent Chymist who makes a great advantage of it. But this I can tell you, that most of the Cures, for which my Preparation of Harts-horn hath had the good fortune to be esteem'd, have been performed with the above describ'd Simple Spirit and Salt, with which some skilful Physitians, and other Ingenious Persons, who had it from me, have within these few Years sav'd so many Lives, that I am enclined to think, I have done no useless piece of Service, in bringing so happy a Medicine into Request, especially with those that have skill and opportunity to make better use of it then I. But, *Pyrophilus*, I find I have detained you so long with so prolix a Mention, of the three above describ'd Remedies, that I should think it requisite, to make you a solemn Apologie; but that I hope your Charity will as well invite you to Pardon the fault, as mine induc'd me to commit it.

C H A P. VII.

A Fourth way of lessening the Charges of Cures, may be this; That whereas the dearness of very many Medicins proceeds from the Chargeableness of those Chymical Operations, whereby they are wont to be Prepar'd, 'tis to be hoped that a greater measure of skill in Physiologie, and other Experimental Learning, will suggest cheaper and better ways of doing many things in Chymistry, then are, as yet, usually practis'd.

And those thrifty Expedients, I conceive, may be of several kinds, of which I shall at present mention, and that but transiently, three or four.

And first, I doubt not but Chymists may be taught to make

make better Furnaces, for several purposes, then those that have been hitherto most us'd among them: For profess'd Chymists, having been for the most part unacquainted enough with many other parts of Learning, and particularly with the Mechanicks, their contrivances of Furnaces and Vessels have been far enough from being as good as knowledge in Mechanicks and dexterity in contrivances might, and, I doubt not, hereafter will, supply them with; whether as to the saving of Fuel, or to the making the utmost use of the Heat afforded by the Fuel they do employ, or as to the intending heat to the height, or as to the regulating of heat at pleasure.

'Tis somewhat wonderful, as well as pleasant, to see how many Vessels may be duely heated by one Fire (perhaps no greater then common distillers employ to heat one Vessel) if the Furnace be so contriv'd, as that the Flame may be forc'd to pass in very crooked and winding Channels, towards the Vent or Vents, and the heat may be skilfully conveyed to the several parts of the Furnace, according to the Exigency of the work it is to do: And as for the intention of heat, I remember I have had odde effects of it, by the contrivance of a certain Furnace, that held but very few Coles, and to which I us'd no Bellows. But though by this way I could vitrifie sometimes the very Crucibles, and though possibly I could, with a slight alteration, melt down the sides of the Furnace themselves; yet a Disciple of *Cornelius Drebell*, and a very credible Person, assur'd me, That he knew a way of Furnaces that was yet fitter to bring heat to the *superlative* Degree: and that he himself, the Relator, could, by the meer force of Fire in his Furnace, bring *Venetian Talk* to flow; which is more, I confess, then ever I have been able to do either in mine, or those of the Glass-house, But Ex-

perience hath assured me, 'tis easie to make a Furnace give that heat as expeditiously enough, and in other respects very conveniently to *Capel* both Gold and Silver, without the least help of Bellows: That also Furnaces may be so ordered, as that the heat may be better regulated, then That in our ordinary ones, I may elsewhere shew you cause to believe: And in the meane time I shall only tell you, that I look upon the skill of intending and remitting heat at pleasure, and especially the being able to keep a gentle heat long and equal as a thing of much greater moment, both as to Phyfick and Philosophy, then Chymists are wont to think (the powerful effects of constant and temperate heats, being as yet known to few save those that have made tryal of them) And with Lamp Furnaces, well ordered, divers things may be done in imitation of nature; some friends of mine having, as several of them assure me, in such Furnaces, brought Hens egges to manifest Animation. That also Furnaces may be so built, as to save much of the Laborants wonted attendance on them, may appeare by the obvious invention of *Athanors* or Furnaces with Towers, wherein the Fire is for many Hours, (perhaps for twenty-foure or forty-eight) supply'd with a competent proportion of Coales, without being able to burne much faster then it should: And that in many cases the labour of Blowing may be well spar'd, and the annoyance of Mineral fumes in great part avoyded, by an easie contrivance, is evident by those Furnaces which are blown by the help of a Pipe, drawing the Air, as they commonly speak, either at the top, as in *Glaubers* fourth Furnace, or at the bottom, as for want of room upwards, I have sometimes tryed: To which may be added, that the casting of the Matters to be prepar'd upon quick Coals, as *Glauber* prescribes in that which he calls his first Furnace, is in some cases a cheap

cheap and expeditious way of preparing some Minerals ; though his method of making Spirit of Salt in that Furnace would not succeed, according to his promise with me, and some of my acquaintance. And there are other more commodious Contrivances, by casting some things upon the naked Fire, which invites me to expect, That there will be several good Expedients of employing the Fire to Chymical operations, that are not yet made use of, nor, perhaps, so much as dream'd of.

And as Furnaces, so the Vessels that more immediately contain the Thing to be prepar'd, are questionless capable of being made more durable, and of being better contriv'd, then commonly they are. Good use may be made of those Earthen Retorts, that are commonly call'd *Glauber's* second Furnaces, in case they be made of Earth that will well endure strong Fires ; and in case there be a better way to keep in the Fumes, then that he proposes of melted Lead, which I have therefore often declin'd for another, as having found it lyable to such inconveniences as I elsewhere declare.

But for Materials that are cheap, and to be distill'd in quantity, as Woods, Harts-horn, &c. the way is not to be despis'd, and is, as we may elsewhere have occasion to shew, capable of improvement ; though in many cases this kinde of Vessel is inferior to those tubulated Retorts, that were of old in use, and mentioned by *Basilus Valentinus*, and from which *Glauber* probably desum'd that which we have been speaking of. The utility of the way of sealing Glasses hermetically, and of the Invention that now begins to be in request of stopping the Bottles, that contain corrosive and subtle Liquors with Glass-stopples, ground fit to their Necks, instead of Corks, together with some other things, not now to be mention'd, keep me that I scarce doubt but
shall

that if we could prevail with the Glafs-men and the Potters, to make Veffels of Glafs and Earth exactly, according to directions, many things in Chymiftry might be done better and cheaper then they now are; and some things might be then done, that with the forms of Veffels now in ufe cannot be done at all. And if that be true which we finde related in *Pliny*, and with some other Circumftances in *Dion Caffius*, of a more ingenious then fortunate Man, who, about his time, was put to death for having made malleable Glafs, as the truth of that Story, if granted, would fhew the retring that Invention, a thing not to be despair'd of: So he that could, now Chymiftry is fo cultivated, finde again the way of making Glafs malleable, would be, in my Opinion, a very great Benefactor to Man-kinde, and would enable the *Virtuofi*, as well as the Chymiffts, to make feveral Experiments, which at prefent are fcarce practicable; And some Chymiffts would perhaps think this attempt more hopeful, if I tell them firft, that I remember *Raymund Lully* exprefly reckons it among three or four of the principal Vertues he afcribes to the Philofophers Stone, that it makes Glafs malleable; and then, that an expert Chymifft ferioufly affirm'd to me, that he met with an *Adeptus*, who, among other ftrange things, fhew'd him a piece of Glafs, which the Relator found, would endure and yield to the Hammer: But what my own Opinion is concerning this matter, and what are the (uncommon) Inducements I have to be of it, I muft not here declare.

And on this occafion, I remember I have feen an Inftrument of Tin, or Pewter, for the drawing of Spirit of Wine (which you know is one of the chargeableft things that belong to Chymiftry) fo contriv'd, that whereas in the ordinary way much time, and many rectifications, are requifite
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to dephlegm Spirit of Wine ; one distillation in this Vessel will bring it over from Wine it self, so pure and flegmless, as to burn all away. And I remember , that the ancient French Chymist, in whose Laboratory I first saw one of these Instruments, told me, That 'twas invented, not by any great Alchymist or Mathematician, but by a needy *Parisian* Chyrurgion. And now I speak of Spirit of Wine, I shall adde; That as the charges of Chymistry would be very much lessened, if such ardent Spirits could be had in plenty, and cheap ; so I think it not improbable, that in divers places there may be found, by Persons well skil'd in the Nature of Fermentation, other Vegetable Substances far cheaper then Wine , from which an inflammable, and saline Sulphureous Spirit, of the like vertue for dissolving resinous Bodies, drawing Tinctures, &c. may be copiously obtain'd: For not only, 'tis known, that Sydar, Perry, and other Juices of Fruits will afford such a Spirit ; and that most Graines, not very unctuous, as Barley, Wheat, &c. will do the like ; but other Berries that grow wild, as those of Elder, will yield a Vinous Liquor. And in the *Barbada's* they make a kind of Wine, even of Roots, (I mean their *Mobby*, which they make of Potatos ; as I have also, for curiosity sake, made Bread of the same Roots) nay, even from some sorts of Leaves, such a Liquor may be obtain'd: For I have observed Roses well fermented, to yield a good Spirit very strongly tasted, as well as inflammable. And as to the Preparing of pure Spirit of Wine it self, I know wayes (and one of them cheap) that may exceedingly shorten the time, and pains of dephlegming it ; but that being to be done otherwise, then by any peculiar contrivance of Furnaces or Glasses, I reserve it for a fitter place, in one of the following Essays.

And as more expedient and thrifty wayes, then the vulgar ones,

ones, of making Chymicall Furnaces and Vessels, may be devis'd; so 'tis to be hoped that a skilful Naturalist may find cheaper waies of heating the Chymists Furnaces, or Distilling in his Vessels (either by finding combustible Materials, not formerly in use in the places where we work, or by making those already employed fitter for use) by bringing them, by some cheap alterations, either to give a greater, or a more durable heat, or to be less offensive by their smoak or smells; or else by discovering some cheap way of doing, in some cases, without Fire, what was wont to be done by it.

We see that in some places; especially here in *England*, where Char-coale was only burnt in Furnaces, Pit coale is substituted in its room; and at this Day there are several of those that make *Aqua-Fortis*, in great quantities, that Distil it with such Coales, which cost nothing neer so much as those made of Wood. And experience hath inform'd me, that even in other sorts of Furnaces, the same Fuel may be imploy'd, provided the Barres of the Grates be set wider asunder, and a little Char-coale be mingled with it for the better kindling; and since of late Years Pit coale have been found in several places among us, where they were not formerly known to be, it seems not improbable, that many other Countries may afford Chymists, and the rest of their Inhabitants the like advantage, if search were duely made, by boring of the ground, by the observations of the Waters, and the Steames of places suspected, and by other waies of inquiry that a skilful man might direct; But because the abundant Smoak of Pit-coale, uses to be very offensive, and the smaller Coales easily run through the Grates, and because of other inconveniences, there hath been a way found out of charring these Coales, and thereby reducing them in-

to

to coherent Masses, of a convenient bigness and shape, and more dry and apt to kindle; and these though, quantity for quantity, their price be little inferiour to that of Char-coale. Yet those that consume great proportions of Coales, tell me they finde them almost as cheap again, in regard they will not only last much longer, but give (especially near at hand) a far more intense heat: And therefore it must be a very useful thing to Chymists, to shew a way of charring Sea-coales, without the help of those Pots, which make them of the price they now beare. And that it is not only possible, but very easy, I could quickly shew you, if it would not prejudice an industrious Laborant, whose profession being to make Chymicall Medicines in quantity, obliges him to keep great and constant Fires, and did put him upon finding a way of charring Sea-coale, wherein it is in about three houres or less, without Pots or Vessels, brought to Char-coale; of which having, for curiosity sake, made him take out some pieces, and coole them in my presence, I found them upon breaking to appeare well charr'd, and much thereof in shew not unlike a Marchasite. And that which was very convenient in this Contrivance was, that whil'st the Pit-coale was charring, it afforded him a very intense heat to melt or calcine the Minerals, he had occasion to expose to it: And he confest to me, that by this Method, he saved three parts in foure of the Charges the keeping such great and constant Fires, with common Char-coale, would cost him. In *Holland*, likewise, they have a way of charring Peat, (which is a combustible Turfe, that they dig under Ground) and a skilful Distiller, that much employ'd it, commends it to me, as a very good Fuel, even for Chymical Fires; which I therefore mention, because the way of charring Peat, is not yet brought into several Countries, where Peat is dig'd up:

And probably, it would be found in divers Regions, where 'tis yet unknown, if due search were made for it. To which I may adde, that 'tis not unlike, that some Countries may afford such combustible Materials, fit for Chymical Furnaces, as have not, as yet, been so much as nam'd by Mineralist's; as I remember I have seen, and had, a sort of Coales, some of which look'd like Marchasites, that burn'd clear with a good Flame, and had this convenient quality, for the Chymist's use, that they were not apt, like the common Pit-coales, to stop the Grates with their Sindes, but burnt to whitish Ashes almost like Char-coale made of Wood; and yet gave so great a heat, that an Industrious Chymist of my acquaintance, who kept many things constantly at work, found it worth while to have them brought him, above a daies journey, on Horses backs.

But 'tis not impossible, that when Men grow better Naturalist's, they may find waies, of exciting heat, enough for many Chymicall operations, without the help of Fire; and consequently, without the consumption of Fuel. We find that by the attrition of hard Bodies, considerable degrees of heat may be produc'd, not only, in combustible Materials, as Wood, and the like, (which would therefore be improper, to be here insisted on) But in others also, and particularly in Iron and Steel, one may by attrition soon produce a smart heat, as you may quickly try, by nimbly Filing a piece of Iron, with a rough File; or swiftly rubbing, though but for a few minutes, a thin piece of Steel against a Board. And whether some contrivance may not be found, by the help of cheap Engines mov'd by Water, or otherwise, to produce a durable heat in Iron Vessels, fit to digest in, we may elsewhere have further occasion to consider; But this is known, that from some succulent Plants, a Liquor may be drawn,

drawn, only by exposing them in Glasses, purposely contrived to the Beames of the Sun. And there is nothing more common, then for Chymists to make their Digestions by the warmth of Horf-dung, whereby they might also (as some Analogous tryals incline me to think) conveniently enough, Distil some fermented Liquors; especially, if the way were improv'd by the skilful addition of Quick-lime, and seasonable aspersions of Water. And I doubt not but many cheap Materials might, by a few tryals, be found, whereby portable digesting Furnaces, without Fire, (if I may so call them) might be made, without the ill smell and nastiness, which discommends the use of Horf-dung. For not only we see, by what happens in the Spontaneous heating of Malt, and some other familiar substances, that probably most sort of Graines, and Berries, fit for Fermentation may be brought to yeeld, for a good while, a heat great enough to putrifie, or digest with: But I have, several Years agoe, by many trials found; that I could, by invironing Glasses with refuse Hay well press'd down and equally wetted throughout, produce for divers daies such a heate, as made me decline the employing of Horf-dung; and yet (which is the chiefe thing for which I mention this) the quantity of Hay was so small, that in all my trials I found not, that the Hay did of it self, though kept close enough, take Fire; as else is usuall in Ricks of Hay not sufficiently dried, where the quantity, and consequently the weight, that presses the lowermost parts close together, is considerable.

But further, in divers operations, where an actual Fire is requisite, it may be hop'd that Knowing Men, may discover waies of saving much of the Fire, and making Skill perform a great part of the wonted office of heat. To obtain the

Spirit of fresh Urine, you must Distil away near nine parts of ten, which will be but Flegm, before the Spirit or Volatile Salt will (and that scarce, without a pretty strong heat) regularly rise. And there are several Chymist's that, to this day, make use of no better way of Distilling Urine; But he that knows, how Putrefaction opens many Bodies, may easily save himself the expence of so much Fire: For if you let Urine stand well stop'd, for eight or ten Weeks, the Saline and Spirituous parts will so extricate themselves, that the Spirits that before staid behind the Flegm, will now, even with the gentlest heat, rise up first, and leave the Flegm behind. And on this occasion I shall teach you, what I do not know to have been mention'd by any Writer; namely, That even of fresh Urine, without Digestion or Putrefaction, I can, by a very cheap and easie way, make a subtle and penetrant Spirit, ascend, first, even in a gentle heat; And I am wont to do it only by pouring Urine, how fresh soever, upon Quick-lime, till it swim some Fingers breadth above it, and then distilling it as soon as I please. But I did not find, upon many trials, that this Spirit, though even without Rectification very strong and subtle, would Coagulate Spirit of Wine, like that of putrified and fermented Urine; though, perhaps, for divers other purposes it may be more powerful.

And here I shall advertise You, that whereas I just now took notice, that there was a pretty strong Fire requisite to force up the Salt of unfermented Urine, out of that part, which after the abstraction of the Phlegm, remains of the consistence of Honey; trial hath inform'd me, That the volatile Salt may out of the thick Liquor be obtain'd, better and more pure, with ease, and with a, scarce credibly, small heat; barely, by tempering the Urinous extract with a convenient

venient quantity of good Wood Ashes, whereby (for a reason
 elsewhere to be consider'd) the volatile part, of the Salt of
 Urine, is so free'd from the grosser Substance, that with
 strange facility it will ascend, fine and white, to the top of
 very tall Glasses. But of the differing Preparation of Urine,
 more perhaps elsewhere. I now proceed to tell you, that I
 think it not unlikely, that even Bodies, which are more
 gross and sluggish, may by the affusion of such *Menstruums*,
 as humane Industrie may find out, be far more easily, either,
 volatiliz'd or unlockt, then common Chymists are wont to
 think. For I know a Liquor, not very rare among Chy-
 mist's, by whose help I have, often enough, distill'd Spirit of
 Nitre, (whose distillation requires much about the same vi-
 olence of Fire, with that of *Aqua-Fortis*) even in a mode-
 rate heat of Sand, and without a naked Fire. This Spirit may
 easily enough be brought over, even in a Head and Body;
 and, for a Wager, I could obtain a little of it without any
 Fire or outward heat at all. And I remember, also, That hav-
 ing once digested a certain *Menstruum*, for a very short time,
 upon crude *Antimony*, and abstracted it, in a very gentle heat,
 of Sand; the Liquor, not only, brought over some of the
Antimony in the form of red Flowers, swimming in it, and u-
 nited other parts of the Mineral, with it self, in the trans-
 parent Liquor, but the gentle heat rais'd to the top of the
 Retort, divers little Masses of a substance, that were very
 transparent, like *Amber*, which were inflammable, and
 smelt, and burnt blew, just like common *Sulphur*; And yet
 the *Menstruum*, which was easily again recoverable from
 the *Antimony*, was no strong Corrosive, tasting, before it
 was pour'd on, not much unlike good Vinager.

But besides all the ways, above mentioned, of saving the
 Chymist, either, Time, or Fire, or Labour; I despair not
 that

that divers others, yet unthought on, will be in time found out by the Industry of skilful Men, taking notice of the nature of things, and applying them to Chymical uses; as we see, that by Amalgamations with *Mercury*, the calcination of Gold, and Silver, may be much easier perform'd, then by a long violence of Fire. And, (if it be true, what *Helmont*, and *Paracelsus*, tell us of their immortal Liquor *Alkahest*) Medicines far nobler, and otherwise more difficult to make, then those hitherto in use among the Chymist's, may be Prepar'd with greater ease, and expedition, and with far less expense of Fire, then the nature of the Mettals, and other Concretes, to be open'd by it, would let a vulgar Chymist suspect. However, I see no great cause to doubt that there may be *Menstruum's* found that will much facilitate difficult Operations, since not to mention again the Liquor, I lately told you, would work such a change on Nitre (and, I might have added, on some other compact Bodies) 'tis very like, there may be *Menstruum's* found, that will not be so spoyl'd by a single Operation, made with them, as our vulgar saline Spirits are wont to be. For I have try'd that a *Menstruum*, made by the bare distillation of good Verdigrease, will not only draw, as I have formerly told you, a Tincture of Glass of *Antimony*, or perform some other like Operation for once, but being drawn off from the dissolved body, or the extraction, will again serve, more then once, for the like Operation upon fresh Materials.

The fifth, and last way, *Pyrophilus*, that I intend to mention, of lessening Chymical expenses; is, That the Naturalists may probably find out wayes of preserving some Chymical Medicins, either longer or better, then those wayes that are usual. But of this preservation of Bodies, being like, as I formerly intimated, to have elsewhere further occasion

casion to Treat; I shall now only say, That the purified Juices, liquid Extracts, *Robs*, and other soft Medicaments, made of Plants, may be Conserv'd far cheaper, as well as better, then with Sugar (which clogs most Mens Stomacks, and otherwise disagrees with many Constitutions) in case *Helmont* say true, where he tells us, That for a small piece of Money, he can, for I know not how long, preserve whole Barrels of Liquor. And a way he intimates, of fuming liquors with *Sulphur*, I have already told you, is a very good way of keeping them uncorrupted; provided, that (though he prescribes it not) they be six or seven several times (seldomer or oftner, according to the quantity or nature of the Liquor) well impregnated with that embalming Smoak; to which purpose it is convenient to have two Vessels, to poure from one to the other, that whilst the Liquor is shaking in the one, the other may be well fill'd with Smoak; whereto I shall only subjoyn this secret, which a friend of mine, practises in preserving the fumigated Juices of Herbs (as, I elsewhere inform you, I do to preserve other things) with a success that I have somewhat wondred at; which consist's, in adding to the thick Liquor, to be preserved, a due, but small, proportion of the white *Coagulum*, (which I often elsewhere mention) made of the pure Spirits of Wine and Urine.

But I have made this excursion too prolix, and therefore I shall only adde as a general admonition, that we are not, by the common practice of Vulgar Chymist's, to estimate what Knowing Naturalist's, skill'd in Mechanical contrivances, may be able in time to do, towards the making of Chymical Remedies, as well more *cheap* as more *effectual*; and, indeed, to make them more *effectual*, is the best way to make them more *cheap*.

For,

For, *Pyrophilus*, after all the wayes, that I have mention'd, whereby the charges, of the *Therapeutical* part of Physick, may be lessned; I must advertise you, both, That I make no doubt but there may be divers others found, which either through want of skill or leasure I have pretermitted, and that I have not yet named the principal of all; which is, That the deep insight into Natural Philosophy may qualifie him that hath it by several wayes, and especially by discovering the true Causes and Seats of Diseases, to find out such generous and effectual Remedies, (whether Specificks, or more Universal *Arcana*) as by quickly freeing the Patient from his Disease, may exempt him from needing, either, much Physick from the Apothecary, or many chargeable visites from the Doctor of Chirurgeon. Thus the rich Merchant I mention'd in one of the former Essayes to have been freed, by a Specifick, from the Gout; and the young Lady, cur'd of her Fistulas, by the infusion of *Millepedes*; might well, in the ordinary way, have spent, even supposing them thrifty, a hundred times more, upon Physitians and Physick, then the potent and nimble Remedies, whereby they were so happily recovered, cost them.

[To which I shall adde, by way of Confirmation, both of this and of what I lately told you; concerning the Efficacy that may be, even, in slightly Prepared Simples; what I came to learn, since the writing of the former part of this Essay, namely, that a young Lady, who (though of great Birth, is yet of far greater Beauty and vertue, whom I presume I need not name to you) having been long troubled with an almost hereditary Epileptical Distemper, and after having been wearied by courses of Physick prescrib'd her, by the famousst Doctors that could be procur'd, without at all mending, but rather growing worse, so that some-
times

times She would have, in one day, eight or ten of such dismal Fits, as You and I have seen her in; was cur'd onely by the Powder of true *Misseltoe* of the Oake; given as much as would lie upon a Sixpence, early in the morning, in black Cherry Water, or even in Beere, for some days near the full Moon. And I am assur'd, partly, by the Patient her self, and, partly, by those that gave her the Medicine, That though it had scarce any other sensible Operation upon her, and did not make her sickish, especially, when she slept upon it; Yet, after the first day she took it, she never had but one Fit. And this Remedy, an ancient Gentleman, who, being casually present when she suddenly fell down as dead, gave it her, profess'd himself to have constantly cur'd that Disease with it, when he could procure the right Simple, which is here exceeding scarce. And what further Experiment some Friends of Yours have succesfully made, of its Vertue, I may elsewhere have occasion to relate.]

To which I shall only adde, That one of the Skilfullest Methodists I ever knew, having had much adoe to preserve a young Cousin of Yours from a very dangerous Cough, by a long course of Physick; the party, at the beginning of the next Winter, falling into a Relapse more threatening then the first Disease, was rescued from it in two or three days, by not many more takings of a Specifick sent her, made of nothing else but Hartshorn prepar'd as I lately taught You. And if such slight Medicines, consisting, each of them, but of a single Simple, not elaborately prepar'd, may sometimes (for I say not alwaies) perform such speedy cures even in Chronical Distempers, what may not be hoped from the *Arcana majora* (such as *Paracelsus's Laudanum*, so praised by *Operinus* himself; and *Butlers Driff*, so extold by *Helmont*) when the skilfullest Preparations, of

the noblest Simples, shall come to be known by Learned and Judicious Men, intelligent in the *Theory* of Physick, and especially vers'd in the History of Diseases? And though *Riverius* were none of the greatest Naturalists, or, at least, Chymists, Yet if in his Observation, and elsewhere, he flatter not his own *Febrifugum*; how many Patients did that one Specifick, rescue from Quartanes, that would else probably have prov'd as Chargeable as Tedious?

But, *Pyrophilus*, having sayed so much, that I fear you have thought it tedious, to shew that a Naturalist, skill'd in Chymistry and the Mechanics, may assist the Physitian to make his cures less Chargeable; 'tis high time, that after so long an excursion, I proceed to consider in what other particulars he may be a benefactor to the Physitians Art.

C H A P. VIII.

Firstly, then, that the Naturalists skill may improve the *Pharmaceutical Preparations* of Simples, by several wayes partly touch'd already, and partly to be, either, added or further treated of; the great variety of new Remedies, wherewith the Laboratories of Chymists have furnished the shops of Apothecaries, may convincingly inform you. To which I must take the liberty to adde (and that upon serious Consideration) That the *Chymical Preparations*, hitherto common in *Dispensatories*, are, as to the Generality of them, far enough from being the most Dextrous, or Noble, that can be devis'd: For our Vulgar Chymistry (to which our Shops owe their venal *Spagyricall Remedies*) is as yet very incomplete, affording us rather a Collection, of loose and scatter'd (and many of them but casual) Experiments, then an Art duely superstructed upon Principles and Notions, emergent from

from severe and competent Inductions, as we have elsewhere endeavoured, more particularly, to manifest. And therefore till the Principles of Chymistry be better known, and more solidly establish'd, we must expect no other, then that very few vulgar Chymical Remedies should be of the Noblest sort ; and that in the Preparation of many others, considerable errours should be wont to pass unheeded ; and faults, gross enough, be apt to be mistakenly committed. But, of this Subject, we may elsewhere have divers occasions to entertaine You ; and our single^e Essay, *of the Chymical Distinctions of Salts*, will perhaps discover to You no small mistakes, in the Preparation of divers applauded Vulgar Medicines. For it is not the Elaborateness, but the Skillfulness of Preparations, that produceth the Noble Remedies, and a few Teeming Principles well known and apply'd, will enable a man with ease to make better Remedies, then a great many Furnaces and Glasses, though never so well contriv'd, and though very useful in their kind. To make out this in some measure, I shall name some such Instances, as may withall confirm what I formerly deliver'd in this Essay, touching the possibility and usefulness of Correcting either poisonous, or otherwise very noxious Simples. I never knew *Opium* so much Corrected by Saffron, Cinnamon, and other Aromaticall and Cordial Drugs (wherewith 'tis wont to be made up into *Laudanum*) nor by the most tedious tortures of *Vulcan*, as I have known it by being a while Digested in Wine, impregnated with nothing but the weight of the *Opium* of pure Salt of *Tartar* ; as we elsewhere more fully declare. (a much nobler *Laudanum* may be made by adding to the *Opium*, instead of the Salt, two or three appropriated Simples, and by due Fermentations and Digestions of them with it) And for that violent Vomiting Medicine,

by Chymists flatteringly enough, call'd *Mercurius Vita*, a whole Pound of Cordial Conserves, or Liquors, will not so well moderate its evacuating force, as the keeping it continually stirring in a flattish and well glaz'd earthen Vessel, placed over a Chafingdish of Coales till it emit no more fumes, but grow of a grayish Colour: which I am very credibly informed to be the Preparation of *Merc-Vita purgans*, often mention'd and commended by the famous Practitioner *Riverius*, in his Observations. A not unlike, but far more sudden, Correction of that active Powder, I elsewhere teach. And as for those Operative Minerals, *Quicksilver* and *Antimony*, though long Experience of their churlish and untractable Nature have made many, of the waryer Physitians and Chymists shy to meddle with either of them single: Yet these Concretes, which seem so Incorrigible, may, by being barely (in the gradual Distillation, of Butter of *Antimony*) sublim'd up together into a *Cinnaber*, and then that *Cinnaber* six or seven times resublim'd *per se*, be united into a Medicine, that not only is not wont to work, either upwards or downwards, but of which I have known safely taken, even in substance, to the Dose of many Grains; and a few Drachmes, of which, infus'd in a Pound or two of Wine, hath made it of that inoffensive Efficacy (taken, in the quantity of a Spoonful or two, daily upon an empty stomach) That, if it still succeed as well as we have observ'd it two or three times to do, we may think that our having thus acquainted You with the Vertue of this one unlikely Remedy, (though we have also met with it, even, in Printed Books) may make you amends for all the rest of this tedious Discourse. I once knew a slight (but altogether new and tedious, as well as Philosophical) Preparation, of Salt of *Tartar* Correct and Tame such Poisons, as ten times the quantity of the highest Vulgar Antidotes,

tidotes, or Cordials, would (I was confident) scarce have
 so much as weakned: And I have known by the same Pre-
 par'd Salt, dextrously Specified by Simples, the Vertues
 of some Vegetables so exalted, That, without any *Cathar-
 tique* or *Emetique* Operation, they have (if many Patients,
 of whom I had casual opportunities to enquire of the Effects
 of those Remedies upon them, do not mis-inform me)
 prov'd more effectual in Tameing divers stubborn Diseases,
 then *Crocus Metallorū*, *Mercurius Vita*, (as 'tis abusively call'd)
 and those other dangerous Remedies; which make the Vul-
 gar wont to say of Chymists, that they quickly either cure
 their Patients or kill them. And to let You see, *Pyrophilus*,
 by one plain, and yet noble, instance; That the knowledge
 of the Specifick Qualities of Things, skilfully applied to
 Preparations, may perform, with ease, what neither costly
 Materials, nor elaborate Processes are able to effect; Give
 me leave to inform You; That, whereas, Chymists and
 Physitians have not been able by infusing the true Glass
 of *Antimony* (made *per se*) in Spirit of Wine, or the
 richest Cordial Liquors; nor yet by torturing it after sever-
 al tedious and artificial manners, to deprive it of its *Eme-
 tique* quality; That Vomitive faculty, of *Antimonial* Glass,
 may be Corrected by so slight a way, as that of Digesting it
 with pure Spirit of Vinegar, till the *Menstruum* be highly
 ting'd. For if you gently abstract all the Liquor, and on
 the remaining yellow or red Powder, you Digest well de-
 phlegmated Spirit of Wine; You may after a while obtain a
 Noble and not *Emetique* Tincture: Of which though *Basil-
 us Valentinus* prescribes but five or six Drops for a Dose, yet
 a *Domestick* of mine having, out of curiosity, taken to the
 quantity of thirty Drops at a Time, he found it not at all
 Vomitive. And this Tincture we the rather mention, Be-
 cause

See his
Curvus Tri-
umphalis
Antimonii.

cause, not only, *Basilius Valentinus*, but other skilful Persons, highly extol it for several Diseases.

And let me adde, *Pyrophilus*, (and be pleas'd to mark well what I tell you) That by bare reiterated Digestions, and Fermentations, there may be Prepar'd, out of many Vegetables, Saline and Sulphureous Essences (whose Bulk is exceeding small, in proportion to the Concrets whence they are Extracted) which will keep many Years, as I can shew you some above three Years old, and contain more of the *Crafs* (if I may so call it) of the Simple, then the vulgar Vegetable Waters, Spirits, Extracts or Salts, hitherto extant in Laboratories and Shops. But there is so great a length of Time required, to the Preparation of these Efficacious Juices, That my ambulatory condition of Life, hath not allowed me to furnish my self with many of them.

And, *Pyrophilus*, if You will not disbelieve a Person for whom You have so just an esteem, as You have for that Ingenious, and Experienc'd, *Monsieur L. F.* who was the French Kings Chymist, when You knew him at *Paris* ; I can, present You with a yet Nobler instance, to perswade You ; That, if skill be not wanting, a single Herb, without any violence of Fire, may, by other wayes then are in use among Chymists, be easily enough brought to afford Medicines, endow'd with some Nobler Vertues, then any of the most compounded, costly, and elaborate Medicines, whether Minerals or others, that are to be met with among Vulgar Chymists. This Efficacious part of the Plant, whence 'tis obtain'd, *Paracelsus* call's the *Primum Ens* of the Plant that yeilds it ; But though, indeed, I have found the way of Preparing it much plainer, and better deliver'd, then is usual in his Writings, at the end of his Book *De Re-*

novatione

novatione & Restauratione; Yet I freely acknowledge, That, I should scarce have thought it worth the Trial, if it had not been for what the Experienc'd Chymist, above mention'd, affirmed to me, upon his own Observations, concerning it, partly, because I am not wont to be forward so much as to try long Processes upon *Paracelsus's* credit, and partly, because what he call's *Sal Solutum* seem'd to me somewhat ambiguous; since, in the same Page teaching to draw the *Ens Primum* of Gold and *Antimony*, he makes not use of Sea-salt, but of (a Salt of an incomparably higher Nature) his *Sal Circulatum*; and in the Processe immediately preceeding ours, to make the *Ens Primum* of *Emeralds*, he Prescribes the Calcining them in *Sale Soluta*, which agrees far better with his *Sal Circulatum* then with any Solution of Sea salt, which seems very unlikely to be able to Calcine and, as he sayes it must, dissolve *Emeralds*. But the way, that our French Chymist told me he us'd, was in substance this: Gather, in a convenient season and time of Day, Baulm for instance, or some other fit Herb, (for experience hath taught, both him and me, that all Herbs are not fit, by this way, to be reduc'd into Liquors) and having beaten it well, in a marble Morter, to a soft mash, plac'd in a Bolt-head hermetically seal'd, to Digest forty dayes in a Dunghill or some analogous heat; then, opening the Vessel, take out the Matter, which will be far more Liquid then before, from which, having separated the grosser parts, You must Digest it in a gentle Bath, that the yet remaining grosser parts may subside; to which, being filtrated, You must, according to him, (for I find not that *Paracelsus* requires it) joyn the fixed Salt, of the grosser parts above mention'd, dry'd and calcin'd. To this, Prepar'd Liquor, You must adde equal parts of the
Liquor

Liquor of good Sea-salt well purifi'd, and then melted, and suffered to run *Per Deliquium*: This Liquor, being also seal'd up in a convenient Glass, must be expos'd to the Sun for about six Weeks; at the end of which time there will swim at the top of it, the *Primum Ens* of the Plant in a Liquid form, transparent, and either green or red, or, perhaps, of some other Colour according to the Nature of the Plant. And though *Paracelsus* prescribes but Celandine, and Baulm, to be us'd, Yet having enquir'd of our Chymist, he told me, he had made such *Prima Entia* of *Scrophularia*, and, as I remember, of one or two other Herbs. But that which makes me thus, particularly, take notice of these kind of Medicines, is, That not only *Paracelsus* ascribes to the *Primum Ens* of Baulm, (or Celandine) the power of renovating them that use so much of it in good Wine as will give it a Tincture, early every Morning; till, first of all, the Nailes of their Fingers, then those of their Toes, afterwards their Hair, and Teeth, fall off, and, lastly, the Skin be dri'd and exchange'd for a new one: But Your ingenious acquaintance assured me several times, and once, in the presence of a famous Physician, and another *Virtuoso*, to whom he appeal'd, as knowing the truth of what he say'd; That an intimate Friend of his, whom he named to me, having, after the above mentioned manner, Prepared the *Primum Ens* of Baulm, to satisfie himself the better of its effects, made the Trial upon himself, and took of it, according to the Prescription, for about a Fortnight; Long before which his Nailes, both of Hands and Feet, began to loosen themselves from the Skin, (but without any pain) which at length falling off, of their own accord, this Gentleman keeps yet by him in a Box for a rarity, but would not pursue the Trial any further, being satisfied with what he had found,

and

and being in no need of such Physick; But having given of the same Medicated Wine, for ten or twelve Dayes, to a Woman that serv'd in his house, and was neer seventy years of Age, without letting her know, what he expected it should do, Her *Purgationes Menstruæ* came upon her again in a sufficiently great quantity, to fright her so much, that he durst prosecute the Experiment no further. And when I ask'd, why he made no triall upon Beasts? It was answer'd, that though he had but little of the Medicine, yet he put apart an old Hen, and moistning her food with some drops of it for a Week, about the sixth day she began to moult her Feathers by degrees, till she became stark naked; but before a fortnight was past, she began to regain others, which when they were come to their full growth, appear'd fairer, and better colour'd then the first; And he added, That besides that, her crest was rais'd, she also laid more Egges, then she was wont. And as to the *Primum Ens* of the greater *Scrophularia*, by the relater himself, though he ascrib'd not to it any renovating power, as to that of Balm or Celandine, yet he assured me, he had found it enobled, by other great and extraordinary Vertues. But of this kind of Preparation, I might ere now, possibly, have been able to give You a better account, if in my trials about them, I had not met with some unhappy accidents, which I hope my next attempts will escape: which if they do, I may possibly, with an account of them, send You one of some attempts to prepare the like Medicines another and shorter way, together with a consideration, whether *Paracelsus* and others deservedly call such accidents as the abovemention'd change of Nails Hair, and even of Teeth a reall renovation or rejuvenescence.]

'Tis likewise a way of preparation, differing enough from those that are common among Chymists, which *Helmont* (as
a a he

In tracta-
culo cui ti-
tul. sequun-
tur Quae-
dam Imper-
fectiora.

he saies out of commiseration to the sick) delivers, where he teaches that which he calls the *Via Media* of making the *Elixir Proprietatis*, of which he gives us this commendation: *Hoc medicamine tam Quartanam, quam continuam statim absolvi. Adè ut qui noctu susceperat sacrosanctum viaticum, & olei extremam unctionem, me in prandio convivam circa lectum habuerit.* And though many think, that he has rather fraudulently, then rightly set the process down; yet experience has invited me to absolve him in this particular. (Though I must tell You, that because a Languid heat is not sufficient to make a Spirituous liquor ascend and circulate as he requires; 'tis not every Chymist, that will, especially in his first trials, avoid the breaking of the Glasses, or at least the burning of the materialls, to which accidents this preparation is very obnoxious, if it be not as well watchfully as skilfully made.) And though for my part, I have scarce us'd this *Elixir* but as a Cordial; yet I know some very expert Physitians, that have given it with great successe in divers difficult cases, and particularly a Friend of the younger *Helmonts* gives it so succesfully, that partly his Patients, and partly others that have try'd it, have sometimes taken of him, at a great rate, whole Pounds in a Year or too; and yet I know by his own confession, that, besides the skill he employses in making it dexterously, he adds nothing but one Ingredient, to which I confess, I am not apt to ascribe any considerable part of the efficacy of the Medicine; which, when made, he sometimes perfumes by cohobations with Musk, and Amber.

And *Pyrophilus*, that you may not wonder, that I, who think much of *Helmonts* Theory scarce intelligible, and take great exceptions at many things in his writings, should yet now and then commend Medicines upon his Authority, I must

must here confesse to you once for all, that (alwaies excepting his extravagant piece, *De magnetica vulnerum curatione*,) I have not seen cause to disregard many things he delivers, as matters of fact, provided they be rightly understood; having not found him forward to praise Remedies without cause, though he seem to do it sometimes without measure, and having more then once, either known, or even had, considerable effects of Medicines he commends, which one of the happiest Practitioners I have met with, and one not lavish in extolling Chymicall Remedies has solemnly assur'd me, he has generally, though not alwaies, found more then ordinarily effectual. And upon occasion of this odde preparation of the *Elixir Proprietatis*, I shall adde that, Since Experience shewes us, by what is daily done in Chymicall Laboratories, that upon the operation of the fire upon several Concretes, substances of Nature oftentimes very differing both from the body that afforded them, and from one another, may be obtain'd; as the Oyles, and fixt Salts, even of cold Plants or Hot: Since also, by the mixture of active Bodies new Concretes, endow'd with new qualities, may be produced; as we see that *Saccharum Saturni* emergeth from the conjunction of Lead, with the Acid Salt, distill'd Vinegar; and Since too the same Concrete, according to the differing manners, after which 'tis handled, may acquire differing Qualities, as is clear in the various Medicines, afforded us by Quicksilver, and by Antimony, according as each of them is order'd; I cannot but think, that if Chymistry did no more then assist us, by the resolution of bodies, to extricate their more active parts, and, partly by such resolutions, and partly by associating bodies together, to alter the former texture of Natures Productions, or present us with new Concretes of new Textures; by this

very means, if men want not Curiosity, and Industry to vary and prosecute experiments, there must necessarily arise such a store of new and active Medicines, that in all probability, many of them will be found endow'd with such Vertues, as have not been, at least in that degree, met with in the usuall Medicines, whether simple or compound, to be bought in Apothecary shops; and consequently, even without any notable discovery, or improvement of Principles, Chymists, (even as matters now stand with them) may considerably adde to the Pharmaceutical part of Physick. But if the Operations of Chymistry were seriously enquir'd into, and thoroughly understood, I make little doubt, but by a skilfull application of them, and especially by a *series* of them, in a rationall and orderly way, succeeding one another, there may be found out a great many preparations of Remedies, both very differing from the common ones, and far more noble then they. And to make this seem probable, I need but repeat some of the examples formerly mention'd; To which I shall adde now, that Experience has inform'd me there is a way, whereby firmer consistent substances, belonging to the bodies of Animals, may without the addition of any extraneous matter, and without any violence of heat, be reduced almost totally into Liquor, and if I much misremember not, these Liquors without any violence of heat, afford their Spirituous and Saline parts, in a very gentle heat, and that before their Flegme. And I must peculiarly inculcate this, That if we had but a few potent Menstruums, to dissolve and unlock bodies with, I scarce know what might not be done in Chymistry. But when I speak of noble Menstruums, I mean not such as work like the generality of Corrosives, and the like Acid or Saline Liquors, which work but upon few kinds of bodies, and soon coagulate, or exantlate themselves by

by working, and thereby become unfit for future operations; but I mean such as either are separable with all their efficacy from the dissolv'd Body; as is said of the *Alkalest*, or such Saline or other piercing Liquors, as not being precisely either Acid, Urinous, or Alcalizate can resolve a great variety of Concretes, without having their Vertue, I say not impair'd, but destroy'd thereby; and unlock Minerall bodies, far more then vulgar Menstruums, (as for instance by volatilizing them, or else making them irreducible, or working the like grand changes in them:) and if it be not quite separated from the dissolved Body, is yet so friendly to Humane Nature, as to be free from either fretting, or other such dangerous and offensive Qualities, and rather to be of it self a powerfull Medicine. I should therefore exhort both You, and such other ingenious persons, as wish the advancement of Chymistry, and Physick, (I might possibly adde Natural Philosophy too) to apply their Chymical attempts, chiefly to the finding out of Noble Menstruums, for by being possessor but of one of these, a Man may be able to doe a great number of things, that otherwise are not to be performed; As one of our ordinary Goldsmiths, by the bare knowledg he hath of *Aqua-fortis*, can make many useful Experiments, about Silver, and Gold, that before that Menstruum was found out, all the Men of his profession in the World, were never able in many ages to compass. Nor do I much wonder at that advise, which *Helmont* gives those that aime at the improvement of Physick, in these Words: *Quod si ad istud ignis arcanum non pertingatis* (he was speaking of a prodigious, not to say incredible Liquor) *discite saltem, salem Tartari reddere volatilem, ut hujus medio vestras solutiones perficiatis. Qui etsi sua soluta, anaticè homogenea deferat, digestus in nobis: illorum tamen aliquot vires mutuatus est, quos intra defert, plurimorum morborum*

Helm. de
febr. cap. 5.
num. 26.

Helm. de
febr. cap.
17. vers.
finem

Helm. de
scholar.
Humorista.
pass. decept.
cap. 2. nu-
mero 89.

borum dormitrices. For concerning this Salt, he not only else-where saies: *Dicam saltem pro ingenuis, quod Spiritus Salis Tartari, si unicornu, argentum, hydrargyrum, lapides cancro- rum, vel aliquod è simplicibus dissolverit, neam febrim, sed & plures affatim morbos saret, &c.* But in another place he gives us, together with some account of its way of working, this great and comprehensive commendation of it. *Mi- rum sanè, saies he, quantum sal Tartari, vel unicum, volatile factum, non præstiterit: Nam omnem è venis amurcam deter- git & obstruentium contumaciam, dispergitque apostematum suscepta conciliabula. De hoc salis (& non olei) spiritu, verum est illud Paracelsi, quod quocunq; non attigerit vix alius poten- tior perveniet.* These passages I should not think worth transcribing and laying together, but that I find that besides the concurrent Testimonies of *Helmont, Paracelsus, and Ba- filius* in praise of this Salt, the generality of the more inquisi- tive Chymists, without excepting the more sober and judi- cious, do, by the various and painfull, though fruitlesse, at- tempts they have made to Volatilize Salt of Tartar, conspire in acknowledging it a thing highly worth labouring for; nor do I for my part see (whatever some say to the contrary, and however I have indeed found it more difficult, then perhaps a Novice in Chymistry would think) it should be impossible, for I have more then once with ease enough, made Gold it self volatile, though it be confessed to be the fixest body in the World, and consequently more fixt then Salt of Tartar, which in an open Vessel, may be in time made to flie away by a vehement fire; And I have likewise by an unusual Method, that I have elsewhere deliver'd, more then once ob- tain'd from a mixture of crude Tartar, and two or three Mi- neral bodies good store of true Volatile Salt, which I could see no just cause not to think afforded by the Tartar. But

But I confesse this may be rather a volatile Salt of Tartar, then Salt (that is Alkali) of Tartar made volatile, and therefore the principal thing I mention it for, is to shew you, that Tartar it self, by an unusual way of management, may be brought to afford an unusuall kind of Salt. But this I can tell You, that an ingenious acquaintance of mine, whom notwithstanding my wonted distrusts of Chymists, I durst credit, affirm'd to me, that he had himself seen a true and real *Salt Tartari volatile* made of Alkali of Tartar, and had seen strange things done with it, insomuch that he believ'd most of the things, that *Helmont* delivers of it. For my part I am inclin'd to think, that Salt of Tartar may be made volatile, (whether in the form of a Sublimate or a Liquor) by more wayes then one, though not all of them neer equally good: and whereas one of the best (if not the very best) of the wayes of volatilizing it, seems to do it principally with Spirit of Wine, and the great difficulty of that way consists in bringing this Spirit to associate with the salt: I have seen Salt of Tartar of my own, brought to that passe, which great Virtuosi have long in vain attempted to bring it unto, namely, to flow readily upon a red hot Iron, and also to take fire, and burn with a conspicuous flame, besides that when it had been dry'd by a smart fire to drive away any parts that did not firmly adhere to it, it would yet readily dissolve in high rectify'd Spirit of Wine, which you know Salt of Tartar will not otherwise do; not to mention the change of its Alcalizate taste, and other lesser alterations; but what I can further say of this matter, I must not declare in this place.

And *Pyro*. That You may not be as many other Virtuosi, discourag'd from labouring for noble Menstruums, by the confident perswasion of many, who believe *Angelus Sala* & *Guntherus Billychius* (whom I deny not to have been Learned Men,

Men, but do not take to have been great Masters of Chymicall *Arcana*) fit to determine with Authority, what can, and what cannot be done by Chymistry, least I say You should be, by such mens inconsiderate severitie, brought to despair of ever seeing any noble Menstruum, that is not sharpe to the taste, nor of any of the three peculiar kinds of Saline Liquor. (Acid as *Aqua fortis* Urinous, as the Spirits of Blood, Urine, and other Animal substances, nor Alcalizate, as Oyle of Tartar *Per deliquium*) I shall assure you, that to my own knowledg there is in the World a kind of Menstruum, that consists of a pure Chrystalline substance, that is made by the fire, and as truly Saline as Salt of Tartar it self, which strange Salt, though well purified, and readily dissoluble, as well in dephlegmed Spirit of Wine, as common Water, and though it be totably volatile (whence you may guesse of how Saline a nature it is) and also be either way reducible to a noble Menstruum, does really tast sweet. I mean not in the Chymical sense, by want of sowerneſs (as when they say that the *Calces* of corroded and precipitated things are dulcify'd by frequent ablutions) but by a positive sweetnesse. And whereas the vulgar Saline Menstruums, (which alone seem to have been known to *Sala* and *Billychius*) are so specificated, if I may so express it, that what an Acid Menstruum dissolves, an Alcalizate, or an Urinous will precipitate, & *è converso*; And whichsoever you choose of these three sorts of Menstruums, one of the other two will disarm, and destroy it. I found by trial, not only that a Red Tincture of Glas of Antimony, being drawn with a Menstruum that was but a degree to this Liquor, I could not precipitate it like our common Tinctures, either with Spirit of Urine, or an Alcalizate Solution. But that (which is for more considerable) though it would readily mix with Acid Spirits

Spirits, as Oyle of Vitriol, with Volatile and Urinous Spirits, as Spirits of Urine it self, and with Alkalizate Solutions; yet would neither of these three make any Ebullition at all with it, or seem to work at all upon it. But of such Matters no more at present.]

CH A P. IX.

YOU will perhaps expect, *Pyrophilus*, that, Treating of the advantages that may accrew to the Therapeutical part of Physick, from a more accurate knowledg of Natural Philosophy; I should tell you with the Chymists, that Chymistry it self, and much more Physiology in its full extent, is not only capable of improving the Pharmaceutical part or Preparation of Remedies; (for, that we have confessed already) but also of affording us a new and much better *Methodus medendi*, or skill of using the Helps, that Nature or Art hath provided against Diseases. And indeed the Physitians Art is so difficult, and a man must know so many things to be, though not tolerably, yet perfectly skilld in it, that it may without disparagement to Physitians, be thought yet capable of being improved, if not of being reformed. *Hippocrates* begins his Aphorismes with a complaint, that Life is short, but the Art long. And *Paracelsus* himself, though he say after his boasting manner, *Ars est longa, vita brevis, ubi autem donum finis* (as he speaks) *est, ibi ars est brevis, vita verum longa si arti conferatur*: Yet expounding the same words a little above, he saith, *Itaque Hippocrates meritò de eo conqueritur: nam & affectis ipsius idem accidit: Ars medica consistit in Philosophia, Astronomia, Alchymia & Physica, meritò igitur dici potest Artem esse longam. Multum enim requiritur temporis, ad quatuor has Columnas Medicina discendas*

scendas & perscrutandas. Celsus, who hath been stiled Hippocrates Latinorum doth more then once call Physick a Conjectural Art, as particularly in that place where he saith, *Est enim hac ars conjecturalis, neque respondet ei plerumque non solum conjectura sed etiam Experientia.* And well might these great men acknowledg their Art to be difficult, since the two Instruments (as Galen calls them) of finding Arts, being Judgment and Experience, Hippocrates gives this Character of them; ἡ δὲ πείρα σφαλερὴ, ἡ δὲ κρίσις χαλεπή. And that Experience may be uncertaine without the Theory of Physick, he that so much builds upon Experiments, Paracelsus himself seems to confess where expounding those words of Hippocrates, he saith, *Hoc modo se habuit: Medicina in Principio, ut nullam Theoriam habuerit, sed solum Experientiam hoc laxare, hoc constipare, quomodo autem & cur, id ignoratum fuit: ideo unus salvatus est, alter perditus, nunc autem, &c.* And concerning the Critical part of Physick (to allude to Hippocrates his expression) Galen who exercised his reason so much about it tells us, that *Per rationem judicium haudquaquam facile existit, sed, si quid aliud, maximam habet difficultatem.* And to confirm the difficulty of finding the best way of employing reason to the cure of Diseases, not only by the Authority of Galen, but his Arguments; Let me inform you, that after having told us how difficult a thing, and how rarely to be found is that reason, which considers, and determines what on every occasion is to be done, *Neque enim* (addes he) *si veritas esset inventu facilis, tot ac tanti viri in ea quarenda occupati, in tam contrarias sectas fuissent unquam dispersiti.* And Paracelsus, whatever he often elsewhere boastingly affirmeth of himself, yet handsomely enough both expresseth and confesseth the difficulty of being a good Physician, in one of his Prefaces to the Students of Physick

Lib. 2. c. 6.

In Praefatio, Lib. 1.

In Commentar. Aphorism. 2.

sick, where he saies, *Non Titulus, non Eloquentia, non Linguarum peritia, nec multorum Librorum lectio* (& si hac non parum exornant) *in Medico considerata, sed summa rerum ac Mysteriorum cognitio, quæ una facile aliorum omnium vices agit. Rhetoris quidem est disertè posse loqui ac persuadere atque judicem in suam sententiam trahere. Medici autem ætuum genera, causas ac symptomata novisse, & iis insuper sagacitate ac industriâ Pharmaca applicare, atque pro cujuslibet ingenio ac ratione vel cunctis mederi:* But though, *Pyrophilus*, after the acknowledgments made by such great men of the almost insuperable difficulty of their Art, you would perhaps think it no great presumption, if a man should attempt to innovate in any part of it, and consequently even in the *Methodus medendi*: Yet *Pyrophilus*, I am much too young, too unlearned, and too unexperienced, to dare to be dogmaticall in a matter of so great moment. And the Physicians are a sort of men, to whose Learned Writings on almost all subjects, the Commonwealth of Learning is so much beholden, that I would not willingly dissent from them, about those notions in their own profession, wherein they seem generally to agree; And do very much disapprove the indiscreet practise of our common Chymists and Helmontians, that bitterly and indiscriminately raile at the Methodists instead of candidly acquiescing in those manifest Truths, their Observations have enricht us with, and civilly, and modestly shewing them their Errors where they have been mistaken. And yet, *Pyrophilus*, Since divers of the eminentest Methodists themselves have more then once ingeniously acknowledged to me, and seriously deplored with me, the incompleatnesse of their Art, (which perhaps made (that Learned Prince) the Late King tell them, that they were at best but good gueffers) and since about divers particular diseases we

Paracelsus
in his Preface to his
Bertheona,
or Chirurgia Minor.

have observed, the Method of some of the most reputed Doctors in *England* (which yet, I think, is at this day as well stored with Learned Men of that profession, as any part of *Europe*) not only very differing, but repugnant to each other; I suppose we may without disrespect to their profession, dissent from the most of them about those cases, about which they are reduced to disagree so much among themselves. And it would be worth an impartial disquisition, whether, since the *Methodus medendi* ought to be grounded on and accommodated to the Doctrine of Diseases, the new Anatomical discoveries formerly mention'd, and others not yet publish'd do not by innovating divers things in *Pathology*, require some alterations & amendments in the *Methodus Medendi*? But in this particular, I dare yet affirm nothing, and therefore shall proceed to observe to you, that the unusual efficacies of new remedies, may probably make the Method of curing more compendious, because (as I lately also intimated) one Medicine may be so richly Qualified, as to answer several intentions, which in the common way, require diversity of Helps and Remedies. Thus, for instance in the Cure of the Kings-Evil, by the received Method, the Physician must propose to himself several scopes (suited to several indications) and prosecute them successively with distinct and appropriated Remedies. But I have (as I formerly also told you to another purpose) known a single Specifique Simple, given only in small Beer, in not very many daies, without any sensible Evacuation, waite the peccant humor, appease the pains (which before were very great) and discusse the unbroken Tumours, and heal the broken ones. Thus, according to the known Method, the great Remedy in Plurifies is copious Blood-letting, which is strictly prescribed even to Aged persons and teeming Women, by the famous

self of our Practitioners, and, I confess, not irrationally, where
 the Physician is furnisht but with vulgar Remedies: and yet
 by some *Helmontian* Medicines, we have known Plurifies
 cured even in young men, without Phlebotomy, and our
 selves some while since made a succesful trial of that Nature
 in a young Gentleman not unknown to you, which I men-
 tion not, with *Helmont*, to reject or so much as to dispa-
 rage *Phlebotomy* in this disease (for so it be moderate and sea-
 sonable Experience shewes it frequently proves useful) nor
 as if we had observed all *Helmonts* boasted Remedies (though
 for the most part good ones) to be constantly succesful; but
 to give you an instance of the truth, of what I was saying be-
 fore, That new and more generous Remedies may so far
 alter the received *Methodus Medendi*, as to make divers of
 its prescriptions unnecessary. Of this truth, *Pyrophilus*, ano-
 ther instance might be afforded us by the Rickets, a new and
 abstruse Disease, at least as is supposed, and sometimes so
 stubborn, that one of the famousst Physicians in *Europe*,
 (whom I think I need not name) hath not been able of late to
 cure it in several of his own Children. And yet I suppose
 you may have heard that Excellent Person your Mother,
 several times mention her having performed divers cures
 (some of them improbable enough) of this Disease, barely
 by that slight preparation of *Colcothar*, lately taught you, and
 presented Her by us; And by which (we having made and
 distributed, at Her desire, a considerable quantity of it) sever-
 al other Persons have freed Children from that disfiguring
 Sickness: Of which, but few Moneths since, your little
 Cousin *D.* being sick almost past hope, vvas a while since
 brought out of danger, by Gods blessing upon some of the
 same Remedy, wherewith we presented her Mother, toge-
 ther with our perswasions to try it on her own Child, as she
 had

had succesfully done on the Children of divers others. And yet this Remedie (to adde that upon the By, in favour of something to be said anon) works almost insensibly, save that in many bodies it is, especially at first, diaphoretique. And this property of that Remedie minds me to adde, that it would not be amiss for Physitians, to consider whether or no (However, Bleeding, Purging, Vomiting, Issues, Glisters, Scarifications, and those other painful wayes of Evacuation be not (however Chymists are too bitterly and unreservedly wont to reject them) to be altogether condemned and laid aside, yet) there may not in some particular diseases and bodies be found more gentle, and yet effectual waies of discharging Nature of that which offends her, then those painful and debilitating ones, which we have mentioned (without the use of one of the chief of which namely *Phlebotomy* we see that almost all kind of Diseases are cured in Children.) The contributing to render the waies of Cure less painful and weakning, would gratifie so great a part of those who may need Physick, that I hope you will easily pardon my spending some Pages to that purpose. I consider then, that oftentimes the peccant matter, though very offensive by its qualities, is much lesser then is supposed, in quantity, and might, if we were but Masters of Specifique Remedies, either be breathed out by insensible transpiration, or carried off by Sweat or Urine, without tormenting, or weakning the Patient, by those other copious Evacuations of grosser Matter, which are alwaies troublesome and painful enough, though not alwaies effectual: Nay that even in Chirurgery it self, if those that practise it were as knowing as Nature has been bountifull, there would not be so often a necessity as 'tis commonly supposed there is of mutilating or tormenting the Patient to recover him. You cannot doubt, unless

less You will denie what *Gulielmus Piso* affirmes, upon his own Observation, of the Cures done by the illiterate Indian *Empericks*. The passage You have seen already ; But to it he adds so notable and ingenious an acknowledgment, that I cannot but honour him for it, and be willing to make way for the Credibility of a good part of what we are hereafter to deliver, in this discourse, by premising it. *Immo* (continues he) *ex venenatorum fungorum aliorumque toxicorum esu, solo potu infusi recentis radices Faborandi in instanti à letho vindicatos, me aliisque Galeni Nepotibus haud parum pudore suffusis, post tot alexipharmacorum & iheriacalium Antidotarium irritos conatus. Ita ut postea ejusmodi collegas barbaros subinde mihi adjungi passus sim, non adeo quidem nostratium valetudinem ad tactum arteriarum moderari quam dictis modis consilii copiam præbere solitos.* Thus farre he: Which premis'd, let us proceed to consider, more particularly, some of the less painful wayes of freeing men from Diseases.

C H A P. X.

THat great Cures may be done by bare outward Applications, You will scarce deny, if you dis-believe not the Relations which are made us, by Learned Men, concerning the Efficacy of the *Lapis Nephriticus*, only, bound upon the Pulses of the Wrist's (chiefly that of the left Hand) against that stubborn and anomolous Disease *the Stone*: And that which gives the more credit to these Relations is, That not only the Judicious (a) *Anselmus Boetius de Boot* seems to prize it, but the Famous *Monardes* professeth Himself not to write by Hear-say, of the great Vertues of this *Indian Stone*, but to have made tryal of it Himself upon persons of very high Quality:

Franciscus Bernius, Donzellinus, Ernestus Burgravius, who commend it upon their own experience, besides very many that commend in general termes.

(a) De Lapid: & Gemme lib: 2. cap: 11.

(b) Nico-
laus Monardes
de Simpli: Ind:
Histor: Cap:
seu Tit: 20.

(c) De Ne-
phrit: lib: 1.
cap. 24. where
he hath nine or
ten Observations
which he calls
Observationes
raræ & inaudita
de Lap: Ne-
phritico.

De Gem: &
Lapidibus lib.
1. cap. 23.

Quality: And that which is related by (b) *Monardes* is much less strange, then those almost incredible things which are with many circumstances delivered of that Stone, by the Learned Chymist (c) *Untzerus*. And although it must be acknowledged, That some Stones, that go under that name, have been ineffectually applied in *Nephritick* Distempers, Yet the accurate *Johannes de Laet* Himself, furnisheth us with an Answer to that Objection, informing us that many of those *Nephritick* Stones (which differ much in Colour, though the best are wont to be greenish) although not at all Counterfeited, or Sophisticated, are of little or no Vertue. But that yet there are some others of them which can scarce be distinguished from the former, but by tryal upon *Nephritick* persons, which are of wonderful Efficacy, as he Himself hath more then once tryed in his own Wife. *Garcias ab Orta* (lib: 1. cap: 53.) mentions a Stone, found in *Balagat*, call'd *Alaqueca*; of which he tells us, That though it be cheap, *Hujus tamen virtus* (to use his own words) *reliquarum Gemmarum facultates exuperat, quippe qui sanguinem undiquaque fluentem illico sistat.* *Monardes* (cap: 35.) relates the great Vertues of a Stone against *Hysterickall* Suffocations, and concludes, *Cum uteri Suffocationem imminentem præsentiant, adhibito lapide subito levantur, & si eum perpetuo gestant (Hysterici) nunquam simili morbo corripiuntur, exempla hujusmodi faciunt ut his rebus fidem adhibeam.* The same Author in the next Chapter, treating of the *Lapis Sanguinaris*, or Blood Stone, found in new Spain, (having told us, that the *Indians* do most confidently believe, that if the Flesh of any Bleeding part be touched with this Stone, the Bleeding will thereby be stanch'd) adds this memorable Observation of his own, *Vidimus nonnullos hæmorrhoidum fluxu afflictos remedium sensisse, annulos ex hoc lapide*

lapide confectos in digito continue gestando ; nec non & Menstruum fluxum sisti. And of the formerly mentioned *Lapis Porcinus*, the Experienced *Bontius* (having mentioned how the *Indians* give the Wine wherein it hath been steeped, against the Disease called *Cholera* ; which is as much and as justly feared, by the Islanders of *Fava*, as the Plague is in *Holland*) adds this memorable passage, *Pregnantibus tamen hic lapis non bene datur ; nam abortum provocare adeo certum est, ut femina Malaica mihi retulerint ut si quando Menstrua eorum purgatio non bene procedat, si saltem hunc lapidem manu gestent juvamentum se inde sentire.* And the relations, *Pyrophilus*, that I may in another place present You with, concerning the wonderful Stone, formerly mentioned, with which your Grandfather performed such eminent Cures, (particularly of the Stone in the Lord of *Falkland*, then Deputy of *Ireland*, and others, to whose Backs it was applied) will, I suppose, make You the more readily give credit to the Relations of the Authors we have newly mention'd. What *Monardes* mentions of the Vertue of the *Lapis Sanguinaris*, to Cure *Hemorrhoidal* Fluxes, puts me in mind of a yet much stranger thing, which *Helmont* affirms, namely, That he could make a Mettal, of which, if a Ring were worn, the pain of the *Hemorrhoids* would be taken away, in the little time requisite to recite the Lords prayer ; and within twenty four Hours the *Hemorrhoids* themselves, as well internal as external, how protuberant so ever, would vanish, and the restagnant Blood would (as he speaks) be received again into favour, and be restored to a good condition. The same Ring he also commends in the suffocation and irregular motion of the Womb, and divers other Diseases: But if *Paracelsus* be in any case to be credited in an unlikely matter, We may think, by his very solemn Protestations,

c c

that

Helm. de
Febr. cap. 2.

Paracels. in
Archidox
Magic. lib.
5.

De Operat.
Chirurg p.
3. cap. 51.

that he speaks upon his own experience; That he had a Ring made of a Metalline substance, by him called *Electrum*, (which, by his description, seems to be a mixture of all the Mettals joyn'd together under certain Constellations) which was of far greater Vertue then this of *Helmont*; For, *hoc loco* (sayes he) *non possum non indicare admirandas quasdam vires virtutesque electri nostri, quas fieri his nostris oculis vidimus, adeoque cum bona veritatis conscientia proferre attestarique possumus. Vidimus enim hujus generis annulos, quos qui induit, hunc nec spasmus convulsit, nec Paralysis corripuit, nec dolor ullus torset, similiter nec apoplexia, nec epilepsia invasit. Et si annulus hujusmodi Epileptici digito annulari, etiam in paroxysmo saevissimo, insertus fuit, remittente ilico paroxysmo, ager à lapsu ilico resurrexit. &c.* But to take notice of some other outward Remedies. To our present Theme belongs that noble Cure, performed by the Famous and experienced *Fabritius ab Aquapendente*; who tells us, That he Cured a man of a *Scirrhus Lienis*, and a Dropsy, by the long use of Sponges, moistned with strong common Lime Water, and then expressed and worne upon the Spleen; notwithstanding the Muscles of the *Abdomen*, and all the other parts that ly betwixt the applyed Spong and the part affected. And to this we may adde, the strange Cures mention'd by *Kircherus*; and confirmed to me, by a Learned Eye-witness, to be frequently performed of very dangerous Diseases, in that Cave, neer *Rome*, where the Patients being exposed stark naked, and tyed Hand and Foot, upon Beds of Straw; and being by the *Sulphureous* vapour of the place and sometimes their own fear, cast into a sweat, are lick'd well by a great number of peculiar kind of Serpents that inhabit that *Grotta*. Moreover, We oftentimes see Agues Cured by Amulets and Applications

to the Wrists. And I my self was, about two Years since, strangely Cured of a violent *Quotidian*, which all the wonted Method of Physick had not so much as abated, by applying to my Wrists a mixture of two handfuls of Bay-Salt, two handfuls of the freshest English Hops, and a quarter of a Pound of blew Currants very diligently beaten into a brittle Mass, without the addition of any thing moist, and so spread upon Linen Cloth and tyed about the Wrists. And with the same Remedies (which yet we have observed sometimes to fail) have divers others been cured, both of *Quotidian* and *Tertian* Agues: Nay an Eminent Physitian gave me, lately, thanks for the great Effects he had found of it, even in continual Feavers.

And here, *Pyrophilus*, I shall not scruple to acquaint You, with my having sometimes wished, That Physitians had been a little more curious to make Observations and Tryals of the distinct Operations of various Bodies outwardly applyed. For I consider that, in some of them, the subtle Corpuscles, (which seem to insinuate themselves into the Pores of the Body, and into the Mass of Blood, with little or no alteration) have much the like Operations with the Body whence they exhale, taken in at the Mouth. As we see in some Preparations of *Sulphur*, which have like Vertues, inwardly given and outwardly applyed; and more manifestly in *Cantharides*, which I have found, by external application, to work strangely upon the Bladder, as that they excoriated it when taken into the Body; & yet more manifestly in *Quick-silver*, which by inunction may be made as well to Salivate, as if it were swallow'd down. And an eminent Physitian lately complain'd to me, That washing a Childs scabby Head with a Decoction of Tobacco, to kill and dry up the Scabs, the Boy was made thereby both

sick and drunk: And Learned Men assure us, That, by some *Catharticks* outwardly applyed, those may be purg'd that will not swallow Physick. But other Medicines there are, which, before they get into the Mass of Blood, are much alter'd; either in straining through the Flesh and Membranes of the Body, or in the Digestions they pass through in the Stomack, and elsewhere: And these may have very differing Effects, inwardly given and outwardly applyed; as, in the formerly mention'd instance of Hops, Currans and Salt, neither any of the Ingredients inwardly given, nor the mixture hath been (that I know of) noted for any Febrifugal Vertues. So likewise Turpentine and Soot that inwardly taken are good for quite other Diseases, (as Plurisies, and Obstructions of the Kidneys) outwardly applyed are the main Ingredients of *Pericarpiums*, extoll'd against Agues. And *Mille-folium* or *Tarrow*, besides the Vertues it hath inwardly against Diseases of quite other Natures, being worn in a little Bag upon the tip of the Stomack, was (as Himself confess'd to me) the Secret, against Agues, of a great Lord, who was very curious of Receipts and would sometimes purchase them at very great Rates; And a very famous Physitian, of my acquaintance, did since inform me, That he had used it with strange success. I know also a very happy Physitian, who assures me, That he hath very often cured, both in himself and others, the Chilblains when they come to be broken, by barely strowing on the sore parts the fine powder of Quinces thinly slic'd and dryed. And who knows what unexpected Operations divers other Bodies may have, when outwardly applyed, if various Trials of that Nature were skilfully made; especially, since we see that (for reasons elsewhere to be considered) some Bodies seem to have quite contrary Operations, when outwardly

wardly applyed and inwardly taken. For we see that Spirit of Wine does, in several cases, allay the inflammation of the external parts, which given inwardly, would quickly inflame the body. And our often commended *Piso*, speaking of a choise Remedy for those Distempers of the Eyes, that used to trouble Men in *Brasil*, addes, *Idem quoq; præstat manipahera, ex radice Mandihoca, quæ licet pota venenosa habeatur* (as we formerly noted out of his and other Testimonies) *oculis tamen prodest, visumq; emendat.* And if the Simples, to be outwardly applied, be skilfully prepar'd, That may much vary and improve their operations. As we see that Vitriol, which is made of Copper, or Iron corroded by, and Coagulated with Acid Salts, hath outwardly divers Vertues which crude Copper has not, either outwardly or inwardly. And Gold Dissolved in *Aqua Regis*, and precipitated vvith Oyle of *Tartar*, is invvardly, as far as I can discover, gently Purgative; yet the same *Aurum fulminans* being calcin'd vvith tvvice or thrice it's weight of Flovvers of Brimstone, till the *Flores* be burnt away, is known to be much commended by Chymists, and others, for a Diaphoretick. But though, as to any outward Vertues of the same Powder, Physitians and Chymists are wont to be silent, yet probably it may have very great ones, as well as quite differing from those it has, being taken at the Mouth. For I know a Person, that being grievously tormented with exulcerated *Hæmorrhoides*, a very expert Chymist of my acquaintance, not knowing what else to do, applied to the part affected, an Oyntment consisting onely of *Aurum fulminans* prepared and fixed by a slight and familiar way (which you may command) and made up with a little Oyle of sweet Almonds, into a requisite consistence; and though presently upon the application of the Remedy, the pain for a quarter of an

Houre

Houre hugely increased, yet soon after it abated, and the Hemorrhoids the next day were closed, and the day after went away; Nor has the Patient ever since (that is, for some Years) been troubled with any thing of Relapse. And the same Physician assures me, that with the like Remedy he has found a strange effect in Venereal Ulcers. And perhaps to this may be referred what has been found by some friends of mine, that Phlegm of Vitriol, and *Saccharum Saturni*, which not only inwardly given are said much to cool the Blood, but outwardly applied are good for Burns and hot Humours, do yet potently discusse cold Tumours. But least you should say, that this diversity may proceed (at least in part) from the Corpuscles of differing Natures, that may be imagined in the forementioned Medicines; I shall return to what I was discoursing of before, and take notice of the Efficacy of some other external Remedies.

[Since the beginning of this E s s a y, I saw a lusty and very sprightly Boy, Child to a Famous Chymical Writer, who, as his Father assur'd me and others, being by some Enemies of this Physicians, when he was yet an Infant, so bewitcht that he constantly lay in miserable torment, and still refusing the Breast, was reduc'd by pain and want of food to a desperate condition, the experienc'd Relater of the Story, remembring that *Helmont* attributes to the *Electum Minerale immaturum Paracelsi* the Vertue of relieving those whose distempers come from Witchcraft, did according to *Helmonts* prescription hang a piece of this Noble Mineral about the Infants Neck, so that it might touch the Pit of the Stomack, whereupon presently the Child, that could not rest in I know not how many Daies and Nights before, fell for a while a sleep, and waking well, cry'd for the Teat, which he greedily suck'd, from thenceforth hastily recovering,

ring, to the great wonder, both of his Parents, and several others that were astonish'd at so great and quick a change. And though I am not forward to impute all those Diseases to Witchcraft, which even Learned Men Father upon it; yet its considerable in our present case, that whatsoever were the cause of the Disease, the Distemper was very great and almost hopeless, and the cure suddenly perform'd by an outward application, and that of a Mineral, in which compacted sort of Bodies, the finer parts are thought to be more lock'd up.]

Among the proofs of the efficacy of appended Remedies, we must not pretermitt the memorable Examples, that are deliver'd by the Judicious *Boëtius de Boot*, concerning the Vertues of that sort of *Fasper*, which is blood red throughout the whole Body of the Stone, not being mingled with any Colour: *Testari possum* (saies he) *me, qui alias lapidibus & geminis tantas vires, quantas vulgus solet, non tribuo, credibile vix, de Faspidis viribus, observasse. Nam cum ancilla fluxu menstruorum ita laborasset per aliquot dies, ut nullo modo sisti posset, Faspidem rubram impolitam & rudem femori alligari iussi. Alius (in eadem Domo) cum in pede vulneratus esset, nec sanguinis fluxus cohiberi posset, admoto lapide, extemplo impeditus fuit, licet vulnus non tegeretur.* To these he adjoynes a much more memorable Example, of a Maid he cur'd at *Prague*, who had been for six Years sick of an Hemorrhagy so vehement, that there scarce ever pass'd a Week, in which she did not several times Bleed, neither could she be reliev'd by any Remedies, though she had long us'd them, till she was quite tired with them; wherefore our Author setting them all aside, lent her a *Fasper*, of whose Vertues in such cases he had made good trial, to hang about her Neck, which when she did, the flux of Blood presently ceas'd, and she after-

*De Lapid.
& Gem. l.
2. cap. 102.*

wards

wards for curiosity sake, oftentimes laying aside the Stone, and as often as she needed it, applying it again, observ'd, That whereas the flux of Blood did not presently return upon the absence of the *Fasper*, but after divers Weeks, yet upon the hanging it on again it would presently be stopt, so that she could not ascribe the relief to any thing but the Stone, by which our Author tells us, that at length she was quite cur'd: And speaking of the praises given by others to *Green Iasper* speckled with Red, he concludes, *Sed ego, quod multoties expertus sum, refero.* But amongst the Operations of outwardly appended Medicines, I have scarce met with a stranger then that which the Experienc'd *Henricus ab Heer*, mentions in the fourteenth of those Observations which he truly styles *Rare*, namely, That a Woman, who had by an unskilful Mid-wife the Bladder Lacerated, and thereby been subject to a perpetual *Incontinentia Urinae*, and had been reduc'd constantly to wear a Silver Pipe, was perfectly help'd, by wearing, as a Gypsie had taught her, a little Bag hung about her Neck, containing the Powder made of a live Toad, burnt in a New Pot: Which relation I the rather mention, not only because the Author having try'd the Remedy upon a Merchant, to whom an unskilful *Lythotomist* had left the like Disease, found it presently to succeed; But because having been very desirous to have further trial made of so odd a Remedy, by a curious Physitian, he lately gave me this Account of it, that though in one or two it had fail'd, yet having given some of the powder to an inquisitive Person, known to us both, he assur'd him it had succeeded in two or three. (and the Disease is too unfrequent, to give occasion to have the Remedy often tried) And the Physitian adds, that one of those Patiens tels him, (the Physitian) That though her infirmity were occasion'd by a *Laceratio Vesicae*, yet the Remedy

In observa.
Medic. op-
pido rarif.
pag. 194.

yet the Remedy helps her as long as she wears it about her, in case she renew the Powder, when the Vertue of it begins to decay : but that (which is remarkable to our present purpose) if she leaves it off awhile, she findes the Disease return. The same *Henricus ab Heer*, among his freshly commended Observations, hath another of a little Lady, whom he concludes to have been cast into the strange and terrible Distemper, which he there particularly Records, by Witchcraft. Upon so severe an examination of the Symptoms made by himself, in his own House, that if, notwithstanding his solemn Professions of veracity, he mis-relate them not, I cannot wonder he should confidently impute so prodigious a Disease to some supernatural cause. But though the Observation, with its various Circumstances, be very well worth your perusing ; yet that, for which I here take notice of it, is, what he adds about the end of it, concerning his having cured her, after he had in despair of her Recovery sent her back to her Parents, by an outward Medicine, namely, an Ointment which he found extoll'd against Pains produc'd by Witchcraft, in a Dutch Book of *Carrichter's* : (where also I remember I met with it set down a little differently from what he delivers) Of which wonderful Ointment, the Ingredient that he found so extreamly difficult to procure, namely, The Missetoe of Hazel, being in *England* not so rare, but that I have more then once got it, and found it, as he intimates, very green, and (what he mentions not) extreamly bitter, I could wish that those that have the opportunity would make tryal. For besides what *Carrichter* delivers, and our Author relates of it, a Learned Physitian did highly commend it to the Judicious *Gregorius Horsius*. And though, if we allow it to cure bewitch'd Patients, the vertue that may be in external Remedies, will be made so much the more

conspicuous; yet supposing the Diseases to be, though strange, yet but natural, we cannot but allow that there may be a wonderful efficacy in an outward Remedy, since it was able, onely by anointing the Joints, and those pained parts with it, to cure a radicated Disease, attended with such wonderful and horrid Symptoms. And after this it may seem but little, what else would appear a strange thing, which *Helmont* affirms of a Plaister he had, wherewith he tells us, That he safely cur'd hundreds of *Quartans*, even Autumnal, without relapse: elsewhere he saith, That he made this Plaister, for by the Circumstances I presume he means no other, of a few resolving and absterfive things; and adds, That it never fail'd him, but onely that in fat Persons it succeeded more slowly. And yet in these, and the like ways of curing Diseases, though approv'd, if not also commended, by eminent Physitians both Ancient and Modern, there is no sensible evacuation made of peccant Humors, which perhaps materially remain in the Body, and may, by the *Effluvia* of these Remedies, be deprived of their former Qualities, and made so far obsequious to nature, that she is able, if need be, to ease her self of them by Sweat, Urine, or undiscerned transpiration.

And that the peccant Humors remaining for awhile materially in the Body, the Disease may sometimes be removed, may appear by the Cures which we see now and then performed of Agues by suddain frights, by which no discernable evacuation is made of Humors, though probably some considerable change be thereby produced in the temper of the mass of Blood, or in the Texture of the Morbifick Matter: (as Physitians call it) As seems probable both from divers other things mention'd here and there in this Essay, and particularly from the lately recited Passage of *Helmont*, where
he

*Helmont, de
febr. cap. 14.
vers. finem.*

*Cap. 17. in
fine.*

he takes notice of the rectifying of the peccant, and, by Nature, rejected Blood, without any sensible evacuation upon the wearing of His Ring. I knew a Gentleman, a strong and a resolute Man, who had been long a Souldier, and attained the highest sort of Military Employments; notwithstanding which, he was strangely fearful of Rats, and could not endure the sight of them: This Gentleman, having been long troubled with an obstinate *Quartan*, and travelled with it into several Countries, without being able to finde any Cure for it, coming at length accidentally and suddenly into a place where a great Rat was in a corner, whence he could not flie from the Gentleman, he furiously leap'd upon him (yet without biting him) and thereby put him into a fright, which freed him from the Ague that had so long importuned him. And the experienced *Salmuth* tells us a pleasant Observation, of one who was cured even of the Gout by a fright. For this Man having his Feet and Hands covered with a Poultis, made of Turneps, Flower and Milk, and being left in his Chair in a low Room, was, whil'st his Servants were all gone into the Garden, assaulted by a Sow, who finding the Door open, and invited by the smell of the Cataplasm, came to devour it; and striving to do so, flung the sick Man and the Chair to the Ground, and put him into such a fright, that our Author tells us, That that very Day his Pains decreased, and continued lessening by degrees, till at length they wholly left him, without ever returning to trouble him again. There are divers Instances that discover what great changes may be produced in the Body, without taking in any thing visibly at the Mouth. And on the other side a good Air alone doth often, in Consumptions and other Diseases, perform what hath in vain been expected from the use of emptying Physick. It were to be wished that we

Observ: Cent. 1.
Observ: 48.

History of Chi-
na, part. 1.
chap. 12.

[NB]

Medicinae fa-
cienda medio-
crem habeat pe-
ritiam.—Agris
falsa, acris, &
plura proponunt,
dicente Matf.o,
piscis & con-
chylia Pharma-
ca suavia & o-
dorata.

[NB] San-
guinem nunquam
eliciunt, Mag-
nam Medicorum
dignitatem vi-
dere est ex Epi-
stola Almeidae
ubi narrat, &c.
Bern: Varenii-
us, in Descript:
Regni Japon.
Cap. 25.

had, among our *European* Physicians, the Physick Books of those of *China*; For though our Doctors are much more Learned Men then theirs, yet probably their Writings and their Practise may teach us something that is new, and something making for our present purpose. For the famous Je-
suite *Semedo* informs us, That the Books of our Physicians having not yet been brought to *China*, they are instructed in their Art by abundance of their own Writers; and that though in their practise they do not let Blood (as the Learn-
ed *Varenius* tells us, That neither do the *Japonian* Doctors) or set Cupping-glasses, though they use no Syrrups, nor Potions, nor any Issues, but are onely Herbarists, using no-
thing but Herbs, Roots, Fruits, Seeds, &c. yet *Physick* (to use our Authors Words) is in a very good condition in *China*. (as *Almeida* also tells us, That the Physicians are much esteemed in *Japan*) And of the skill of some of the *Chineses* in that Art, he gives us in the same Chapter some considerable Instances. And though, as we said it is very likely that their Doctors are much inferior, in point of Learning to ours, yet it is considerable, that in so vast, so civiliz'd, and so poulous a Countrey, Physick can be practised with reputation, without the use of those Evacuations which are here so frequently made by Phlebotomy, Potions and Issues. Nor should we onely expect some improvement to the *Therapeutical* part of Physick, from the Writings of so ingeni-
ous People as the *Chineses*; but probably the knowledge of Physicians might be not inconsiderably increased, if Men were a little more curious to take notice of the Observations and Experiments, suggested partly by the practise of Mid-
wives, Barbers, old Women, Empericks, and the rest of that illiterate crue, that presume to meddle with Physick among our selves; and partly by the *Indians* and other barba-
rous

rous Nations, without excepting the People of such part of Europe it self, where the generality of Men is so illiterate and poor, as to live without Physitians. For where Physick is practised by Persons that never studyed the Art of it in Schools or Books, many things are wont to be rashly done, which though perhaps prejudicial, or even fatal to those on whom they were tryed, may afford very good Hints to a Learned and Judicious Observer: Besides, where the Practitioners of Physick are altogether illiterate, there oftentimes Specificks, may be best met with. For such Persons, being wont, for want of skill in Physick, and particularly the Art of mixing Simples, and in that of varying their Remedies according to Circumstances, do almost wholly rely upon Specificks; whose Vertues, from their practise, may be sometimes better gathered, then from that of skilful Physitians, in regard that those Empericks (besides, that they assist not with any skill in the *Methodus medendi* the vertues of their Remedies) are wont, for the Reasons newly mention'd, to try obstinately, and to the uttermost, the effects of their few specificks. And the nature of their Medicines may be the better known, in regard they are not wont to blend them, as Learned Men but too often do, with many other Ingredients, whose Mixture, as we formerly noted, either alters their nature, or makes it difficult to determine (as *Galen* himself in a like case confesseth, *Nam ut verum fateamur hæc difficilis quoque res est & rara inventu cum post multa remedia adhibita agrotanti quod ex iis in causa fuisse dicitur ut melius peiusve habeat*) whether the effect be to be ascribed to what is given for the specificck, or to some other of the Ingredients, or to the whole Compound as such. The experienced *Bontius*, in his excellent little Tract *De Medicina Indorum*, doth more then once confess, That it is very undeservedly that the *Europe-*

*Gal: in Aphor:
Hipp. Comment.
1.*

ans

Lib. 2. Dialog: 7. *ans* look upon the *East Indians* as *Barbarians*. And even of

Voyages chap. 24.

Preface, Lib. 1.

those among them, that are ignorant of other things, he hath this Passage, *Hinc etiam fit quod homines cateris rebus idiota tam exactam herbarum & stirpium nanciscantur scientiam ut si vel Doctissimus Pavius, nostri avi Botanicorum princeps è mortuis resurgens huc veniret, miraretur se ab hisce hominibus barbaris doceri posse.* And *Linschoten* in his *Voyages*, speaking of that Famous Mart of the *East Indies*, the City of *Goa*, where the Viceroy and the Arch-Bishop resided, and he himself lived: These Heathenish Physitians (saith he, mentioning those of *Goa*) do not onely cure their own Nation and Country-men, but even the *Portugals* also; for even the Viceroy himself, the Arch-Bishop, and all the Monks and Fryers, do put more trust in them then in their own Country-men, whereby they get great store of Money, and are much honored and esteemed. I have not now the leisure to acquaint you with what I might alledge, to confirm this truth out of the practises of the illiterate Natives of some not yet sufficiently civiliz'd parts of *Ireland*, and the Inhabitants of some other places where Physitians have not yet settled: But I shall minde you of the Confession of *Celsus*, where speaking of Physick, *Hæc nunquam* (saith he) *non est: siquidem etiam imperitissimæ gentes herbas aliâq; prompta in auxilium vulnerum morborumq; noverunt.* And I wish that other Learned Men would imitate the commendable example not onely of *Prosper Alpinus*, who Writ a Treatise *De Medicinâ Egyptiorum*; and of *Jacobus Bontius*, in his *Medicina Indorum*, but of *Gulielmus Piso*, who hath lately presented the World with the rude ways of curing, used by the *Brasilians* themselves, in his new and curious Books *De Medicina Brasiliensi*, in the beginning of the second of which, he much confirms what we have been delivering, in the ensuing

ing Passage: *Quemadmodum multa in tam crassa Barbarie cruda vel corrupta arteq; Hippocraticâ indigna reperiuntur; sic etiam non pauca utilissima antiquitatem redolentia: quæ vel eruditissimos medicos ad urnas medicinae subjiciunt, observanda occurrunt. Quippe cum multarum Artium rudimenta vel ab ipsis Animantibus brutis (quibus benigna mater Natura arte insula imprimis curandis morbis destitui noluit) ad nos redundare fatendum sit; Quis dubitet ab his mortalibus, licet remotissimis à dogmaticâ & rationali medendi arte, non plurima nobilissima at secreta remedia atq; antidota, medendi morbos veteribus incognitos quotidie ad posteros derivari? quibus paulatim ad manum traditis & tandem quasi in succum & sanguinem à rationalibus conversis doctorum scholæ & libri superbiunt? And to this agrees very well that grave saying of our experienc'd Harvey, to the very Learned Doctor Ent: Nulla gens tam Barbara est quæ non aut fortuito, aut inevitabili quadam necessitate coacta, aliquid in usum communem adinvenerit quod Nationes alias humaniores latuit. Nor should we disdain the Remedies of such illiterate People, onely because of their being unacquainted with our Theory of Physick. For though I will not say, as the old Empericks wittily enough did in that Passage of Celsus, *Requirere etiam, ratio idem doceat quod experientia, an aliud? Si idem supervacuum esse, si aliud etiam contrarium.* But lest we should, by too great reliance on the Galenical, or other ancient Opinions, neglect useful Remedies, because presented by Persons that ignore them, and perhaps too, hold Opinions contrary to them, I shall leave you to consider what is in the Person of the same Empirical Sect, represented by Celsus, where having spoken of the darkness of the causes of Things, and the uncertainty of the Theorems of Physick: *Ac nihil istas cogitationes (saith he) ad Medicinam pertinere, eo quoq; disci, quod qui diversa**

Piso de Medicis
Brasi: Lib: 2.
Cap: 1.

Georg: Ent in
Epistol: præfix:
Exercit Harveï
de Gen: Anim:
mal:

de

Celsi præfatione
ad Lib. 1.

de his fenserint ad eandem tamen sanitatem homines perduxerint. Id enim fecisse, quia non ab obscuris causis neq; à naturalibus actionibus, quæ apud eos diversa erant; sed ab Experimentis, prout cuiq; respondeant, medendi vias traxerint, ne inter initia quidem ab istis questionibus deductam esse medicinam sed ab Experimentis, &c. For though this Sentence ascribes too little to reason, yet there is something in it that deserves to be considered: Especially since we observe not that the late Anatomical Discoveries of the motion of the *Chyle* and *Lymphatick* Liquor, by formerly unknown ways, in newly detected Vessels, hath yet made Men cure Diseases much better then before. Not that I think that Anatomical and Pathological Discoveries will not, in process of time (when the *Historia facti* shall be fully and indisputably made out, and the Theories thereby suggested, clearly establish'd) highly conduce to the improvement of the *Therapeutical* part of Physick; but yet this Observation may make it the more reasonable to beware of relying so much upon the yet disputable Opinions of Physicians, as to despise all Practises, though usually successful, that agree not with them: For of such our Author speaks well, *In omnibus ejusmodi cogitationibus in utramq; partem differi posse, itaq; ingenium & facundiam vincere: morbos autem non eloquentiâ sed remediis curari; quæ si quis elinguis usu discreta benè nôrit, hunc aliquanto majorem medicum futurum quam si, sine usu, linguam suam excoluerit.* And *Paracelsus* spoke well too, if he spoke truly, when in one of his Prefaces, speaking to those whom he invited to hear him expound his Books of Physick and Chyrurgery at *Basil*, *Illos tamen* (saith he of the formerly mentioned Books) *non aliorum more ex Hippocrate aut Galeno, aut quibuscumque emendicatus, sed quos summa rerum doctrina, experientia atq; labore assequutus sum, proinde si quid probaturus*

rus experimenta, ac ratio, auctorum loco, mihi suffragantur.

It would, *Pyrophilus*, I fear, be tedious to trouble you here with all that I have met with in good Authors applicable to my present subject, and the Design I have been prosecuting in favor of external Remedies: But yet one Passage there is, which doth so notably confirm what we have deliver'd, as well touching the Efficacy of simple Medicines, as the great cures that may, in divers cases, be perform'd by outward Applications, that I must not here omit the mentioning of it, as I find it in the Epistle Written out of *Peru* to the inquisitive *Monardes*, in these words: *In urbe Posto, ubi aliquot annis vixi, omnis generis morbos Indus quidam curabat solo cujusdam Plantæ succo artubus & parti affectæ illito. Egros deinde stragulis egregiè tegebat ad sudorem provocandum: Sudor è partibus illitis emanans, merus sanguis erat, quem lineis pannis abstergebat, atque ita in curatione pergebat, donec satis sudaſſe putaret, optimis interea cibus eos alens. Eo Remedio multi morbi deplorati curabantur, imò agri juniores & robustiores ab ejus usu fieri videbantur; sed neq; pretio, neq; precibus, neq; minis unquam efficere potuimus, ut eam plantam nobis demonstraret.*

*Petrus de Oſma
in Epist. ad Mo-
nard. quæ exstat.
in libello de sim-
plicibus medica-
mentis ex Occi-
dentali India
delatis.*

C H A P. XI.

BUT, *Pyrophilus*, besides such external Medicines as work after the manner of those I have heretofore mention'd, we may possibly without absurdity, provided we do it without credulity, enquire, Whether there may not be a sort of others that operate, in a more wonderful and extraordinary way? And it would not perhaps be altogether unworthy the Experiment, to try whether or no, there may not sometimes be performed, such cures as are wont to pass, either for

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Fabulous

Fabulous or Magical; some of them being to be done without exhibiting, or applying any thing immediatly to the Patient, and others by some such unknown wayes as those which Chymists call, either Magnetism, or Transplantation: such as are the cures reported to be perform'd by the Weapon-salve, and Sympathetick Powder, and such as is that cure of the Yellow Jaundice (mention'd with some variation by *Paracelsus*) wherein seven or nine cakes (for it must, forsooth, be an odde number) are made up with the newly emitted and warm Urine of the Patient, and the Ashes of Ash-wood, and buried for some daies in a Dunghil. For it is not only by the easie and superstitious vulgar, that the possibility of performing such cures, by transplantation, or some other Magnetical way (as they are pleas'd to call it) hath been believed; For within the compasse of my own slender reading, I find that divers Eminent Physicians, have both made use of, and commended Magnetical Remedies.

What is to be thought of the Sympathetick Powder; I confesse I am as yet in doubt, but however I shall take this occasion to inform you, That a very honest Gentleman, whom his Pen has made known to a great part of the Learned Men, and Virtuosi in *Europe*, complaining often to me, that though he were much troubled with, that sad disease, the Stone in the Bladder, yet he was more incessantly tormented with an Ulcer he had in the same part (all the searching Medicines that he took to dissolve, as he hop'd, the Stone, exasperating the Ulcer:) I one day advis'd him to make trial of the Powder of Sympathy, upon some of the Ulcerous Matter he voided with his Urine; the Remedy being such, as if it had a Magnetick Virtue, might do him good, and if it had none, could not prejudice him; a while after, I receiv'd both from him in a Letter, and from his
Phyitian

Physician very great thanks for the advice, the Patient having since the use of the Powder, been eas'd of the distinct pain he was put to by the Ulcer, and this relief lasted, if I misremember not, above a Year, and how much longer I know not. But I shall not insist either upon this, or upon the Testimonies and Relations of *Paracelsus*, *Helmont*, *Galenus*, *Burgravius*, nor even the modern Roman Doctor *Servius*, nor any of the other Authors that do professedly take upon them the defence of the Weapon-Salve, by reason of what we have elsewhere to Write to you, by way of Examination of that Salve, and the Sympathetick Powder, though I deny not in some Trials, I have found them unavailable; Yet besides what I have newly related, I have seen sometimes something follow upon the use of the Sympathetick Powder, that did incline me to think, that sometimes it might work Cures. But I shall alleadg something of more unsuspected credit, and first *Dominicus Panarola* now Professor of Physick at *Rome* in his newly divulged *Fasciculus Arcanorum* presents us two instances to our present purpose, in these words. *Mira* (say's he) *quotidie reperiuntur in Medicina ad confirmationem operis quod Doctissimus Physicus, Petrus Servius* (the same we lately mentioned) *complevit de unguento armario, sciendum est, quod petia sanguine imbuta sub cineribus calidis posita menses sistit experimento pluries comprobata: quin etiam Magister meus Petrus Castellus* whose name his late Anatomy of the Civet Cat, and other Writings have made Famous) *ajebat se expertum fuisse Hemorrhoides, si tangeretur tuberosa radice Chondrilla, siccari, si Chondrilla siccetur; corrumpi vero si corrumpatur: quapropter sub Camino exsiccanda ponitur, post hujusmodi tactum Chondrilla tuberosa.* The Learned *Salmuth* in his Observations furnishes us with an Example of a most violent pain of the Arme, removed by

*Panarola Fase:
Arcan. 1.*

*Centur. 3. Obser.
vat. 34.*

Transplantation: They did beat up Red Corals with Oaken leaves, and having kept them on the part affected, till suppuration; they did in the Morning put this mixture into an Hole bored with an Auger in the Root of an Oak, respecting the East, and stopt up this Hole with a Peg, made of the same Tree, from thenceforth the pain did altogether cease, and when they took out the Amulet, immediately the torments returned sharper then before. A great and excellent Lady (a near Kinsvvoman, *Pyrophilus*, of yours and mine) and very far from credulous, confess'd to me, as did her servants also, that with the above mentioned Remedie of Ashes and Urine, she was not only once cured of the Yellow Jaundice, by a Friend of hers that had observed, that she had been fruitlessly vexed by a Tedious course of Physick, prescribed by the famousst Doctor then in *England*; but that afterwards relapsing into that same Disease she had cured her self by the same Remedy. I remember, that being some years since brought almost to the brink of the Grave by a suddain effusion of Blood within my Body, from which without a signal mercy of God, I should not have recovered, among other men skilled in Physick that came to assist me, in that danger, I was visited by a Galenist of much repute, whose pale looks inviting me to enquire what it was that ailed him, he answered me, That he had not long before been desperately sick of an obstinate *Marasmus*, which notwithstanding all the Remedies he could use, did daily so consume him, that he appeared but a Skeleton, whereupon having found the uneffectualness of ordinary Remedies, and being hopeless of being relieved by them, he resolved to try a Sympathetick Medicine, which I remember my self to have met with in *Hartman*. He took then an Egge, and having boiled it hard in his own warme Urine, he with a Bodkin perforated

rated the shell in many places, and then buried it in an Ant-hil, where it was left to be devour'd by the *Emmets*, and as they wasted the Egge, he found his distemper to lessen, and his strength to encrease, insomuch that he now conceived his Disease to have quite left him.

The Experienc'd *Riverius* in his last Observations (newly publish'd since his Death) has two notable Examples to our present purpose: For (a) first, he tells us, that the eldest Daughter of a great Officer in *France*, was so tormented with a *Paronychia* for four daies together, that the pain made her passe the night sleepleess; whereupon having by *Riverius* his order, put her Finger into a Cats Eare, within two houres she was deliver'd from her Pain, and her whole hand, which before was Tumid, unswell'd again; except the Finger, which it self was out of Pain. (b) The other case was of a Counsellors Wife, who by the same Remedy was cured of a *Panaritium* (which had for four daies vex'd her) in a much shorter time then the other, namely within a quarter of an Houre. But that which chiefly makes these stories pertinent to our present occasion, is this notable Circumstance, that in both these cases, the Cat was so manifestly put to pain, that *Riverius* thought it had attracted to it selfe the morbifick matter from which it freed the Patient; For in the former of these two cases, the Cat loudly complain'd of the pain he felt, and in the other, was, in that short time the cure was in performing, put to so much pain in his Eare, that two men were hardly able to hold him fast, he struggl'd so forcibly. And these two relations of *Riverius*, may, though there be some disparity in the cases, give some countenance to what might otherwise be distrusted in the Observations of the Industrious (c) *Petrus Borellus*, where he saies, *Podagra mirè levatur, si catelli cum podagrigo recumbant, morbum enim contrahunt*

(a) *Riverius*
Cent. 4.
Observ. 62

(b) *Riverius*
Cent. 4.
Observ. 191

(c) In Hist.
storiar. 6.
Observ. 3.
Medico-
physicar.
Cent. 3.
Observ. 281

* Some years since the present ESSAY was written, I lighted on the 66th Observation of the industrious Bartholinus 3 Century, and the 53 Observation of his 6 Century, in both which places giving instances of the Transplantation of Diseases he mentions, besides some of those Examples deliver'd by us, divers others; for which I am willing to refer you to the ailedged places, only in the last of those Observations delivering something as upon his own knowledge (which he does not in the rest of the instances.) that much confirms what we have mention'd concerning Fludd. we shall annex it in his own words, In Catello Milefio

hunc adeo ut vix incedere queant; Ager verò levamen suscipit. Which perhaps he may have been induced to write by the story that goes of, that odde Chymist, Robert Fludd's having transplanted the Gout of one of his Patients, by making him often sleep, with a Dog that was fond of him, who thereby became afterwards subject to such periodical fits of the Gout, as the Master had been troubled with.

[And since I begun this Chapter, and met with these Observations, discoursing of this matter with a judicious person, well skill'd in Physick, and whom his learned Writings have made Eminent, He told me, that he had not very many Months since, seen a Cure by Transplantation, perform'd on the Son of one that was wont to make Chymical Vessels for me: and because the Observation is considerable, that there might be no mistake in it, he was pleas'd to set it me down in writing (attested with his annexed name) which enables me to present it you in his own words, namely: *N. N.* of *N. Potter*, had a Sonne, who was long sick of the Kings Evil, which swell'd much, and broek into sores at last, which he could by no ordinary means heale. The old Man had then a Dog, which took an use of licking the soares, which the Dog continued so long, till he wasted the very kernels of the Ulcers that were knit in with the Veins, and perfectly cur'd the sore, but had the swelling transplanted to himself, so that he had hereupon a great swelling, that arose and continued on his Throat. The Lad was hereby freed, and so continu'd to be till 1660, and for ought I know, is so this day. This I saw being there at that time to view the Claves, and bespeak Retorts of the old man. *]

Avi nostri materni, quem jam alit in ædibus suis Avunculus meus suspiciendus *M. Jacobus Finc' kius* Phys P.P. & Academiæ nostræ senior, evidentius hæc patuit trahendi facultas. Colico dolore torquebatur Avunculus, Canis ventri impositus quum incaluisse, urgebat exitum, vomuit vehementer et Tormina colica Avunculi remiserunt. Ancilla ejusdem in dolore dentium eundem canem gen'is apposuit, sensitque levamen, sed canis dolorum impatiencia hinc inde curstare et latrare. Idem expertus est scriba in Colli Tumore.

And

And to confirm the credibility, as well as increase the number of our magnetical waies of cure; I shall adde, That *St. Francis Bacon* himself Records, with great solemnity, his own having been freed, not only from very many new warts, but from one almost as old as he, by a piece of Lard, vwith the skin on it, which after having rub'd upon them, was exposed out of a Southern Window to putrifie. And therefore, though the vanity and superstition of most of the Authors that speak of Magnetick Remedies, and the impertinent circumstances, that are usually prescribed, as necessary to their effectualness, do generally, and justly enough, make sober men despise, or at least suspect such unlikely waies of cure; yet in consideration of the instances lately produced (to which we may perhaps elsewhere adde some others) and because divers men, as well Physitians as others, have seriously assured me of their having been some of them eyewitnesses, and others performers of such cures; I am apt to think it fit, that, a severe indeed, but yet further trial be made of Physical Experiments of this kind. And I cannot but commend the curiosity of *D^r Harvey*, who, as rigid a Naturalist as he is, scrupled not often to try the Experiment mentioned by *Helmont*, of curing some Tumors or Excrescencies, by holding on them for a pretty while (that the cold may thoroughly penetrate) the Hand of a man dead of a lingering disease; which Experiment, the Doctor was not long since, pleased to tell me, he had sometimes try'd fruitlessly, but often with good successe. Nor doth the grand Objection against such Experiments, namely, that such or such a person, having once made trial of them, found them not succeed, seem at all to me, alone, of weight enough to make such Experiments, or those other improbable ones formerly mentioned, totally rejected: Because, that if they really

Centur. X.
Exp. 997.

really do sometimes succeed, though sometimes they chance to fail, yet that possibility of their succeeding may sufficiently evince, that there are really in Nature Medicines that worke after that extraordinary manner. And I see no reason, why it should be more required of those Medicines, that work at a distance from the Patient (or at least are not taken at the Mouth, or injected elsewhere) only by subtle *Effluvia*, that they should alwaies cure, then it is exacted of vulgar Remedies, from which we might reasonably expect more constant effects, because of their being either inwardly given, or more immediately or at least more durably applied to the Patient. And if Rubarb be, justly affirmed to be an excellent medicine in Loosenesses, though we daily in *Ireland* see many swept away of those diseases, in spite of the use of Rubarb and Mirabolans, with other astringent Remedies to boot: And if quiksilver be, not unreasonably, by most of our Physitians esteemed, and employed as an effectual Remedy against Venereal Diseases, because it sometimes removes them; though *Fernelius*, *Montanus*, and many other Learned Authors tell us, as they say upon their own experience, that (though it often palliate those distempers) it very seldom cures them: Nay, and if Diaphoreticks are still esteemed such by the generality of Physitians, though few Sudorificks will cause sweat in all bodies, and scarce any in some bodies, I see not, why these Remedies, that work, as it were, by Emanation, may not deserve the name of Medicines, if they sometimes unquestionably succeed, though they should not alwaies prove succesful ones; Nor why they should, notwithstanding their sometimes not succeeding be laid aside, especially since these sympathetical wayes of cure are most of them so safe and innocent, that, though, if they be real, they may do much good, if they prove fictions they can do no harme, (unlesse

(unlesse by accident, as in case the Patient should so singly rely on them, as to neglect (which he need not) all other helps to recover.)

CHAP. XII.

BUT you will now perhaps demand, *Pyrophilus*, how the Naturalist, as such, can contribute to the Credit or Advancement of the mentioned ways of curing Diseases, without the wonted weakning and painful Evacuations? In answer to this Question, I must put you in minde, That it would be no new thing for Naturalists, not professedly Physicians, to treat of this subject; and that the Naturalist may afford good Hints to the Practitioner of Physick, both upon divers other accounts already touch'd upon, and by trying on Bruits variety of hitherto untryed Medicaments or Remedies, and by suggesting to him both the Events of such Tryals, and also what hath been already observed about the cures of the Diseases incident to Beasts. For though (as we formerly told you) there are some things that are not equally Poysonous, as others not equally Safe, to Man and to *some* Bruits; yet there are other Beasts, especially Dogs and Monkeys, whose Bodies are, by many Poysons, affected almost like those of Men: And since according to the old Rule, *Periculum faciendum est in vili animâ*, many things may be very well tryed on such Creatures, that we dare not at first venture to try on Men. We may give Dogs Poysons, onely to try the Vertue of our Antidotes; and we may give them Wounds, to make tryal of the efficacy of the Weapon-salve and Sympathetick Powder: Since divers of my Friends (as I have intimated above) assure me, That they have some of them seen, and others performed cures of Horses, lam'd by pricking, by sticking the Nails that hurt
ff
them

them into the Weapon-salve ; which for that very use, among others, some of them are wont to carry about them in Silver Boxes. When Oxen, and such-like Cattle, are troubled with that Disease which makes them continually turn about in one place (and is therefore called *The turning Evil*, or *Sturdy*) a common Remedy here in *England*, as Gra-fiers that make use of it inform me, is to cast down and tie fast the sick Beast, and then to open his Skull a good way (or, if need be, take off a round piece of it over the place supposed to be affected) and at the open place to take out a little Bag or Bladder, which is usually found to lye near the Membranes of the Brain, and to be full of Water and Blood, and then leisurely to heal up the hurt : And this cure is much commended, as both common and easie, by our experienced *Markham*. In Goates likewise, that are much subject to the Dropfie, the Husband-man ventures to slit, and let out the Water under the Shoulder. And divers hazardous Operations in Chirurgery, such as are Arteriotomy, the Exsection of the Spleen and other parts, were, or should have been first attempted upon Bruits, and then practised on humane Bodies. And in imitation of these, 'tis likely that divers other Experiments, of good use in Chirurgery, may be discovered for the relief of Man, without Endangering him in prosecuting such Discoveries. And to say nothing of the known practice of splaying Swine and Bitches ; In the Neighborhood of a Country House of mine, in the West of *England*, and probably in divers other parts, some experienc'd Shepherds have an odde way of castrating male Sheep, especially Lambs, when they are grown so old that 'tis thought dangerous to geld them the common way. A Servant of mine that deals much in Cattle, and had lately divers Sheep swigg'd (as they call it) after this manner, tells me that is thus done : The Beast, on whom the Operation is to be performed,

Way to get
Wealth. Book, 1.

ed, being held by a strong Man with his Belly upwards, another strong Man draws a string, as firmly as he can (tying it with a knot or two, to prevent its yielding or slipping off) about the Testicles, as if he meant by drawing that string, to cut them off; and then anointing the part with a little fresh Butter, or some such like thing, he lets the Ram goe to feed; which for the most part (notwithstanding the anguish of this Ligature) he will begin to do in a short time: And within two or three days, the Testicles being, by the strict Ligature, denied the Nutriment and Spirits that were wont to be conveyed to them will grow so rotten as either, together with the string, to fall off, or be very easily pull'd off, sometime stinking very rankly like Carrion. And even among those things that are already practised by Farriers, Shepherds and Graziers there are many such things as we have newly mentioned, which may serve either to enrich or illustrate the way of curing humane Bodies: Their ignorance and credulousness, together with the liberty and meanness of those Creatures they physick, gives them leave to venture on any thing, having made them try upon Horses and Cattle, many such things as Physitians dare not try upon Men and Women. And among those many extravagant things, some, as it oftens happens, have succeeded so prosperously, as to deserve to be considered by the skilfullest Physitians; Some of whom might, without disparagement to their Profession, do it an useful piece of service, if they would be pleased to collect and digest all the approved Experiments and Practices of the Farriers, Graziers, Butchers, and the like, which the Ancients did not despise, but honored with the Titles of *Hippiatrica* and *Veterinaria*: And among which, if I had leisure, divers things may be taken notice of, which might serve to illustrate the *Methodus medendi*. As to give you but

one Instance which lately occurred to me, The Usefulness of letting Blood in some cases, Which is so severely condemned by many Chymists, and the efficacy of a small, if seasonable, Evacuation, which can scarce be conceiv'd to do more then alter the course of the Blood, may be illustrated by the Staggers in Horses, and the Cure of it. For I have seen a Coach-horse, ready to drop down dead of his Disease upon the High-way, by having his Gums rubb'd with the Coach-whip till the Blood appear'd, relieved almost in a moment so much, that though he were not well able to stand before, yet he was immediatly able to go on, and draw the Coach with his fellows.

CHAP. XIII.

THE next thing we are to observe to you, *Pyrophilus*; and on which its nature and importance will engage us somewhat long to insist, is this, That the Handling of Physick matters was Antiently thought to belong to the Naturalist; as we are clearly informed by the judicious *Celsus*, in that memorable Passage, where speaking of the Origin of Physick, *Primo* (saies he) *medendi scientia Sapientiae pars habebatur; ut & morborum curatio & rerum naturae contemplatio sub iisdem Authoribus nata sit: Scilicet his hanc maxime requirentibus, qui corporum suorum robora, inquieta cogitatione nocturnaque vigilia, minuerant.* He adds, that many of the Professors of Philosophy were skilful in Physick, especially *Pythagoras*, *Empedocles*, and *Democritus*, and that *Hippocrates* (whom some think to be the disciple of this last nam'd) was the first who severd Physick from Philosophy, and made it a distinct Discipline, And this Apologie for the ensuing discourse being thus premised to it, I shall further Answer, that

Celsus in Praefatione Lib. I.

that I should perhaps be obliged to exceed the limits of an *Essay*, if I should in this Discourse insist on every thing, upon whose account the Naturalist may assist the Physitian, if he be barely a *Medicus* to cure Diseases, which that you may the more readily believe, I shall Select and prosecute some of these things in the remaining part of this *Essay*.

And first I shall represent to you on this subject, That the account upon which Physitians are wont to reject, if not, deride the use of such Specificks, as seem to work after a secret and unknown manner, and not by visibly Evacuating peccant humours (or by other supposedly manifest qualities) being generally this, That they see not how the promis'd Effects can well be produced by Bodies, that must work after so peculiar and undiscerned a manner; This being, I say, the great thing that hinders Physitians from endeavouring to find, or, so much as, being willing to make use of Remedies of this sort, the Naturalists may do much towards the removal of this Impediment, by shewing out of such things as may be met with or performed within the Macrocosme, That such, or at least as strange operations as are ascrib'd to these Specificks, are not without Example in Nature; and consequently ought not to be rejected, barely as being impossible. And indeed the Physiologie, wherewith Physitians as well as others are wont to be imbu'd in the Schools, has done many of them no small Disservice by, accustoming them to grosse apprehensions of Natures wayes of working. Whence it comes to passe, that not a few ev'n Learned Doctors will never expect, that any great matter should be performed in Diseases, by such Remedies as are neither obvious to the sence, nor Evacuate any grosse, or at least sensible matter. Whereas, very great alterations may be wrought

wrought in a Body, especially if Liquid, as is the Blood and peccant Humour, without the Ingresse or Egresse of any visible matter, by the intestine commotion of the parts of the same body acting upon one another, and thereby acquiring a differing Motion, Location (if I may so speak) or Figure, which, with the other Qualities and Effects resulting thence, may alter the motion and Texture of the Liquor, and thereby produce great changes in the Body that Harbours it. How much an unperceiv'd recess of a few subtile Parts of a Liquor may alter the Nature of it, may be guess'd at, by the obvious change of Wine into Vinegar; wherein upon the Avolation (or perhaps but the misplacing) of so little of the Spirituous and Sulphureous part, that it's Presence, Absence, or new Combination with the other Parts is not discernable to the Eye, the scarce decreased Liquor, becomes of a quite differing Nature from what it was. And though in *England* this Degeneration be not wont to be so suddenly perform'd by reason of the coldness of the Climate, yet in hotter Countries the change is much more speedily made. As in *Brasil*, the above mentioned *Piso* informes us, that the expressed Juice of the Suger Canes, which by Coction, and farther ordering, would be certainly brought to Suger, will of it self keep sweet but about four and twenty Houres, and then begin to sowre, and be altogether unfit to make Suger of, though very fit to turne into good Vinegar. And this I find confirm'd by a Modern and applauded *French* Writer in his Description, of some parts of the West *Indies*, inhabited by his Nation: And relations of the same sort, concerning the hasty sowing of some other Liquors in *America* I have had from our *English* Travellers and Planters. And in the East-*Indies*, *Linschoten* tells us of a change much more suddain: For speaking of the formerly mentioned

Lib. 4. Cap. 10.

tion'd *Sura* or Liquor, afforded by the wounded *Coco-tree*.
 The same Water (sayes he) standing but one Houre in the Chap. 56.

Sunne is very good Vineger, and in *India* they have none other. And that even very hurtful Liquors (and why not then some peccant matter in the body ?) may after the like manner change their Nature may appear by what we have formerly mentioned, and is unanimously affirm'd by credible Writers of several Nations, concerning the juice of *Mandioca*, which being Poyson, when it is first express'd do's in a few houres by Fermentation, purge its selfe and loose its pernicious Nature. That also by the bare Ingresse of some Subtile and not visible Matter, such intestine Commotions may be excited in Liquors, may appear by the sowing which has been often observed upon great Thunders to happen, not onely to wines, but to other Vinous Liquors also, as I lately received from a great Master of variety of Liquors, a complaint that by some Thunder, which happen'd here a few weeks since, almost all the Beer and Ale in the neighbourhood was spoil'd. And I remember, that when I return'd out of *Italy* thorow *Geneva*, there happen'd in that place an Earthquake, upon which, the Citizens complain'd, that much of their wine was sowr'd, though I that lodg'd in the highest part of the Town, saw nothing to make me believe, that the bare Succussion of the Earth was capable to produce so great and suddain an alteration in the Wine.

See Piso lib. 1.

That such invisible Corpuscles may passe from *Amulets*, or other external Remedies into the Blood and Humours, and there produce great changes, will scarce seem improbable to him that considers how perspirable according to *Hippocrates* a living body is, and that Vegetable and Animal Body's, whose Texture is more loose and open, may well be supposed to send forth Expirations, since even divers Minerals are found

De simp. Medi.
facultatibus
Libro. 6.

found to do the like; as may appear by the odorable steames of rub'd Brimstone, and Amber, by the Corpuscles, which performe the Magnetick Operations, by the Emetick Quality imparted to Liquors by the Glasse of Antimony, and by *Crocus Metallorum* barely infus'd in them, without sensibly loosing any thing, either of their bulk or weight; and by the vertue of killing Wormes, wherewith Wine, and even Water has been, not only by *Helmont*, but by divers other Physitians observed to be enrich'd, after a Quantity of *Quicksilver* has been for some Houres shaken in it, though without any sensible deperdition of the substance of the *Mercury*. And indeed I have somewhat wondred that many Learned moderne Physitians, either out of an affected Severity, or perhaps Animosity against Chymists, overlook or even deride all operations of this Nature; Since I remember *Galen* himself, not only confirms the like Doctrine, by his Reasons and Authority, but delivers a very strang Example of it; for, under the Title of *Glychysida*, Treating of *Peony*, He thus Discourses, *Est præterea omnino rescicatoria: Ea propter haud desperaverim eam ex collo pueris suspensam merito Comitiales morbum sanare. Equidem vidi puellum quandoque octo totis mensibus morbo Comitiali liberum, ac postea fortuna cum quod à collo suspensum erat decidisset, protinus denuo convulsione correptum; rursumque suspenso in locum illius alio, inculpate postea egisse, Porro visum est mihi satius esse rursum id collo detrudere, certioris experientiae gratia: id cum fecissem, ac puer iterum esset convulsus, magnam recentis radicis partem ex collo ejus suspendimus, ac deinceps prorsum sanus effectus est puer, nec postea convulsus est. Rationabile itaque erat, aut partes quaspiam à radice defluentes, ac deinde per inspirationem attractas, affectos ita locos curare, aut Aerem à radice assidue mutari & alterari. Nam hoc pacto*
Liquor Succus

Succus Cyrenaicus collumellam plegmone affectam juvat & Melanthion frictum palam Catarrhos & Coryzas desiccant, Si quis id in calidum linteum, rarium, liget assidueq; calorem ex eo per inspirationem in nares attrahat. Quin etiam si pluribus linis, & maxime marina purpura, collo vipera injectis, illis viperam praefoces, eaque postea cujuspiam collo obvincias, mirifice profueris tum Paristhmiis tum omnibus iis quae in collo expullulant. Nay, that such invisible Bodies, by passing thorough grosser ones, and thereby changing the Motion and *nexus* or Juncture of their parts, may produce lasting alterations in their Textures (though it be a Paradox) seems not to me at all impossible. For we find the most fluid Body of Quicksilver *has been* sometimes, (I say sometimes) and therefore *may*, without sensible increase of *Bulke*, be coagulated by a Metalline Exhalation so, as to be cut like Lead, and to retain that solidity, 'till by some Art or other it be reduc'd to its pristine Fluidness. You may be inclin'd to think, that the hard and solid Body of Iron has a permanent alteration made in it's Texture, if you hold a Needle during a competent time neer the Pole of a Vigorous Loadstone without touching it. For the Magnetical *Effluvia* (as may very probably be conceiv'd) will so dispose the parts of the nearest extrem of the Needle, as that they shall admit the steames that come from one of the Poles of the Load-stone, and not those that come from the other: whereas by skilfully holding it to the contrary Pole of the same Stone, the internal Pores, and consequently the Texture of the Needle, will presently be quite otherwise disposed in reference to the Magnetical *Effluvia*; as we more fully declare in another *E s s A Y*, where we shall, I suppose, also perswade you, that the Effects of the Load-stone are performed by subtil Bodies issuing from, or passing through it. What

we have in a former discourse told you concerning our having at pleasure changed the Poles of a Load-stone, by help of the *Magnetica Effluvia* of the Earth, may let you see that in Stones, also such alterations are possible to be made. And in the next *Essay* save one, we shall give you another Instance, pertinent to our present purpose. For if you heat a slender piece of Steel (as a graver, or the like) red hot, and suffer it to cool leisurely in the Air, it will continue flexible enough, and of so soft a Texture, that you may easily make impressions on it, with any hardned Steel: But if, instead of cooling it thus slowly, you knock it into such a dry Body, as we shall there name to you, it will immediately grow so hard, as to be brittle. Which alteration, whether it be resolved to proceed from the particular *Effluvia* of the Body, into which it is knocked, or barely from the ingresse of the *Corpuscles* of Cold; (if any such there be) it will be however an Instance not unfit for our purpose. And those *Pyrophilus*, that are conversant in Glass houses, may easily observe, that Glass acquires a more or lesse brittle Texture, according as (to speak in the Glass-mens language) it is baked. For if after Glasses are blown, they be quickly carried into the open Air, they are wont to be much more subject to break, then those, that after they are fashioned are placed in a kind of very long Oven (which is wont to be built over the Furnace, wherein the materials, whereof the Glass is made are kept in Fusion) and are by slow degrees refrigerated, and not 'till after some houres exposed to the open Air: For whether this difference of Brittleness, and consequently of Texture, be ascribed to the interrupted Transcursion of some *Etherial* matter, through the Pores of the Glasse, or to the insinuations of the Atoms of the Cold, or to this, that the Particles of the Glasse agitated by the heat, were surpriz'd by the Cold, before

before they could make an end of those Motions which were requisite to their disposing themselves into the most durable Texture; it is evident enough, that 'tis by no gross or visible Body, that this permanent difference of Texture is produced. Of the like to which we may elsewhere give you Examples, in some other Concretes. That also in an human Body, great alterations may be made by very subtil *Effluvia*, appears evidently, not only by the instances we have formerly given of the efficacy of some outwardly applied Remedies, but by divers other things, as that many are purged by the bare Odor of Potions, of which I have been assured upon his own Observation by the experienced Town Physician of *Plimmouth* Dr *D.* And of which *Salmuth* in his Observations, gives us an instance in a young Gentlewoman, whom he saw more happily purged, by the Odor of a Potion, drunk by her Sister, then she was that took the Medicine. And the same Author tells us, of one Dr *Pfeil* an eminent Physician, who was wont, when he had a mind to be Purged, to goe into some Apothecaries shop, where Electuaries electively purging were preparing, to which having a while smelt, they would by their Odour, after his return home, work with him six or seven times, as if he had swallowed the Medicine it self. And *Henricus ab Heer*, in the twenty ninth of his formly commended Observations, tells us, Of a Woman that not only was wont to be copiously purg'd by drinking Bief-broth, but having by a fall broken her Leg, us'd no other Cathartick, then the bare Odor of that sort of Broth. And very Observable to our purpose, is the operation of the Air, all along the ridg of the high mountaine in *Peru*, called *Pariacaca*, of which the Learned Jesuite *Joseph Acosta* relates, That though he went as well prepared as he could, to withstand the Operations usually produc'd in Travails, by that

Cent. 3. Obser. 41

Cent. 3. Obser. 8.

Lib. 3 cap. 9.

piercing Air, yet when he approached to the top of the Mountain, he was (notwithstanding all his Provision) surpriz'd with such fits, and pangs, of striving and casting, as he thought he should cast up his Heart too; having after mear, Phlegme, and Choler, both yellow and green, in the end with over striving cast up Blood; and continued thus sick for three or four houres, 'till he had pass'd into a more temperate Air then that of the top of the Mountain; which runn's about 500 Leagues, and has every where, though not equally this discomposing property, having operated upon some of his companions, as well downwards as upwards. A greater proof of the power of Steams upon the Body may be taken from the propagation of Infectious Diseases, which being conveyed by insensible *Effluvia*, from a sick into a healthy Body, are able to disorder the whole OEconomy of it, and act those sad Tragedies, which Physitians do so often unsuccessfully endeavour to hinder. But you will cease to doubt, that Corpuscles, though so small as to be below the sense, should be able to performe great matters upon humane Bodies; if you consider what alterations may be therein produced by the bare actions of the parts upon one another. This may appear by the effects of several Passions of the mind, which are often excited by the bare, if attentive, thoughts of absent things. In obstinate grief and Melancholy, there is that alteration made in the disposition of the Heart, and perhaps some other parts by which the Blood is to Circulate, that the lively motion of that liquor is thereby disturbed, and obstructions and other not easily remov'd distempers are occasion'd. The bare remembrance of a loathsome Potion, does oftentimes produce in me (and I doubt not, but the like thought may have the like Operation in many others) a Horror, attended with a very sensible Commotion of divers parts of my

my Body, especially with a kind of convulsive motion, in or about the Stomack. And what power the Passions have to alter and determine the course of the Blood, may appear yet more manifestly in modest and bashful persons, especially Women, when meerly upon the remembrance or thought of an unchast, or undecent thing, mentioned before them, the motion of the Blood will be so determin'd, as to passe suddenly and plentifully enough into the Cheeks (and sometimes other parts) to make them immediatly wear that livery of Vertue (as an Old Philosopher styl'd it) which we call a Blush. And even by joy, if great and sudden, I not long since saw in persons of both Sexes, not only the Cheeks and Forehead, but it left (as to the Lady) even the Neck and Shoulders Died of that Colour. And that Passions, may not only alter the Motion of the Juyces of the Body, but likewise make some separation and evacuation of them, may appear in grief, which is wont especially in Women to make all the Commotions requisite to weeping: whereby oftentimes a considerable quantity of Briny Liquor, is excluded at the Eyes, under the forme of Tears, by which divers (especially Hysterical) Persons are wont to find themselves much refreshed, though with some it fares otherwise in teeming Women. Also that vehement desire we call Longing, may well be supposed to produce great alterations in the Body of the Mother, which leaves such strange and lasting impressions upon that of the Infant; since 'tis the Mother only, and not at all the Infant that conceives those importunate desires.

C H A P. XIV.

THere are many Instances to be met with in Physitians Books, to shew that Imagination is able so to alter the Imagining person's Body, as to work such a disposition in the Spirits, Blood and Humors of it, as to produce the determinate Disease that is excessively feared. And I remember, that soon after the last Fair Lady R. Died of the Small Pox, I chanced to meet one of her Sisters with her Mask on amongst some other Persons of High Quality, and wondering to see her sit Maskt in such Company, her Husband (who was present) told me, That his Wife having been happily brought to Bed some while before her Sister fell sick; he had carefully kept the knowledg of her sicknesse from his Wife, least the kindnesse that was betwixt them two might prejudice her in the condition she was in, but that after, a while a Lady unawares making mention in her hearing of her Sisters sickness, she immediatly fancied, That she should have it too, and accordingly fell sick of that disfiguring Disease, whose Marks obliged her for a while to weare a Mask. Nor is it in Women only, but even in Men, that conceit may produce such real and lasting effects. For many authentick Histories record examples of those in whom excessive Grief or Fear has made such a change in the Colour of their Hair in a Night, as Nature would otherwise have scarce made in divers Years. And I remember, that being about four or six Years since, in the County of *Cork*, there was an *Irish* Captain a man of middle Age and Stature, who coming with some of his followers to render himself to your Uncle *Broghill*, who then commanded the English Forces in those parts upon a publick profer of pardon

don to the *Irish* that would then lay down Arms, he was casually in a suspicious Place, met with by a party of the *English* and intercepted. And my Brother being then absent, upon a designe, he was so apprehensive of being put to Death, by the inferiour officers, before your Uncles returne, that that Anxiety of mind quickly changed the Colour of his Hair after a peculiar manner: of which I being then at that Castle of your Uncles whereunto he was brought) had quickly notice given me, and had the Curiosity to examine this Captain, and found that the Hair of his Head, had not (as in the instances I had met with in Histories) uniformly changed its Colour, but that here and there certain peculiar Tufts and locks of it, whose *Bases* might be about an inch in *Diameter* were thus suddenly turned White all over: the rest of his Hair (of which you know the *Irish* use to weare good store) retaining it's former Reddish Colour.

[You will mistake my design *Pyrophilus*, if you conclude from what I have said, concerning the Power of *Effluvia*, to work upon the Body that I am either so much an *Helmontian* as to condemne the Use of all those Remedies that make such more grosse Evacuations (if I may so call them) as are made by Vomit, Seige, and the like; or that I would have you, or am my self so credulous, as to believe all the Vertues that are, ev'n by Eminent Writers ascribed to the Remedies called *Specificks*: For (to mention here but this) we have observed, that the hopes built upon ev'n excellent *Specificks*, unlesse they be of such a resolving and absterfive Nature, as to be able to make way for themselves into the Recesses of the Body are oftentimes disappointed, where some Emetick or Cathartick Remedy has not been first us'd to free the Stomack and Guts from those viscous Humours, which obstructing the first passages much enervate the Vertue of the
Remedy,

Remedy, if they do not altogether deny it access to the innermost parts of the Body. That then which I aim at, is first to keep you from being prejudiced by the Confidence of some Learned Doctors, who laugh at the very name of Specificks, and will not allow any Disease to be curable, but by visible Evacuations of store of what they call peccant Matter; And next to give you cause to think that such Specificks, as men of judgment and credit do recommend upon their own Experience ought not to be rejected without Trial, upon the bare account of their not being either Laxative or Vomitive, Sudorifick, or Diuretical; Nay, nor so much as for this, that they are not endow'd with any Eminent Degree of any manifest Quality, such as Heat, Cold, Driness, Odor, Taste, Astringency and the like; nor able perchance to work any considerable alteration in a healthy Human Body. For I consider the Body of a living man, not as a rude heap of Limbs and Liquors, but as an Engine consisting of several parts so set together, that there is a strange and conspiring communication betwixt them, by vertue whereof, a very weak and inconsiderable Impression of adventitious matter upon some one part may be able to work on some other distant part, or perhaps on the whole Engine, a change far exceeding what the same adventitious Body could do upon a Body not so contriv'd. The faint motion of a mans little Finger upon a small piece of Iron that were no part of a Engine, would produce no considerable Effect; but when a Musket is ready to be Shot off, then such a Motion being applied to the Trigger by vertue of the contrivance of the Engine, the Spring is immediatly let loose the Cock falls down, and knocks the flint against the Steel, opens the Pan, strikes Fire upon the Powder in it, which by the Touch-hole Fires the Powder in the Barrel and that
with

upon

upon my self when I had a mind for healths sake to be put into a fit of Sea sicknesse. If a person be very Ticklish and you but gently stroke the Sole of his Foot with the top of a Feather, that languid Impression on the bottome of the foot shall, whether he will or no, put all those Muscles and other parts into motion, which are requisite to make that noise, and to exhibite that shape of the Face (so farre distant from the feet) which we call Laughing; and so the gentle Motion of a straw tickling the Nostrils is able to excite Sneezing. Most men may observe in themselves, that there are some such noises as those made by the grating of an ungreaſ'd Cart. wheele upon the *Axle-tree*, or the tearing of course Paper which are capable of setting the Teeth on edge, which yet cannot be done without exciting a peculiar Motion in severall parts of the Head. I had a servant, who sometimes complained to me of a much more remarkable and unfrequent disorder, namely, that when he was put to whet a Knife, that stridulous Motion of the Air was wont to make his Gummes bleed. *Henricus ab Heer* (in his Twenty ninth Observation) Records a Story of a Lady, to whom he was sent for, who upon the hearing of the sound of a Bell, or any loud noise, though Singing, would fall into fits of Sounding, which was scarce distinguishable from Death; and we may confirm that this disposition depended upon the Texture of her Body in reference to Material sounds by what he subjoyns, that having well purg'd her, and given her for two Months the *Spaa*-waters, and other appropriate Remedies he thoroughly cur'd her. And it often enough happens, that when a Woman is in a Fit of the *Mother*, another Hysterical person standing by, is by reason of a peculiar Disposition of her Body, soon infected with the like strange discomposure. And

And to shew you, that a distemper'd Body is both an Engine, and also an Engine disposed to receive alterations from such Impressions as will make none on a sound body, let me put you in mind that those subtile Steames that wander through the Air before considerable changes of Weather disclose themselves, are wont to be painfully felt by many sickly Persons and more constantly by men that have had great Bruises or Wounds in the parts that have been so hurt; though neither are healthy men at all incommodated thereby, nor do those themselves that have been hurt, feel any thing in those sound parts, whose Tone or Texture has not been alter'd or enfeebl'd by outward violence. I have known several also (and the thing is obvious) whose body's and Humours are so fram'd and constituted, that if (as men commonly speak) they ride backward in a Coach, that Motion will make them giddy, and force them to Vomit. And it is very ordinary for Hysterical Women to fall into such Fits as counterfeit Epilepsies, Convulsions, and I know not what violent distemper by the bare smell of Musk and Amber, and other strong perfumes, whose steames are yet so farre from having great, much lesse such Effects in other Humane body's, that almost all men, and the generality ev'n of healthy Women are not affected by them, unless with some innocent delight. And that even on men Odours (how minute and invisible bodies soever) may sometimes have very great power, may be gathered from the story told us by *Zacutus Lucitanus*, of a Fisherman, who having spent all his life at Sea, and being grown Old there, and coming to gaze upon a solemne reception, made in a Maritime Town, to *Sebastian* King of Portugal, was by the perfumes plentifully Burnt, to welcome the King immediatly cast upon the ground thereby into a Fit which two Physicians judg'd Apoplectical, and Physick'd him

In Pr. Med.
adm. lib. 3. Ob.
Observat. 99.

him accordingly 'till three daies after the Kings chiefe Physician *Thomas à Vega* gueffing at the cause of his disease commanded him to be remov'd to the Sea fide and cover'd with Sea Weeds, where within four Houres the Maritime Air and steames began to open his Eyes, and made him know those that were about him, and within not many Dayes restor'd him to health. We may also conjecture how much the alteration produced in the Body by sickness may dispose it to receive strong Impressions from things that would not otherwise much affect it, by this, That even a man in perfect health, and who is wont to Drink cold without the least harme, may, when he has much heated himself by exercise be cast by a draught of cold Drink into such sudden, formidable, and dangerous distempers as, did not daily Experience convince us, we should scarce think possible to be produc'd in a Body, free from Morbid Humours by so familiar a thing as a cup of small beer or water; insomach that *Benivennius* relates a Story of one, who after too vehement exercise Drinking a Glasse of very cold Water fell into a swoon, that was quickly succeeded by Death. And yet, to adde that on this occasion, in Bodies otherwise dispos'd a large draught of cold Water, Drunk even without thirst, may very much relieve the Drinker, and prevent great Fits of the Mother, and partly of the Spleen, especially upon suddain frights, to which purposes I know some Hyfterical Ladies that find in this Remedy, as themselves assure me more advantage then one would easily imagine.

And (further) to shew you that the Engine we are speaking of is alterable, as well for the better as for the worse, by such Motions of outward Bodies as in themselves consider'd, are languid, or at least may seem despicable in reference to sickness or recovery; Let me call upon you

you to consider a few, not unobvious things, which may also serve to confirme some part of what has hitherto been deliver'd.

[The true Mosse growing upon a Humane Skull, though I do not find Experience warrant all the strange things some Chymical Writers attribute to it for the stanching of Blood, yet I deny not, but in some Bodies it does it wonderfull enough. And I very well know an Eminent *Virtuoso* who has assur'd me, as his Physitian likewise has done, that he finds the Effects of this Moss so considerable upon himself, that after having been let Blood, his Arm falling to Bleed again, and he apprehending the consequences of it, his Physitian, who chanc'd to be present, put a little of the abovemention'd Mosse into his hand, which barely held there, did, to the Patients wonder, stanch his Blood, and gave him the curiosity to lay it out of his hand, to try whether that Mosse were the cause of the Bloods so oddly stopping its course, whereupon his Arm after a little while, beginning to Bleed afresh, he took the Mosse again into his hand, and thereby presently stanch'd his Bleeding the second time: and if I misremember not, he added, that he repeated the Experiment once more with the like successe. The smock of burnt feathers, or Tobacco blown upon the face of an Hysterical Woman, does oftentimes almost as suddenly recover them out of Fits of the Mother, as the odour of perfumes did cast them thereinto.]

And now I speak of Cures performable by fumes, it brings into my mind, that a friend of yours and mine, and a Person of great Veracity professes to have strangely cur'd Dysenteries by a way unusual enough, which is to make the Patient sit over a Chair or Stool close on the sides, and perforated below, so that the *Anus* and the neighbouring parts may be expos'd to the fumes of Ginger, which must be
thrown

thrown upon a Pan of Embers, plac'd just under the Patient, who is to continue in that posture, and to receive the Fume as long as he can endure it without too much fainting. And when I mention'd one of the Cures that was thus perform'd, to one that is look'd upon as a Master of Chymical *Arcana* against Diseases; he preferr'd before it (as he saies upon experience) the shavings of Harts-horn us'd after the same manner, and the Remedy seems not irrational. But if in this distemper, the Actual heat applied to the abovemention'd parts of the Body concurre not to the Effect, we may too, warrantably enough, adde that Cures may be perform'd by far more minute corpuscles then those of smoke, insinuating themselves from without into the Body. For I know a very dextrous Goldsmith, who, when he over heats himself, as he often unawares does at hammering of Plate, is subject to fall into Gripings of the Belly, which lead to Fluxes; but his usual and ready Cure is, as soon as conveniently he can, to heat his Anvil, and sit upon it for a great while together, heating it hot again if there be need. But to return to our Medicinal Smoaks, 'tis known that some find more good against the Fits of the Colick, by Glysters of the Smoak of *Tobacco*, then by any other Physick they take; so that I know wealthy persons, that relying upon the benefit they find by this Remedy, have left off sending for their Physitians to ease them of the Colick. And indeed, when I consider what an odde Concrete, even common Soot is, and that many Concretes by being resolv'd into Smoak, may be either more or otherwise unlock'd, then they would be by the Stomack of a Man (so that I may elsewhere entertain you of the great heightning of some Emetick and Cathartick Simples in their operation, by their being reduc'd into Smoak,) and that also probably the Operation of some Fumes and Odours may

may be much chang'd and improv'd by their not getting into the Body by the Mouth, but other parts; I am inclinable to think that there might be made further use of them, if Physicians pleas'd, then hitherto has been. For I have made such trial of the Vertue of Sulphureous Smoak, to preserve some Liquors, as I was much pleas'd with. And not only *Paracelsus*, but *Helmont* highly extol, as a grand Specifick in fits of the Mother, the Smoak of the Warts that grow upon the Legs of Horses, conveigh'd to the parts suppos'd to be primarily affected. And I remember, that lately I met with a Gentleman curious and intelligent, who, as himself assur'd me, was by the Scurvy and ill condition'd Ulcers, and other obstinate distempers brought so low, that he was scarce able to turn himself freely in his Bed, and thereupon resolv'd against taking any more Physick, partly out of despair of recovery, and partly out of wearinesse of the tedious courses of Physick the Doctors had in vain made him passe thorow: But that some of his Friends bringing him a certain Surgeon, whom they affirm'd to have strangely cur'd many desperate distempers, by wayes very unusual and not troublesome to the Patient, this Gentleman was content to put himself into his Hands, the Surgeon promising that he would not give him any other Physick, but now and then a Cup of Sack by way of Cordial; his way of Cure being to fumigate the Patient very well every Morning with a certain Smoak, which that Gentleman thinks, by what he took notice of, in the Powder that yeelded it, to have been some Vegetable substance. And with this Remedy in a short time he grew perfectly well, and came home a while since in very good health from a Voyage, which the confusions of his own Country invited him to make as far as the *East-Indies*. This Surgeon, whose name I cannot hit upon, dying suddenly, his secret
(which

(which was try'd upon divers others besides this Gentleman) is for ought we yet know, dead with him.

[But as for the efficacy that may be found in appropriated Fumes and Steams. We have more then once by barely unstopping and holding under her Nose a smal Phial of highly rectified Spirit of Sal. Armoniack, or even of Harts horn almost presently recover'd a Young Beauty I need not name to You; out of strange Fits that were wont to take her more suddenly then those of the Falling Sicknesse, and were look'd upon as Epileptical, though perchance they were not meerly so. To which I shall adde, that a Lady that both You *Pyrophilus* and I know and love very well, though she have been long subject to violent and tedious Fits of the Head-ach, and though that distemper have since been much increas'd by a great concussion of her Head, occasion'd by the overturning of a Coach, yet she is wont presently to be relieved, barely by holding her Head a pretty while over a strong decoction of *Thee*, and breathing in the Steams of it.]

And now I am discoursing of Cures made by Steams, or other seemingly slight means, I must not pretermit a thing so remarkable, that if it were more generally known in *Europe*, I should think it somewhat strange to find it so little reflected on by Physitians; and that is the constant and almost suddain ceasing of the Plague, how raging soever, in the almost incredibly populous City of *Grand Cayro* in *Aegypt* towards the latter end of *June*, about which time in most Countries in our Hemisphere it is wont to spread fastest and be most rife. The truth of this is attested by so many Travellers of several Nations, that 'twere injurious to doubt of it, and not only the Dexterous Mr *R.* whom you well know, and who lived at *Cayro* has confir'md to me the truth of it.

But

But the Learned *Prosper Alpinus*, who both was an excellent Physician, and spent many Years in *Aegypt*, gives us this particular account of it, *Pestis Cayri atq; in omnibus locis Aegypti invadere eos populos solet ineunte Septembri mense, usq; ad Junium: his enim omnibus mensibus, à Septembri ad Junium usq; Pestis aliunde per contagium illuc asportata eam gentem invadere solet: And after a few Lines, Junio vero mense, qualiscunq; & quantacunq; sit ibi Pestilentia, Sole primam Cancris partem ingrediente omnino tollitur, quod multis plane divinum esse non immerito videtur: Sed quod etiam valde mirabile creditur, omnia suppellectilia, Pestifero contagio infecta, tunc nullum Contagii effectum in eam gentem edunt; ita ut tunc ea vobis in tutissimo & tranquillissimo statu reducatur, ex summe morbofo: atq; morbi particulares, sporadici, à Græcis vocati tunc apparere incipiunt, qui nusquam gentium tempore Pestis apparebant.* And in the next Chapter, inquiring at large into the causes of this Wonder, he denys it to proceed from the increase of the Nile, which happens to be coincident in point of time with the extinction of the Plague, because that the Infection ceaseth before the swelling of the River is considerable; and ascribeth it rather to the alteration of the Air, produc'd by the Northernly Winds which then begin to blow, and some other Circumstances: speaking of which, *Hæc (saith he) per id temporis incipiunt observari à quibus fortasse non immerito causam extinctionis Pestis morbofiq; in salubrem statum mutationis pendere arbitror: quando nulla alia ex conservatricibus causis, quas vulgus medicorum res non naturales appellat, aëre excepto, ibi eo tempore appareat, in quam morbofi status in salubrem mutationem referre possamus: ideo necessarium erit hujusce mutationis causam Aëris mutationi acceptam referre, &c.* Upon this Instance, *Pyrophilus*, I have presum'd the longer to insist, because

*De Medicina
Aegyptiorum,
lib. 1. cap. 17.*

Ibidem, cap. 13.

(if you duly reflect on it) you will, I suppose, discern, that it much credits and elucidates a great part of what hath been delivered in divers of the foregoing Leaves, concerning the possibility of Natures doing great matters against Diseases, without the help of grois and sensible Evacuations.

CHAP. XV.

AND since we have represented a humane Body as an Engine, we shall adde, That it may be altered both for the better and for the worse, by such bare motions or impulses of external Bodies, as act but in a grois and confessedly Mechanical manner: For 'tis known, that out of such speedily killing, unless seasonably remedy'd Distempers, as Fits of Swounding, Patients of either Sex are often recovered without any inward Medicine, by being barely pinch'd in several places. I, that have endured great and dangerous Sickneses, have scarce ever found any so violent for the time, as that w^{ch} the bare motion and smell of a Ship and Sea Air hath put me into, especially in rough weather, till I was somewhat accustomed to Navigation; and yet this violent and weakening Sicknes, as it was not produced by any peccant Humor in the Body, so it was quickly removed by the Air, and Quiet of the Shore, without the help of Physick. And the like may be observed more suddenly in the newly mentioned Instances of those in whom, as the bare agitation of a Coach will produce such violent Fits of Vomiting and such Faintness, that I have known some of them apprehend they should presently die; so the bare cessation of that discomposing motion soon relieved them. We see in our Stables, what operation, the currying of them carefully, hath upon
our

our Horses. And *Helmont* somewhere tells us, That himself, as I remember, could by the Milk of an Ass, tell whether she had been that day diligently curried or no; and so considerable an alteration in Milk should, me thinks, strongly argue, that a great one in the Blood or other Juice, of which the Blood is elaborated, and consequently in divers of the principal parts of the Body must have preceded it. But to prefer our consideration from the Bodies of Beasts to those of Men, 'tis remarkable what *Piso* confesseth, the illiterate *Brasilian* Empericks are able to perform with Frictions, even as unskillfully as they order them: *Mira equidem*, saith he, *tum tuenda sanitatis ergo, cum in plerisque morbis sanandis, frictione & unctione frequenti incolæ præstant, illam in frigidioribus, & chronicis, hanc in acutioribus adhibentes.*

*Histor. Nat.
Med. lib. 2.
cap. 5. pag. 33.*

Quæ remedia lubenter advenæ imitantur, & ut par est, ex legibus artis hæc & plura medendi Empiricorum genera moderantur. And as *Galen* himself highly extols a skilful Application of Cupping-glasses in the Colick; so in *Brasil* they finde that the like Remedy is strangely successful: For *Cholera sicca*, saith our candid *Piso* in another place, *eisdem fere Remediis* (of which he had been speaking) *curatur, maxime si regioni hepatis cornea cucurbitula applicentur.* De quibus merito hoc testor, quod *Galenus* de suis cucurbitulis, quas in Colico affectu incantamenti instar operari tradidit.

Idem cap. 11.

We shall adde, for further confirmation, that notwithstanding all the horrid Symptomes that are wont to ensue upon the biting of that Poysonous Spider, the *Tarantula*, that lasting and formidable Disease, which often mocks all other Remedies, is by nothing so successfully oppos'd, as by Musick. Some determinate tune or other which proves suitable to the particular Nature of the Patients Body; or that

*M. surg. lib. 9.
cap. 4.*

Of the Poyson producing there such a motion, or determination of some former motion of the Spirits, or the Humors, or both; as by conducting the Spirits into the Nerves and Muscles inservient to the motion of the Limbs, doth make the Patient leap and dance till he have put himself into a Sweat, that breaths out much of the virulent Matter which hath been probably fitted for expulsion, by some change wrought in its Texture or Motion, or those of the Blood, by the Musick. For if Sweat and Exercise, as such, were all that relieved him, why might not *Sudorificks*, or leaping without Musick, excuse the Need of *Fidlers*? which yet is so great, that *Kircher* informs us, That the *Apulian* Magistrates are wont to give Stipends, at the publick charge, to such to relieve the Poor by their playing. And not onely He hath a memorable Story of *Robertus Pantarus*, a *Tarantine* Nobleman, whose Disease being not known to proceed from the biting of a Spider, could by no Remedies be cured; he was at length, even upon the point of death, suddenly reliev'd, and by degrees restored to perfect health by the use of Musick: But *Epiphanius Ferdinandus*, in his accurate Observations concerning those bitten with the *Tarantula*, together with *Mathiolus*, and other Authors bear witness thereunto, by resembling Narratives. Now that a Sound (not barely as a sound, but as so modified) may powerfully operate upon the Blood and Spirits, I, who am very Musically given, have divers times observ'd in my self, upon the hearing of certain Notes. And it might be made probable, both by that which we have formerly said of the effect of skreaking upon the Teeth and Gums, and by the Dancing Fit, into which not every Musical Sound, though never so loud, but some determinate Tune is wont to put the bitten Patient.

Patient. But it may be more manifestly prov'd, by the following testimony of our inquisitive Jesuite, wherein he affirms, That the Spiders themselves may, as well as those they have bitten, be made to Dance by Tunes, suited to their peculiar Constitutions. †

† Ubi sonatores
qui Musicâ suâ
hoc malū etiam
publicis magi-
stratus stipendiis
ad pauperum re-
medium solati-

umque conducti curare consueverunt, ad curas patientium certius faciliusque accelerandas, primo ex insectis quæerere solent ubi, quo loco, aut campo, aut cujus coloris Tarantula erat, à quo morsus ipsi sit inflicti. Quo facto indicatum locum protinus, ubi frequentes numero atque omnis generis Tarantulæ retium texendorum laboribus incumbunt, accedere solent Medici Citbarædi, Tarantulæque tentare harmoniarum genera: ad quæ mirum dictu, nunc has nunc illas saltare non secus ac duorum polychordorum æqualiter concinnatorum, personatione illæ chordæ, quæ similes sibi fuerint tono, & æqualiter tense moventur, reliquis immotis, ita ut pro similitudine & conditione Tarantularum nunc has nunc illas saltare comperiunt. Cum vero ejus coloris Tarantulam quæ à patiente indicata fuerat in saltum prorumpere viderint, pro certissimo signo habent, modulum se habere verum & certum humori venenoso tū tāq̃vnti (ort & proportionatum, & ad curandū aptissimū, quo si utantur infallibilē curæ effectū se consequi asseverunt.] Kircher: Musurg: lib. 9. part. 2. cap. 4.

And this I the less wonder at, because *Epiphanius Ferdinandus* himself, not onely tells us of a Man of 94 Years of age, and so weak that he could not go, unless supported by his Staff, who did, upon the hearing of Musick after he was bitten, immediately fall a dancing and capering like a Kid; and affirms, That the *Tarantula's* themselves may be brought to leap and dance at the sound of Lutes, small Drums, Bagpipes, Fiddles, &c. but challenges those that believe him not to come and try, promising them an Ocular Conviction: and adds what is very memorable and pleasant, That not onely Men, in whom much may be ascribed to fancy, but other Animals being bitten may likewise, by Musick, be reduced to leap or dance: for he saith, He saw a Wasp, which being bitten by a *Tarantula* whil'st a Lutanist chanc'd to be by; the Musician playing on his Instrument, gave them the sport of seeing both the Wasp and Spider begin to dance: annexing, That a bitten Cock did do the like.

Histor: 81

Vide Sennerti
Prætic. lib. 1.
p. 2. cap. 16.

CHAP:

CHAP. XVI.

I Might also, *Pyrophilus*, confirm what I told you, when I said, That Sickneſs may produce ſuch an alteration in the Fabrick of the Body, as to make it capable to be very much affected, as well for the better as for the worſe, by ſuch things that would not ſcarce at all affect it if it were ſound, from the conſideration of thoſe many and ſtrange *ιδιοσυμμετασεις*, or *Peculiarities*, to be met with in ſome Perſons in Sickneſs and in Health. For though many of theſe differences between healthy Men, are not likely to be greater then may be obſerv'd between the ſame Man when well, and himſelf as the Oeconomy of his Body may be diſ-compoſ'd by ſome Diſtemper; yet we often ſee, that ſome Perſons have the Engine of their Body ſo fram'd, that it is wonderfully diſordered by ſuch things as either work not at all on others, or work otherwiſe on them: as it is common enough for Men to be hugely diſturb'd, and ſome of them to fall into Fits of trembling or ſwooning, upon the ſight or hearing of a Cat. And to ſuch an affection I know a very eminent Commander obnoxious, Your late Unkle, the laſt Earl of *Barrymore*, a very gallant Noble Man, and who did his Country great Service in the *Irish Wars*, had the like apprehenſion for *Tanſey*. I cannot ſee a Spider near me, without feeling a notable commotion in my Blood, though I never received harm from that ſort of Creature, and have no ſuch abhorring againſt Vipers, Toads, or other venomous Animals. You know an excellent Lady (marryed to a Great Perſon that hath more then once govern'd *Ireland*) whoſe Antipathy to Hony, which is much talk'd of in that Country, hath diſplay'd it ſelf upon ſeveral occaſions: notwithſtanding

ing which, her experienc'd Phyſitian imagining that there might be ſomething of conceipt in her Averſion, took an opportunity to ſatisfie himſelf, by mixing a little Hony, with other Ingredients, of a Remedy which he applyed to a very ſlight and inconfiderable cut or ſcratch, which ſhe chanced to get on her Foot; but he ſoon repented of his Curioſity, upon the ſtrange and unexpected diſorder which his (in other caſes innocent) Medicine produc'd, and which ceaſing upon the removal of that, and application of other ordinary Remedies, ſatisfied him, That thoſe Symptomes were to be imputed to the Hony, and not the bare hurt. The ſame excellent Lady, I remember, complained to me, That when ſhe was troubled with Coughs, all the Vulgar, Peſto-ral and Pulmoniack Remedies did her no good, ſo that ſhe could find relief in nothing but either the Fume of powdred Amber, taken with convenient Hearbs in a Pipe, or that *Balsamum Sulphuris* which we have already taught you in this Eſſay.

[I know a Perſon of Quality, tall and ſtrongly made, who lately asked my Opinion, Whether, when he had need of Vomit, he ſhould continue to make uſe of Cauphy, in regard it wrought ſo violently with him: This gave me the occaſion, as well as curioſity, of enquiring particularly both of Himſelf and his Lady, concerning this odde Operation of Cauphy upon him; and I was told, That an ordinary Wine-glaſs full of the uſual warm decoction of Cauphy, boyl'd in common Water, was wont, within about two hours, to prove emetick with him, and before Noon did give him eight, ten, or ſometimes twelve Vomits, with ſo much violence, that he was leſs affected by the infuſion of *Crocus metallorum*, or other uſual emeticks, and therefore was deliberating whether he ſhould not change Cauphy for
ſome

some of them, though finding its Operation very certain, he had for some Years accustomed himself to take that Vomit: And that which is also remarkable in this matter, is, that he tells me, That scarce any Vomit is more troublesome to him to take, then that above-mentioned is grown of late, so that even the odour of Cauphy, as he passeth by Cauphy-houses in the Street, doth make him sick; and yet that Simple is to most Men so far from being Vomitive, that it is by eminent Physitians, and in some cases not without cause, much extoll'd as a strengthner of the Stomack. And this very Gentleman, himself, used it a pretty while against the Fumes that offended his Head, without finding any Vomitive Quality at all in it.]

The Books of sober and learned Physitians, afford us Examples of divers such, and of much more strange Peculiarities, and likewise of such Persons who having desires of certain things very extravagant, and even absur'd (ordinarily not onely improper, but hurtful to their Distempers) have been cured by the use of them, of very dangerous and sometimes hopeless Diseases: Of which kinde of Cures I may also elsewhere tell you what I have observed, and some credit may be brought to such Relations, by what we ordinarily see more greedily devoured (without much harm) by longing Women, and Maids troubled with the Green-sickness.

But now, *Pyrophilus*, since the Engine of an humane Body thus appears to be so fram'd, that it is capable of receiving great alterations from such unlikely things as those we have been mentioning, Why should we hastily conclude against the efficacy of Specificks, taken into the Body, upon the bare account of their not operating by any obvious quality, if they be recommended unto us, upon their own experience,

perience by sober and faithful Persons ? And that scarce sensible quantities of Matter, having once obtained access to the mass of Blood (which is very easily done by the Circulation) may, by the contrary and swift motion, and by the Figure of the Corpuscles it consists of, give such a new and unnatural impediment or determination to the motion of the Blood, or so dis-compose either its Texture, or that of the Heart, Brain, Liver, Spleen, or some such principal part of the Body (as a spark of Fire reduceth a whole Barrel of Gun-powder, to obey the Laws of its motion, and become Fire too ; or as a little Leaven is able, by degrees, to turn the greatest lump of Dow into Leaven) need be manifested by nothing, but the Operations of such Poysons as work not by any of those (which Physitians are pleased to call) *Manifest Qualities*. For though I much fear, that most of those that have written concerning Poysons, supposing that Men would rather believe then try what they relate, have allowed themselves to deliver many things more strange then true ; yet the known effects of a very small quantity of *Opium*, or of *Arsenick*, of the scarce discernable hurt made by a Vipers Tooth, and especially of the biting of a mad Dog (which sometimes, by less of his Spittle then would weigh half a Grain, subdues a whole great Ox into the like madness, and produceth truly-wonderful Symptoms both in Mens Bodies and Beasts) are sufficient to evince what we proposed.

And that Man's Body may be as well sometimes cured, as we see it too often discomposed, by such little proportions of Matter, may (not now to mention the questionable Vertues ascrib'd to many Antidotes) be gathered from that Experiment, so common in *Italy* and elsewhere, of curing the invenom'd biting of Scorpions, by anointing the bitten and

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Lib. 4. Cap. 48.

See the same
Author, Lib. 3.
under the Title
Cururu.

humid place with common Oyl, wherein store of Scorpions have been drown'd and steep'd. And a resembling Example of the Antidotal Vertue, wherewith Nature hath enrich'd some Bodies, is given us by the above-commended *Piso*, in his *Medicina Brasiliensis*, where (treating of the Antidotal Efficacy of the famous *Brasilian* Herb *Nhanby*, eaten upon an empty Stomack) he adds this memorable Story; That he himself saw a *Brasilian*, who having caught an over-grown Toad, and swell'd with Poyson (such a one as *Brasilians* call *Cururu*) which useth to be as big again as the *European* Toad, and desperately venomous (which perhaps our Toads are not) he presently killed him, by dropping on his back the Juice of the Flowers and Leaves of that admirable Plant. And you may remember, that the same Author formerly told us, in effect, that as great and salutary changes may be produced even in humane Bodies, where he relates, That he had known those that had eaten several sorts of Poyson, Snatch'd, in a trice, from imminent death, by onely drinking some of the Infusion of the Root he calls *Jaborandi*; and this, after I know not how many *Alexipharmaca* and *Theriacal* Antidotes had been fruitlessly administred.

You will perchance tell me, *Pyrophilus*, that these three or four last Instances are of Poysonous Distempers and their Antidotes; not of ordinary Diseases, and their Specifick Remedies. But to this I have a double Answer: and First, Many of those Distempers that proceed from Poyson, are really Diseases, and both call'd by that Name, and treated of, as such, by Physitians. And indeed they may well look upon them but as Diseases, exasperated by a virulent Malignity, which yet appears to be not always easily distinguishable from that of Diseases that proceed not from Poyson, by this, That otherwise the Physitians of Princes and great Men, if after having

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considered all the inward Parts of their dis-bowell'd Patients, could not so often doubt and dispute, as they do, whether or no Poyson were necessary to their death. And *Piso* (who learn'd divers of their detestable Secrets from the *Brasilians*) relates, That some of them are so skilful in the cursed Art of tempering and allaying their Poysons, that they will often hinder them from disclosing their deleterial Nature for so long a time, that the subtle Murtherers do as unsuspectedly as fatally, execute their Malice or Revenge. These Diseases indeed are wont to differ in this from Surfeits, and other resembling ordinary Diseases; that in the one, the venomous matter that produceth the Disease, is at first much more small, then in the other the morbidick Matter is wont to be. But the activity of this little quantity of hostile Matter doth make it so pernicious, that the Disorders it produceth in the Body, being much greater then that of ordinary Sickneses is; the cure of such Distempers is the fitter to manifest how powerfully Nature may be succour'd, by Remedies that work not by first or second Qualities, since such are able to deliver Her from Diseases heightned by a peculiar and venomous malignity.

To this first I shall subjoyn my next, which is, That divers Passages of the former Discourse (especially what we have related concerning the cure of Agues, of the Rickets, and of the Kings-Evil) may satisfie you, That even of ordinary Diseases (some at least) may be as well cured by Specificks, as those produced by Poyson are by Antidotes.

You may also say, *Pyrophilus*, But what if a recommended Specifick do not onely seem unable to produce the promised Effect, but have Qualities, which according to our Notions of the nature of the Disease, seem likely to conspire with it and increase it?

I Answer,

First, That though it is better for a Patient to be cured by a rashly and unskilfully given Medicine, then to die under the use of the most skilfully administred Physick; yet that the Physitian who looseth his Patient, after having done all that his Art prescribed to save him, deserves more commendation then he that luckily chanceth to cure his Patient by an irrational course. And therefore in such a case as you put, *Pyrophilus*, I think the Physitian ought to be very well satisfied of the matter of Fact, before he venture to try such a Remedy, especially if more ordinary and unsuspected means have not been imployed and found ineffectual; for it is not one lucky Cure that ought to recommend to a wary Physitian the use of a Remedy, whose dangerous Quality seems obvious, whereas its vertue must be credited upon Report.

But then secondly, If the Physitian be duly satisfied of the efficacy of the Remedy, upon a competent number and variety of Patients, I suppose he may, without rashness, make use of such Remedies at least, where ordinary Medicines have been already fruitlessly try'd.

CHAP. XVIII.

THat you may cease to wonder at my daring to say this, *Pyrophilus*, I must offer to you three or four Particulars.

And first, it is manifest to those that are inquisitive, That the true Nature and Causes of several Diseases, are much less certain, and much more disputed of among the Doctors themselves, then those that are not inquisitive imagine: Nor is the method of curing divers particular Diseases

eases more settled & agreed on, that depending chiefly upon the
 knowledg of those Causes, which as I was saying, are contro-
 verted. 'Tis not that I am either an Enemy to Method in Phy-
 sick, or an Undervaluer of it; but I fear the generality of Phy-
 sitians (for I intend not, nor need not all along this Essay speak
 of them all) have as yet but an imperfect Method, and have, by
 the narrow Principles they were taught in the Schools, been
 perswaded to frame their Method rather to the barren Princi-
 ples of the *Peripatetick* School, then to the full amplitude
 of Nature. Nor do I finde that Physitians have yet done so
 fit a thing, as seriously (and with the attention which the im-
 portance of the thing deserves) on the one side, to enu-
 merate and distinguish the severall Causes, that may any whit
 probably be assign'd, how the *Phænomena* of that disorder-
 ed state of the humane Body, which we call a Disease, or its
 Symptomes, may be produced. And on the other side, by
 how many and how differing ways the *Phænomena* may be re-
 moved, or the Diseases they belong to destroy'd: And if
 this were analytically and carefully done, I little doubt but
 that Mens knowledge of the Nature and Causes of Diseases,
 and the ways of curing them, would be less circumscrib'd
 and more effectual then now it is wont to be. And I am
 apt to think, that even Methodists would then finde that there
 divers probable, if not promising Methods (proper to di-
 vers cases) which Ways they yet over-look: And though in
 a right sense it be true, that the Physician is but Natures Mi-
 nister, and is to comply with Her, who aims always at the
 best; yet if we take them in the sense those Expressions are
 vulgarly used in, I may elsewhere acquaint You with my Ex-
 ceptions at them, and in the mean time confess to you, That
 I know not whether they have not done harm, and hindred
 the advancement of Physick, fascinating the mindes of Men,
 and

and keeping them from those effectual Courses, whereby they may potently *alter* the Engine of the Body; and by rectifying the Motion and Texture of its Parts, both consistent and fluid, may bring Nature to their bent, and accustom Her to such convenient Courses of the Blood and other Juices, and such fit times and ways of evacuating (what is noxious or superfluous &c.) as may prevent or cure divers stubborn Diseases, more happily then the vulgar Methodists are wont to do.

And indeed, it is scarce to be expected, that till men have a better Knowledg of the Principles of Natural Philosophy, without which 'tis hard to arrive at a more comprehensive Theory of the various possible causes of Diseases, and of the contrivance and uses of the parts of the Body, the Method which supposes this Knowledg should be other then in many things defective, and in some erroneous, as I am apt to think, the vulgar Method may be shewn to be as to some particular Diseases. Of this I may perhaps elsewhere acquaint you more particularly with my suspicions, and therefore I shall now only mention the last Observation of this kind I met with, which was in a Gentleman, You and I very well know, who being for some Months much troubled with a difficulty of breathing, and having been unsuccessfully treated for it by very Eminent Physicians, we at last suspected, that 'twas not the Lungs, but the Nerves that serv'd to move the Diaphragme and other Organs of respiration, upon whose distemper this suppos'd *Asthma* depended, and accordingly by a taking or two of a Volatile Salt of ours, which is very friendly to the *genus Nervosum*, he vvas quickly freed from his trouble some distemper, which afterwards he was fully perswaded did not proceed from any stuffing up of the Lungs. To be short, how much esteem soever
we

we have for Method, yet since that it self and the Theories whereon men ground it, are, as to divers particular Diseases, so hotly disputed of, even among Eminent Physitians, that in many cases a man may discern more probability of the successe of the Remedy, then of the truth of the received Notion of the Disease; In such abstruse cases me-thinks it were not amiss to reflect upon that reasoning of the auncient Empericks (though on a somewhat differing occasion) which is thus somewhere express'd by *Celsus*: *Neque se dicere consilio medicum non egere, & irrationabile Animal hanc artem posse præstare, sed has latentium rerum conjecturas ad rem non pertinere; Quia non inter sit, quid morbum faciat, sed quid tollat.* And as the controverted Method in the abovemention'd Diseases is not yet establish'd or agreed on in the Schools themselves, so divers of those that are wholly strangers to those Schools, do yet by the help of Experience and good Specificks, and the Method their Mother-wit does, according to emergencies, prompt them to take, perform such considerable cures, that *Piso* sticks not to give this Testimony to the utterly Unlearned *Brasilian* Empericks. *Interim, laies he, seniores & exercitatiores eximii sunt Botanici, faciliq; negotio omnis generis medicamina ex undiquaq; in sylvis conquisitis conficiunt. Quæ tanta sagacitate internè & externè illos adhibere videas, præcipuè in morbis à veneno natis, ut quis illorum manibus tutius & securius se tradat, quam medicastis nostris sciolis, qui secreta quadam in umbra nata atq; educata crepant perpetuo, & ob has Rationales dici volunt.*

*Hist. Nat. &
Med. Lib. 2.
pag. 23.*

Secondly, There are divers Medicines, which though they want not some one quality or other proper to encrease the Disease against which they are administr'd, are yet confidently us'd by the most judicious Doctors, because that they are also enrich'd with other qualities, whereby they may

do much more good then their noxious quality can do harm; as in a Malignant Feaver, though the distemper be Hot, and though Treacle and some other Antidotal Sudorificks be hot also, yet they are usefully administred in such Diseases, because the relieve they bring the patient by oppugning the Malignity of the peccant matter, and perhaps by easing him of some of it by sweat, is more considerable then the harm they can do him, by encreasing for a while his Heat.

Cap. 2:

The very experienced *Bontius*, Chief Physitian to the Dutch Plantation in the East-Indies; in his *Methodus medendi Indica*, Treating of the *Spasmus*, which (though here unfrequent) he reckons among the Endemial Diseases of the Indies, commends the Use of *Quercetanus's Laudanum*, of *Philonium*, and principally of an Extract of *Opium* and *Safron*, which he describes and much Extols; and least his Readers should scruple at so strange a prescription, he adds this memorable passage to our present purpose. *Fortassis* (saies he) *Sciolus quispiam negabit his remediis, propter vim stupefactivam ac narcoticum nervisque inimicam, esse utendum. Speciosa quidem hac prima fronte videntur sed tamen vana sunt. Nam praterquam quod calidissima hujus Climatis temperies non requirat, certissimum est in tali necessitate: sine his agrum evadere non posse. Adde quod nos tam rite Opium hic preparamus ut vel infanti innoxie detur: & (sane ut verbo absolvam) si Opia- ta hic nobis deessent in morbis calidis hic grassantibus frustra remedia adhiberemus quod etsi imperitis durum, ex progressu tamen me nihil temere dixisse patebit.*

The drincking freely, especially if the Drink be cold Water, is usually (and in most cases, nor without much reason;) strictly forbidden, as very hurtful for the Dropsie, and yet those that frequent the *Spaa*, tell us of great cures perform'd by pouring in plenty of Waters into the Patients already di-

distended Belly; and I know a Person of great Quality, and Vertue, who being by an obstinate Dropsy, besides a complication of other formidable diseases, brought to a desperate condition, was advis'd to Drink *Turbridg Waters*, when I happn'd to be there, by her very skilful Physitian: Who told me, that the Doctors having done all their Art could direct them unto in vain, she would be cur'd by Death, if she were not by these Waters; from whence (the weather proving very seasonable for that sort of Physick) she return'd in so prosperous a condition of recovery, as exacted both his and my wonder. That the Decoction of so heating a Simple as *Guajacum*, would be lookt upon by the generality of Physitians, both *Galenists* and *Chymists*, as a dangerous Medicine in Pthifical and other consumptions, you will easily grant: and yet some eminent Physitians, and (particularly *Spaniards*) tell us of wonderful cures they have perform'd in desperate Ulcers of the Lungs by the long use of this Decoction, notwithstanding its manifestly and troublesomely heating Quality. And I know a Physitian eminently learn'd, and much more a Methodist, then a Chymist, who assures me, that he has made trial of this unlikely way of curing Consumptions with a successe that has much recommended these Paradoxical *Spaniards* to him. 'Tis also believ'd, and not without cause, by Physitians, that *Mercury* is wont to prove a great enemy to the *Genus nervosum*, and often produces Palseys, and other distempers of the Brain and Nerves: and yet one of the exactest and happiest Methodists I know, has confess'd to me, that *Mercurial* preparations are those which he uses the most successfully in *Paralytical* and the like distempers of what Physitians call the *Genus nervosum*. And on this occasion, I remember, that a Gentlewoman being confin'd to her Bed by a Dead Palsey, that had seis'd on one side of

her Body, a Phyſitian eminent for his Books and Cures, giving her a doſe of a certain Preparation of *Mercury*, corrected with a little Gold, which I put into his hands for that purpoſe, was pleas'd to bring me word, that by the firſt taking of the Powder, which wrought but gently by Siege, without either Vomits or Salivation, ſhe was enabled the ſame or the next day to quit her Bed, and walk about the Room.

Thirdly there are many things which ſeem to be againſt reaſon whiſt they are barely propos'd and not prov'd for which we afterwards diſcerne very good reaſon: when experience, having ſatiſfied us they are really true, has both invited us, and aſſiſted us to enquire into their cauſes. Of this we have elſewhere given divers not Medical Inſtances in our *ESSAY Concerning improbable Truths*: And I could eaſily enough, if I durſt be tedious, give you ſome Medical Illuſtrations of the ſame truth. But I dare now only invite you to conſider this one thing, which may be of great uſe to explicate many others, both in Natural Philoſophy, and in Phyſick too, which is, That there are divers Concretes, ſome of them as to Senſe, *Similar*, or *Homogeneous*, whoſe differing parts are endow'd with very differing and ſometimes contrary Qualities. And this not only appears in the Chymical Analyſis of Bodies made by the fire, where the difference of what Chymiſts call the ſeparated Principles of Concretes is often very manifeſt and great, but ev'n in divers Bodies that have not been reſolv'd by the violence of the Fire; as is evident in *Rhubarb* taken in ſubſtance, whoſe ſubtiler parts are purging, and its terreſtrial aſtringent: Nay, if thoſe parts which do in much the leſſe quantity concur to the conſtitution of the concrete do but meet with a Body dispos'd to receive their Impreſſions, it is very poſſible,

fible, that they may work more powerfully on it then the other Parts of the same Concrete, of which the Eye judgeth it altogether to consist.

This I have made out to some ingenious Men, by shewing, that though Saller Oyl be generally reputed to consist of Fat and Unctuous Particles, and therefore to be a great resister of Corrosion; yet it contains in it sharp and piercing parts, which meeting with a disposed subject, do more powerfully operate then the more purely Oleaginous ones. As we endeavoured to evince by keeping for a short while in a gentle warmth, some pure Oyl-Olive, upon a quantity of Filings of ev'n crude Copper: For from them the Liquor extracted an high Tincture betwixt Green and Blew, like that which such Filings would have given to Distill'd Vineger, which according to Chymists Notions obtains that Colour, by making with its Acid and Corrosive Salt a real solution of some part of the Copper, as may appear by the recoverableness of the metal out of it. Another proof or two of the Acrimony of some of the parts of Oyl we may elsewhere give you. But now we shall rather confirme our Answer to your Question, by two or three Examples of Cures perform'd by unlikely Remedies.

I went once to visit an Ingenious *Helmontian*, whom I found Sick on his Bed, and having by the Symptomes of his Disease, discern'd it to be a *Pleurisy*, I talk'd with him of seasonably opening a Veine, but he was resolv'd against it, and told me he would cure himself by a remedy, which at first seems as likely to encrease such a disease as Phlebotomy is to cure it, namely by the use of Helmonts *Laudanum Opiatum* which in effect did in three or four daies cure him, and since he without Blood letting cur'd some others with it; which I the lesse wonder at, because of my having observ'd

that *Opium* (with which unskilful men seldome tamper without danger) if duely corrected and prepared proves sometimes a great resolver, and commonly a great Sudorifick in-
somuch, that I have known it make a person copiously sweat, who often complain'd to me, that other Diaphoreticks had no such operation on him.

I have oftentimes seen Coughs strangely abated by the use of a Remedy, which I have not long since told you, how I prepare: and with which (I remember) in a pretty Child you (*Pyrophilus*) know, and who is now very well, I was so happy as to repress in a few Houres a violent Cough, that threatened her with Speedy Death, and yet this Medicine has so eminent a saltneffe, that the Tongue can scarce suffer it; and how much the use of Salt things is by many Physitians condemn'd in Coughs (and indeed in many cases not without Reason) I need not tell You. And with exceedingly piercing Essence or Spirit of Mans Blood, I have known, notwithstanding its being very Saline, and its manifestly heating the Patient, especially for the first Four or Five daies, strange things perform'd even in a deplorable and hereditary Consumption. This *Pyrophilus* brings into my mind, something, that, it may be, you will think odde, which is, that having had occasion to advise for a person of high quality, with a very ancient Galenist, that in his own Country was look'd upon as almost an Oracle, and particularly in reference to Phthifical Consumptions, which was there a vulgar Disease, He confessed to me, that though his having fallen into it himself, made him very solicitous to find a cure for it; and though he had in his long and various practise, made trial of great variety of Methods and Remedies for the cure of that Disease, yet that with which he cur'd himself, and afterwards the generality of his chief Patiens was principally *Sulphur*
melted

melted, and mingled, in a certain proportion to make it fit to
 be taken, in a Pipe, with beaten Amber or a Cephalick Herb.
 The particular circumstances of his Method, I cannot now set
 you down, not having by me the Paper wherein they were
 Noted, but if I mistake not the Herb, with which he
 mingl'd the Brimstone or Flower of *Sulphur* was Coltsfoot
 or Betony; and I well remember, that what he look'd upon
 as the chief and specifick Remedy in his way of curing, was
 the smoak of the *Sulphur*; the other ingredients being added,
 not so much for their being proper enough for the Disease, as
 their helping to fill the Pipe, and thereby to allay the pun-
 gency, wherewith the Smoak, if afforded by a Pipe fill'd with
 Brimstone alone, would be qualify'd. But yet this Sulphu-
 reous Smoak is so predominant in the Remedy, that he us'd
 to have a Syrrup in readiness to relieve those, whom the A-
 crimony of the Fumes should make very sore, and perhaps
 blister on the one side of their Mouthes, or Throats, which ac-
 cident he provided for, by that cooling and healing Syrrup,
 without being thereby discourag'd from prosecuting the
 cure with the same Remedy; wherewith a person very Curi-
 ous and Rich, has solemnly assur'd me, that himself has cur'd
 divers Consumptions, and particularly in a Lady, even in
 health very Lean, that he nam'd to me, as being one I then
 knew. Now we know that Physitians generally, and in most
 cases justly, forbid Acid things to those that have exulcerated
 or tender Lungs, and how highly Acid and piercing the
 Smoak of *Sulphur* is, the Chymists can best tell you, who
 by catching it and condensing it in Glasses shap'd almost
 like Bells obtain from it that very corrosive Liquor, which
 readily dissolves Iron, being the very same that is commonly
 call'd *Oleum Sulphuris per campanam*, and yet it seems that
 either the Theory of Consumptions is misunderstood, or
 that

that the drying quality of the Sulphureous steam, and its great power to resist putrefaction, and as it were embalm the Lungs and season the Blood are considerable enough to account for the Harm which its Acidity may do.

Eeles are so commonly eaten by Persons of both Sexes without being taken notice of for any Quality, except their Crudity, that one would scarce believe such a stinking and odious Medicine as that of their Livers and Galls dried slowly in an Oven should be more proper for any thing, then to make the taker Vomit; and yet *Helmont* in divers places speaks of this Medicine as if it had kept multitudes of Women from dying of hard Labour. And since him, *Panarola* in his New Observations highly extols it. And I knew a very famous Emperick, who had very few other Secrets, and scarce any one so great to get Reputation and Mony by. And I remember also, That some years since I had occasion to give it to the Wife of a very ingenious Physitian, of whom the Midwives and her Husband almost despair'd, and (as she afterwards told me her self) each Dose made her throwes (which before had left her) returne, and at length she was safely delivered she scarce knew how. But I found double the Dose prescrib'd by *Helmont*, requisite to be used at last; and that the quantity of a Walnut of the Powder of these Livers given in Rhenish or White-wine, and when the Stomack was most empty, was no more then such a case required.

Scorpions being Venomous Creatures, to suffocate and infuse them in Oyl might seem the way to make it Poysonous, if experience did not assure us, that this Oyl is so far from being such, that it Cures the invenom'd bitings of *Scorpions*, which effect now that Physitians find it upon trial to be true, they confesse to be rational, and ascribe it, how justly

justly I now examine not to the attraction of the Poyson received into the Body, by that which is outwardly applied to the hurt. And *Piso* informes us that amongst the *Brasilians*, whose country is so much infested with Venomous Creatures 'tis the most general Cure to draw out the Poyson by applying to the hurt the beaten Body of the Beast that gave it. As likewise in *Italy*, they account the crushing of the very *Scorpion* that has bit a Man upon the bitten place for a most speedy and effectual Remedy. And I remember that here in *England* the Old man, whom you have seen going about with *Vipers, Toads, &c.* to sell, tol'd me that when he was dangerously bitten by a *Viper* and all swel'd by the Poyson of it a great part of his cure was the outward application of Venomous Creatures stamp'd 'till they were brought to a Consistence fit for that purpose.

That *Fluxes* are the general and Endemical Diseases in *Ireland*, I need not tell you; and yet I remember, that having occasion to consult the ancientest and most experienc'd Physitian of that Nation Dr. *F.* about the cure of it, he assur'd me, that though during his very long Practice he had found divers Remedies very prosperous, some on one sort of Patients, and some on another; yet the Medicine he most relied on, was this. To take unsalted Butter, and boil it gently 'till a pretty part were consum'd, Skimming it diligently from time to time, whil'st it stands over the fire, and of this Butter melted, to give now and then a considerable quantity, according as the Patient is able to bare it: A Remedy which at the first proposal may seem more likely to put a man into a Flux than to cure him of one. And yet the same Remedy which he suppos'd to benefit by mitigating the sharp humours and preserving the Entrals from their Corrosion was afterwards much commended to me by another

another antient *Irish* Physitian, who was esteemed among the Doctors the next in Eminency to him that I have named.

C A P. XIX.

I Should not here, *Pyrophilus*, adde any thing to what I have allready said above in favour of the use of even odde Specificks, but that finding at every turn, that the main thing, which does (really or in pretence) prevail with many Learned Physitians (especially in a famous University You have visited abroad) to reject Specificks, is, That they cannot clearly conceive the distinct manner of the Specificks working, and think it utterly improbable, that such a Medicine which must passe through Digestions in the Body, and be whirl'd about with the Mass of Blood to all the parts, should, neglecting the rest, shew it self Friendly to the Brain, for instance, or the Kidnies, and fall upon this or that Juyce or Humor, rather then any other. But to this Objection which I have propos'd as plausible as I can readily make it, I shall at present but briefly offer, according to what has been hitherto discours'd, these two things.

And First, I would demand of these Objectors a clear and satisfactory, or at least an intelligible explication of the manner of working of divers other Medicaments that do not passe for Specificks, as how *Rhubarb* Purges Choler, and *Hellebor* Melancholly rather then other Humours, how some Medicines that have endur'd a strong fire, as *Antimonium Diaphoreticum*, and *Bezoardicum minerale* well made, are yet oftentimes strongly Sudorifick; why the infusion of *Crocus Metallorum* or of Glasse of Antimony, though it acquire no pungent, or so much as manifest tast, whereby to velicate the

the Palat or the Tongue, are yet violently both Vomitive and Cathartick; And how *Mercury*, which is *innociously given in many cases* Crude to Women in labour and others, does easily acquire, besides many other more abstruse Medicinal Qualities, not only an Emetick and Purgative, but a Salivating faculty. For I confesse, that to me, even many of the vulgar Operations of common Drugs seem not to have been hitherto intelligibly explain'd by Physitians, who are yet, for ought I have observ'd, to seek for an account of the manner, how Diureticks, how Sudorificks, how Sarcoticks, and how many other familiar sorts of Medicines, which those that consider them but slightly are wont to think they understand throughly, perform their operations. Nay, I much question, whether the generality of Physitians can yet give us a satisfactory account, why any sort of Medicine purges in general: And he that in particular will shew me, where either the Peripatetick or Galenical Schools, have intelligibly made out, why *Rhubarb* does particularly purge Choler, and *Senna* more peculiarly Phlegm, *Erit mihi magnus Apollo*. For I see not how from those narrow and barren Principles of the four Elements, the four Humours, the four first Qualities (and the like;) Effects, far lesse abstruse then the Operations of Purging Medicines, can satisfactorily be deduc'd. Nor can I find, that any thing makes those Physitians, that are unacquainted with the Philosophy that explains things by the Motions, Sizes, and Figures of little Bodies, imagine they understand the account upon which some Medicines are Purgative, others Emetick, &c. And some Purgative in some Bodies, Vomitive in other, and both Purgative and Vomitive in most; but because they never attentively enquire into it.

But (which is the next thing I have to represent) if we duely make use of those fertile and comprehensive Principles of Philosophy, the Motions, Shapes, Magnitudes and Textures of the Minute parts of Matter, it will not perhaps be more difficult to shew, at least in general, that Specificks may have such Operations, as are by the judicious and experienc'd ascrib'd to them, then it will be for those that acquiesce in the vulgar Principles of Philosophy and Physick, to render the true Reasons of the most obvious and familiar operations of Medicines. And though the same Objection that is urg'd to prove, That a Specifick cannot befriend the Kidnies, for Example, or the Throat, rather then any other parts of the Body, lies against the noxiousness of Poysons to this or that determinate part; Yet experience manifests that some Poysons do respect some particular part of the Body, without equally (if at all sensibly) offending the rest: as we see that *Cantharides* in a certain Dose are noxious to the Kidnies and Bladder, Quicksilver to the Throat, and the glanduls thereabouts, *Strammonium*, to the Brain, and *Opium* to the Animal Spirits and *Genus Nervosum*. And if You call to mind, what we have formerly deduc'd to make it out, That a Humane Body is an Engine, and that Medicines operate in it as finding it so; we need not think it so strange, that there being many Strainers, if I may so call them, of differing Textures, such as the Liver, Spleen, and Kidnies, and perhaps divers local Ferments residing in particular parts, and a Mass of Blood continually streaming through all the parts of the Body, a Medicine may be quickly by the Blood carried from any one part to any other, and the Blood, or any Humour mingl'd with it, may be as easily carried to the Medicine, in what parts soever it be,
and

and the Remedy thus admitted into the Masse of Blood, may in its passage through the Strainers, be so alter'd, either by leaving some of its parts there, or by having them alter'd by the abovemention'd Ferments, or by being associated with some other Corpuscles, it may meet within its passage; whereby the Size, or Figure, or Motion of its small parts may be chang'd, or in a word it may by some of those many other waies, which might, if this *ESSAY* were not too Prolix already, be propos'd, and deduc'd, receive so great an Alteration, in reference either to some or other of the Strainers, or other firmer parts of the Body, or to the distemper'd Blood, or some other fluid and peccant matter, that it needs not seem impossible, That by that time the Medicine (crumb'd as it were into Minute Corpuscles) arrives at the *part* or *humour* to be wrought upon, it may have a notable Operation there. I mean *Part as well as Humour*, because the Motion, Size, or Shape of the Medicinal Corpuscles in the Blood, though not by sense distinguishable from the rest of the Liquor they help to compose, may be so conveniently qualify'd, as to shape, bulk, and motion, as to restore the Strainers to their right Tone or Texture, as well as the Blood to its free and Natural course, by resolving and carrying away with them such tenacious matter, as stuff'd, or choak'd up the slender passages of the Strainer, or at least Straitned its pores, or vitiated their Figure; And the same Sanative Corpuscles may perchance be also fitted to stick to, and thereby to strengthen such Fibres of the Strainers, or such other firmer parts of the Body, as may need congruous Corpuscles to fill up their little unsupply'd Cavities.

Meats that are Salt, and Tartareous, whilst they are whirled about in the Mass of Blood, may by the other part of that Vital Liquor be so diluted and kept asunder so, as not to be of-

fenfive to any part: When they come to be separated by the *Parenchyma* of the Kidnies, from the sweeter parts of the Blood, that did before temper and allay them, they easily, by their Saline pungency, offend the tender Ureters and Membranous Bladders of those that are troubl'd with the Stone or Strangurie. And perchance 'tis upon some such account, that *Cantharides* are more noxious to the Bladder then to other parts of the Body. And as Salt meat thus growes peculiarly offensive to the Reins and Bladder; so a Specifick, dispos'd to be dissolv'd, after a peculiar manner, may, in the Body, either preserve or acquire, as to its Minute parts, a friendly congruity to the Pores of the Kidnies, Liver, or other Strainers equally, when distemper'd; as I formerly observ'd to You, that New-milk sweetned with Sugar-candy, though it be not wont sensibly to affect any other part of the Body; nor would have sensibly affected the Kidnies themselves, had they not been disorder'd, yet after the troublesome operation of *Cantharides*, it had a very friendly effect upon the distemper'd Parts; Thus a Specifick, for one Disease, may be resolved in the Body into Minute particles of such Figure and Motion, that being fit to stick to other Corpuscles of peccant matter, which, by their vehement agitation, or other offensive qualities discompose the Body and make it Feavourish, may allay their vehement Motion, and by altering them, as to bigness and shape, give them new and innocent qualities, instead of those noxious ones they had before.

Another Specifick may dissolve the Gross and Slimy Humours that obstruct the narrow passages of the Veins; as I have observ'd that Spirit of Harts-horn, which powerfully opens other obstructions, and resolves stuffing Phlegm in the Lungs, will also, though more slowly, resolve prepar'd
Flowers

Flowers of *Sulphur*, crude Copper, and divers other Bodies; and also it may, by mortifying the Acid Spirit that oftentimes causes coagulations in the Blood, restore that Vital Liquor to its Fluidity and free Circulation, and thereby remove divers formidable Diseases, which seem to proceed from the Coagulation, or Ropiness of the Blood; and on the other side, the Minute parts of some Specificks, against a contrary Disease, may somewhat thicken and fix the too thin and agitated parts of the Blood, or of some peccant matter in it, by associating themselves therewith: as the nimble parts of pure Spirits of Wine, and those of high rectify'd Spirit of Urine, will concoagulate into Corpuscles, bigger and far less Agile. And the same Spirit of Wine it self, with another Liquor I make, will presently concoagulate into a kind of soft, but not fluid Substance. Nor is it so hard to conceive, that a Specifick may work upon a determinate Part or Humour, and let the others alone: as if you put, for instance, an Egge into strong Vinegar, the Liquor will operate upon and dissolve all the hard shell, and yet leave the tender skin untouch'd; And if you cast Coral into the common rectify'd Spirit of *Tartar*, the far greater part of the Liquor, though strong and spirituous, will remain unalter'd thereby, and may be, *integris viribus*, abstracted from it; but the Coral will presently find out, or rather be found out by Acid or Acetuous Particles, and by incorporating it self with them, take away their sharpness: as in some cases Coral has been observ'd to do to Sower Humours a bounding in Humane Bodies, those Humours being easily, by the Circulating Blood, brought (in their passage) to the Coral, whilst it perhaps remains in the Stomack or Guts. And though the Circulation of the Blood be sufficient to bring, little by little, the Acid Particles of that Liquor in its passage through
the

the Vessels to work upon Coral; yet in other Medicines the Operation may be more nimble: The Remedy quickly diffusing it self through the Mass of Blood, to seek, as it were, and destroy the Acid parts, which it meets with blended with the rest of the Liquor; as Spirit of Urine being instead of Coral put into the above mention'd Spirit of Tartar will not (that I have observ'd) fasten it self to the Spirituous nor the Phlegmatick parts of the Liquor, but only to the Acid ones, which it will Mortifie or deprive of their Sowerness by coagulating with them. And I see not why it should be more inconceivable that a Specifick should have a peculiar Vertue to free the Body from this or that peccant Humour, and a benign congruity to the distemper'd Spleen or Liver, then that some Cathartick should purge Electively, and some Antidotes have peculiar Vertues against such Poysons, whose Malignity particularly invades the Brain or Kidnies, or some other determinate part: the former of which the Physitians, we reason with, scruple not to teach, and the latter of which is taught us not by them only, but by Experience too.

[Of the credibility of Specificks, and of the Efficacy even of some unlikely ones, we might easily enough present You with more Proofs and Examples: But these may possibly be sufficient for our present purpose; especially if you duely consider, that as Physick has ow'd its beginning to Experience, so those that practise it must enlarge and rectifie their Principles, according to the new discoveries, which are made from time to time of the Operations and Power of the productions, whether of Nature or of Art. This consideration I thought to insist upon in my own Expressions; but finding lately the same Notion which I had, to have been long since that of the ancient Empericks, I will summe up what

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I meant to say in their words, as I find them wittily deliver'd by *Celsus*, in that excellent Preface, where having spoken in their Sense of the Origin of Physick, He continues *Sic Medicinam ortam, subinde aliorum salute aliorum interitu perniciofa discernentem a salutaribus: Repertis deinde Medicinae remediis, homines de rationibus eorum differere capisse; nec post Rationem, Medicinam esse inventam, sed post inventam Medicinam, Rationem esse quaesitam.* And least the mistaken name of Emperick should make you undervalue so useful a Consideration, which not the nature of their Sect, but that of the thing, suggested to them; I shall adde in favour of what we have deliver'd concerning experienced, though otherwise unlikely Remedies, that 'tis a sentence ascrib'd to *Aristotle* (and in my opinion, one of the best that is ascrib'd to him,) *Ubi res constat, si opinio adversetur rei, quarendam rationem non rem ignorandam.*]

And certainly *Pyrophilus*, though there be scarce any sort of men, whose credulity may do the World more mischief then that of Physitians; yet perhaps, neither nature nor mankind is much beholden to those, that too rigidly, or narrowly, circumscribe, or confine the operations of Nature, and will not so much as allow themselves or others to try whether it be possible for *Nature* excited and manag'd by *Art* to performe divers things which *they* never yet saw done, or work by divers waies, differing from any, which by the common Principles that are yet taught in the Schools, they are able to give a satisfactory account of.

To the many things which you may be pleased to apply to this purpose, out of the precedent Discourse, divers others may be added; if without tiring you, they may be now insisted on. It would scarce have been believed some ages since, by those that knew no other then Vegetable Purges
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and Vomits, that a Cup made of a Concret, insuperable by the Heat of Humane Stomacks should, by having for a while, Wine or any such other Liquor, barely powr'd on it to make an infusion, without any sensible diminution of its own bulk or weight, and without any sensible alteration made in the Colour, Taste, or Smell of the Wine, communicate to it a strongly Emetick and Cathartick Vertue, and prove oftentimes Vomitive, ev'n when put up in Clysters; and yet that this is performable by Antimony, slightly prepared with Salt-peter, or without addition, melted into a Transparent Glasse, is commonly known to those that are not Strangers to the Operations of the Antimonial Cup, and of the Glass made of the same Mineral. And much more strange is that which is affirmed by inquisitive Physitians upon their own Trial of the common *Crocus Metallorum*, or somewhat corrected Antimony wont to be sold in Shops, namely, That a few Drachmes of it, infus'd into some ounces of Wine, will make the Liquor work so strongly, as if six or eight times the quantity had been steep'd in it.

Those that believe that all Diaphoreticks must consist of subtle, sapid and fugitive parts, as if only such were easily separated from each other, and agitated by the gentle heat of a Humane body, will scarce expect that any body could, in a moderate Dose, be a good Sudorifick, that is so fixt as to be able to persist divers hours in a good Fire. And yet that *Antimonium Diaphoreticum* is such a Concrete, is now very well known to many besides Chymists.

That a Stone, and a Stone too so fixed, that it will sustaine the violence of reverberated Fire, and is consequently very unlike to be much wrought upon, or digested by the heat of a Humane Stomach, should be capable of agglutinating together the parts of broken bones, would seem impossible

fible to many, but 'tis very well known to those that have made tryal of the efficacy of the *Lapis Ossifragus*: for though I have sometimes wondred at the Fixtness of this Stone, above others, in the Fire, yet being for some days successively drunk in Wine, or *Aqua Symphyti*, to the quantity of about half a Drachme, or more, it doth so wonderfully cement together the parts of broken and well-set Bones, that it deserves the name it commonly hath in the Shops of *Osteocolla*, and hath wonders related of it by several eminent, not onely Chymical, but *Galenical* Writers.

'Tis almost incredible what *Quercetane* relates of what himself saw done with it as to the cure of broken Bones, without much pain or any of the usual grievous Symptoms, within four or five days; so that to the stupendous Vertue he ascribes to this Stone, both inwardly given and outwardly applyed, in the form of a *Poultis*, with onely beaten *Geranium* and Oyl of Roses or Olives, he thinks fit to annex these words: *Quod incredibile videri posset, nisi prater me innumerabiles alii oculati & idonei testes extarent.* And indeed these need good proof to make a wary Man believe so strange a thing, since Chirurgions observe, That Nature is wont to be forty days in producing a *Callus* to fasten together the pieces of a broken Bone. But to make this the more credible by the testimony of Authors more *Galenically* inclin'd, *Matthiolus* relates, That in many the Bones having been very well set (which Circumstance he requires as necessary) have had their broken Parts conglutinated within three or four days: And not only that most experienced Chirurgeon *Fabricius Hildanus* us'd it much in Fractures, with onely a little Cinnamon and Suger to make it pleasant; but the Learned *Sennertus*, who somewhere calls its Vertue admirable, thinks it requisite, in his Chirurgery, to give us this caution of it:

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Verum

Fab. Cent. 3.
obser. 90.

Lib. 5. Part. 5.
Cap. 1.

Verum in juvenibus & iis qui boni sunt habitus callum nimis auget: Quapropter caute & non nisi in adultioribus exhibendus:
 The warrantableness of which caution, and consequently the strange efficacy of *Osteocolla*, was, I remember, confirm'd to me not long since by a skilful Physitian who hath particularly studyed its nature; and related to me, That some Years since his Mother, having by a fall broken her Leg near the Knee, had too suddenly, by the over-much use of this Stone, a *Callus* produced in the part much bigger then he expected or desired.

He that, before the salivating Property of *Mercury* was discovered, should have told Physitians of the despondent temper of these, we are now discoursing with, that besides the known ways of disburthening Nature (namely by Vomit, Siege, Urine, Sweat, and insensible Transpiration) there were a sort of Remedies, that would make very large Evacuations by Spittle, and thereby cure divers stubborn Diseases that had been found refractory to all ordinary Remedies, would certainly have been more likely to be derided, then believed by them; since no known Remedy, besides *Mercury*, hath been, that I remember, observed to work regularly by Salivation: (for though *Ceruss* of *Antimony* have been observed to make Men, of some Constitutions, apt to spit much, yet it works that way too languidly, to deserve the name of a Salivating Remedy; and probably oweth the quality it hath of enclining to spit, to the *Mercurial* part of the *Antimony*, wherewith the *Regulus* it is made of abounds) and therefore the greater their experience of the Effects of Medicinal Operations should be supposed to be, the greater indisposition it would give them to credit so unallyed a Truth. And yet the reality of this Fluxing Property of Quick-silver is long since grown past question, and hath been

been found so useful in the cure of the most radicated and obstinate Venereal Distempers, that I somewhat wonder those Physicians, that scruple not to employ as boisterous ways of Cure, have not yet applyed it to the extirpation of some other Diseases; as Ulcers of the Kidnies, Consumptions, and even Palsies, &c. wherein I am apt to think, it may be as effectual as in those produced by Lust, and much more effectual then vulgar Remedies, provided that the exceeding troublesome way of working of salivating Medicines be better corrected then it is wont to be, in the ordinary Medicines employed to produce Salivation, which they do with such tormenting Symptomes, that they are scarcely supportable. But if purified Quick-silver be dexterously precipitated by a long and competent digestion, with a due proportion of refined Gold, Experience hath informed us, that the salivating Operation of it may be performed with much less uneasiness to the Patient. And that such *Mercurial* Medicines, wherein the Quick-silver is well corrected by Gold, may produce more then ordinary effects, we have been enclined to believe, by the tryals which we procured by Learned Physicians to be made in other then Venereal Diseases, of a gently working precipitate of Gold and *Mercury*, of which we may elsewhere set you down the Process.

[And now I am upon the Discourse of the peculiar Operations of *Mercury*, and of unusual ways of Evacuation, I am tempted to subjoyn an odde Story, which may afford notable hints to a speculative Man, as it was related to me both in private, and before Illustrious Witnesses, by the formerly commended Chymist of the *French* King: He told me then awhile since, that there is yet living a Person of Quality, by name *Monsieur de Vatteville*, well known by the Command he hath or had of a Regiment of *Swissers* in

France, who, many Years ago following the Wars in the *Low Countries*, fell into a violent Distemper of his Eyes, which, in spite of what Physitians and Chirurgions could do, did in a few Moneths so increase, that he lost the use of both his Eyes, and languish'd long in a confirm'd Blindness; which continued till he heard of a certain Emperick at *Amsterdam*, commonly known by the name of *Adrian Glas-maker* (for indeed he was a Glasier) who being cry'd up for prodigious Cures he had done with a certain Powder, this Colonel resorted to him, and the Emperick having discours'd with him, undertook his Recovery, if he would undergo the torment of the Cure; which the Colonel having undertaken to do, the Chirurgion made him snuff up into each Nostril, about a Grain of a certain *Mercurial* Powder, which, in a strangely violent manner, quickly wrought with him almost all imaginable ways, as by Vomit, Siege, Sweat, Urine, Spitting and Tears, within ten or twelve hours that this Operation lasted, making his Head also to swell very much: But within three or four days after this single taking of the Drastick Medicine had done working, he began to recover some degree of Sight, and within a Fortnight attained to such a one, that he himself assur'd the Relater, He never was so Sharp-sighted before his Blindness. And the Relater assured me, that he had taken pleasure to observe, That this Gentleman, who is his familiar Acquaintance, would discern Objects farther and clearer then most other Men. He added, That *Monsieur de Vatteville* told the Relater, he had purchas'd the way of making this Powder of the Emperick, and had given it to an eminent Chirurgion, one *Benoeft* (an Acquaintance of the Relaters) by whom he had been cured of a Musket-shot that had broken his Thigh-bone, when the other Chirurgions would have proceeded to amputation; and

and that this *Benoeft* had with this Powder, administred as before is related, cur'd a Gentlewoman of a *Cancer* in the Breast. All which, and more, was confirm'd to the Relater by the Chirurgion himself. But in what other stubborn and deplorable Cases they use this Powder, I do not particularly remember. The Preparation of it, which a Chymist did me the favor to tell me by word of mouth, as a thing himself had also made, was in short this: That the Remedy was made by precipitating Quick-silver, with good Oyl of Vitriol, and so making a *Turbith*, which is afterwards to be dulcified by abstracting twenty, or twenty five, times from it pure Spirit of Wine, of which fresh must be taken at every abstraction. But I would not advise you to recommend so furious a Powder to any, that is not a very skilful Chymist and Physitian too, till you know the exact Preparation, and particular uses of it; the reason of my mentioning it here, being but that which I expressed at the entrance upon this Narrative.]

CHAP. XX.

YOU will perchance wonder, *Pyrophilus*, that having had so fair an opportunity as the subject of this Essay afforded me, of discoursing to you about the Universal Medicine, which many *Paracelsians*, *Helmontians*, and other Chymists talk of so confidently: I have said nothing concerning the existence, or so much as the possibility of it. But till I be better satisfied about those Particulars then yet I have been, I am unwilling either to seem to believe what I am not yet convinced of, or to assert any thing, that may tend to discourage Humane Industry; and therefore I shall onely venture to adde on this occasion, That I fear we do somewhat

too much confine our hopes, when we think, that one generous Remedy can scarce be effectual in several Diseases, if their causes be supposed to be a little differing. For, the *Theory* of Diseases is not, I fear, so accurate and certain as to make it fit for us to neglect the manifest or hopeful Vertues of noble Remedies, where ever we cannot reconcile them to that *Theory*. He that considers what not unfrequently happens in distempered Bodies by the *Metastasis* of the Morbifique matter (as for instance, how that which in the Lungs caused a violent cough removed up to the head may produce (as we have observed) a quick decay of Memory and Ratiocination, and a Palsie in the Hands and other Limbs) may enough discern that Diseases that appear very differing, may easily be produced by a peccant matter of the same nature only variously determined in its operations by the constitution of the parts of the body where it settleth: and consequently it may seem probable to him, that the same searching Medicine being endowed with qualities destructive to the texture of that Morbifique matter, where ever it finds it, may be able to cure either all, or the greatest part, of the Diseases which the various translation of such a Matter hath been observed to beget. Moreover, it oftentimes happens that Diseases, that seem of a contrary nature, may proceed from the same cause variously circumstantiated; or (if you please) that of divers Diseases, that may both seem primary, the one is but Symptomatical or at most Secondary in relation to the other; as a Dropsy and a slow Feaver may, to unskillfull men, seem Diseases of a quite contrary nature, (the one being reputed a hot and dry, the other a cold and moist Distemper) though expert Physitians know they may both proceed from the same Cause, and be cured by the same Remedy: And in women experience manifests, that a great variety of

of differing Distempers, which by unskilful Physicians have been adjudged distinct and primary Diseases, and have been, as such, unsuccessfully dealt with by them, may really be but disguised Symptomes of the distempers of the Mother or *Genus Nervosum*; and may, by Remedies reputed *Antihysterical*, be happily removed. To which purpose I might tell you, *Pyro*. That I, not long since, knew a Practitioner, that with great success used the same Remedies (which were chiefly Volatile and Resolving Salts) in Dropsies, and in (not, Symptomatical, but) Essential Feavers. And our selves have lately made some Experiments of not much unlike nature, with a preparation of Harts-horn, of equal use in Feavers and Coughs, both of them primary. I might on this occasion recur to divers of the Remedies formerly mentioned in several places of this Essay; since divers of them have been found effectual against Diseases, which, according to our common Theory, seem to be little of kin one to another: And by telling you what I have observed concerning the various operations of *Helmont's Laudanum*, of our *Ens Veneris*, and even of a Medicine devised by a Woman, the *Lady Kents Powder*, I might illustrate what I have lately delivered: But it is high time for me to pass on to another Subject; and therefore I shall rather desire you, in general, to consider, whether or no several Differing Diseases, and ev'n some commonly supposed to be of contrary natures, be not yearly cured by the *Spaa waters* in *Germany*.

And to assist you in this Enquiry, I shall address you to the rare *Observations* of the famous and experienc'd *Henricus ab Heer*, and to his *Spadacrene*; in the 8th Chapter of which he reckons among the Diseases which those Waters cure, Catarrhs, and the Distempers, which (according to him) spring from thence; as the Palsie, Trembling of the Joints,
and

and other Diseases of kin to these, Convulsions, *Cephalalgia*, (I name them in the order, wherein I finde them set down) *Hemicrania*, *Vertigo*, Redness of the Eyes, of the Face, the *Erysipelata*, *Ructus continui*, *Vomitus*, *Singultus*, Obstructions, and even Scyrhus's, if not inveterate, of the Liver and Spleen, and the Diseases springing thence; the Yellow Jaundise, *Melancholia flatulenta seu Hypochondriaca*, Dropsies, Gravel, Ulcers of the Kidnies, and *Caruncula in meatu urinario*, *Gonorrhæas*, and resembling affections, *Elephantiasis* or the Leprosie, *fluor albus mulierum*, Cancers and Scyrrhus's of the Womb, Fluxes and even Dysenteries; the Worms (though very obstinate, and sometimes so copious as to be voided in his presence, even with the Urine) Sterility, and not onely the *Scabies* in the Body and Neck of the Bladder, and clammy pituitous Matter collected therein, besides Ulcers in the *Sphincter* of it: but he relates, upon the repeated Testimony of an eminent Person that he names, and one whom he stiles *Vir omni fide dignissimus*, That this Party being troubled with a very great Stone in his Bladder, and having had it search'd by divers *Lythotomists*, before he came to the *Spaa*, did, by very copiously drinking these Waters, finde, by a second search made by those Artists, that his Stone was much diminished the first Year, and (by the same way of tryal) that it was so the second Year. And of the Cures of these Diseases, the Physitian mentions in the same Chapter, as to many of them, particular and remarkable Instances; and in the beginning of the next Chapter, having told his Readers that he expects they should scarce believe these Waters can have such variety of Vertues, *Cæterum*, saith he, *si in Spaa maturè & constantibus naturalibus, vitalibusq; facultatibus venerint; aquasq; quo dicemus modo biberint, indubiè quæ dixi, vera esse fatebuntur*: And though

though we be not bound to believe (nor doth he affirm it) that the Spaa-waters do *universally* cure all the afore-mention'd Distempers; y^t it is very much, and makes much for our present purpose, that they should in so many Patients cure most of these Distempers, and lessen, if not cure, the rest. And we may somewhat the better credit him, because even where he reckons up the Vertues of the Spaa, he denys it some, which other Physicians ascribe to it. And it is very considerable, what he subjoyns in these words: *Paucissimos enim vel nullos Spada Incolas Capitis doloribus, Cardialgiâ, Calculo, Obstructionibus renum, Hepatis, Lienis, Mesaraicarum, laborantes invenies, Ictericos, Hydropicos, Podagricos, Scabiosos, Epilepticos, quod sciam, nullos.* But that which I most desire you to take notice of, is, That besides all the above-mention'd Diseases, I finde that he ascribes to these Waters the Vertues of curing such as are counted of a contrary nature, and are thought to require contrary Remedies: For besides that, he expressly affirms, in the beginning of the eighth Chapter, That these Waters being endow'd with the Vertues both of hot and cold Minerals, they cure both hot and cold affections, in the same Patients, and in differing Bodies, and that contrary Effects are performed by them: He hath, after some Pages, this passage, which may go for an Illustrious Proof of what he had asserted: *Inter cetera* (saith he, speaking of the Spaa-Waters) *Mensibus movendis imprimis idonea, quod millies experientia comprobavit. Et tamen nimium eorum fluxum quovis alio medicamento felicius sistit.*

These Testimonies, *Pyrophilus*, of our experienc'd Author, would perhaps obtain the more credit with You, if You had seen what I lately had the opportunity to observe in a hot and dry Season, at our own Tunbridge-Waters in Kent, when

I was there to drink them. And therefore I shall again invite You not onely to consider, Whether one potent Remedy, such as it may be, may not be able to cure variety of Diseases, and some suppos'd to be of contrary natures? But whether or no divers Persons, on whom the received *Methodus medendi* hath been long and fruitlessly employ'd, be not by their tyred and despondent Physitians themselves sent thither, and there cur'd of their abstruse and obstinate Diseases, by Remedies prepar'd by Nature without the assistance of Art? For if you duly reflect on this conspicuous Observation, and consider how much it is possible for Art to meliorate and improve most (especially Mineral) Remedies, afforded us by Nature, you would probably dare to hope, That Medicines might be prepared of greater Efficacy, and applicable to more Diseases, then they who think the more received Theory of Diseases (from which yet very eminent Physitians, in divers Particulars, scruple not to recede) incapable of being rectified; and that judge of all Remedies by them, that are publicly Venal in Apothecaries Shops, will allow themselves so much as to hope.

If now You demand, *Pyrophilus*, if I think that every Particular which hath contributed to swell this Discourse into a bulk so disproportionate to that which the Title of an Essay promised, do directly belong to the Art of Physick? I shall leave it to the Judicious *Celsus* (whom Learned Men have stiled *The Roman Hippocrates*) to answer for me, and he will tell you, That *Quaquam multa sint ad ipsas artes non pertinentia, tamen eas adjuvant excitando artificis ingenium.* I suppose I need not remind You, *Pyrophilus*, that it was not my design, in what hath been represented, to subvert those Principles of the *Methodus medendi*, from which no sober Physitians themselves recede, and in which they unanimously

mously acquies: And that I much less intend to countenance those venturous Empericks, who, without any competent knowledge of Anatomy, Botanicks, and the History of Diseases, think Receipts or Processes alone can enable them to cure the Sickneses they know not, and who would perswade Men to lay by, as needless, a Profession, of whose Usefulness to Mankind we may elsewhere have occasion to discourse. No, *Pyrophilus*, without peremptorily asserting any thing, I have but barely represented the Notions I have mention'd concerning the *Methodus medendi*, as things probable enough to deserve to be impartially considered; That in case they prove fit to be declin'd, they may appear to have been rejected not by our superciliousness or laziness, but (after a fair tryal) by our experience: And in case they seem fit to be approved, they may prove additional Instances of the Usefulness of *Natural Philosophy* to Physick. Which Usefulness, *Pyrophilus*, if I have in any considerable measure been so happy as to make out, I shall not think the time (and much less the pains) I have bestow'd upon that Theme, mispent. For, I must confess to you, *Pyrophilus*, that to me it seems, that few things ought more to endear to us the Study of *Natural Philosophy*, then that (according to the Judicious Sentence of our *Celsus*, *Rerum Naturæ contemplatio*, saith he, *quamvis non faciat Medicum, aptiorem tamen Medicina reddit*) a deeper insight into Nature may enable Men to apply the Physiological Discoveries made by it (though some more immediately, and some less directly) to the Advancement and Improvement of Physick.

And I well enough know, *Pyrophilus*, that if instead of Writing this Essay to such an one as You, I should Write it to the more critical and severer sort of Readers, they would be apt to think both that it is impertinent for me, who do not

profess to be a Physician, to treat proluxly of Matters Medicinal; and that it may appear somewhat below me, in a Book, whose Title seems to promise you Philosophical Matters, to insert I know not how many Receipts: But I shall not scruple to tell such a Person as *Pyrophilus*, That since my Method requir'd that I should say something to you of the *Therapeutical* part of Physick, I thought that Christianity and Humanity it self, oblig'd me not to conceal those things, w^{ch} how despicable soever they may seem to a speculative Philosopher, are yet such, as, besides that *some* of them may perhaps afford improveable Hints touching the Nature of Remedies, if not also of Diseases, Experience hath encouraged me to hope, that *others* may prove useful to the sick. And as for the inserting of Receipts, even in Books of Philosophical Subjects, I have not done it altogether without example. For not onely *Pliny*, a Person of great Dignity as well as Parts, and Friend to one of the greatest *Roman* Emperors, hath left us in a Book, where he handles many Philosophical Matters, store of particular Receipts; but our great Chancellor, The Lord *Verulam*, hath not disdain'd to Record some. And as for that Industrious Benefactor to Experimental Knowledge, the Learned and Pious *Mersennus*, his Charity made him much more fearful to neglect the doing what good he could to others, then to venture to lessen his Reputation by an *Indecorum*, that in a Mathematical Book, and in a Chapter of Arithmetical Combinations, he brings in not onely a Remedy against the *Erysipelas*, but even a Medicine for Corns, where he tells us, That they may be taken away, by applying and daily renewing for ten days, or a fortnight, the middle Stalk that grows between the Blade and the Root (for that I suppose he means by the unusual Word *Thallum*) of Garlick, bruisd. Nor is it

it without Examples, though somewhat contrary to my Custom in my other Writings, that in this, and the four precedent Essays, I have frequently enough alledged the Testimonies of others, and divers times set down Proccesses or Receipts, not of my own devising. For even among professed and learned Physicians, scarce any thing is more common, then on Subjects far less of kin to Paradoxes, then most of those I have been discoursing of, to make use of the Testimonies and Observations of other approved Writers, to confirm what they teach. And not now to mention the voluminous Books of *Schenkius* and *Scolzius*, that famous and experienc'd Practitioner *Riverius* himself, hath not been ashamed to publish together a good number of Receipts, given him by others, under the very Title of *Observationes communicatae*: And *Henricus ab Heer*, hath, among his *Observationes oppidorarum*, divers Receipts that came from Mountebancks, and even Gypsies. And therefore I hope that you, who know that it is not after every Body that I would so much as relate an Observation, or mention a Medicine, as thinking them probable, will easily excuse one that hath much fewer Opportunities then a profess'd Physician to try Remedies himself; if treating of Subjects not so familiar, I choose to countenance what I deliver by the Testimonies of skilful Men, and if I scruple not to preserve in these Papers some not despicable Remedies, as well of abler Men as of my own, that otherwise would probably be lost. But of this Practise I may elsewhere have occasion to give you a more full Apology, by shewing how much it may conduce to the enriching and advancement of Physick; an Art, with whose praises I could long entertain You, if I were at leisure (and durst allow my self) to exhaust common places.

And yet give me leave to tell you, That Man is so noble
a Creature,

a Creature, and his Health so requisite to his being able to relish other goods ; and oftentimes also to the comfortable performance of what his Conscience, his Country, his Family, his Necessities, and perhaps his allowable Curiosity challenge from him, that I wonder not so much at those Antient Heathens, that being Polytheists and Idolaters, thought themselves oblig'd, either to refer so useful an Art as that of Physick, to the Gods or God-like Persons ; or to add those, that excell'd in so noble a Faculty, to the number of those they worshipp'd. For my part, *Pyrophilus*, a very tender and sickly Constitution of my own, much (impair'd by such unhappy Accidents as Falls, Bruises, &c.) hath, besides (as I hope) better motives of Compassion, given me so great a sense of the uneasinesses that are wont to attend Sicknes, that I confess, if I study Chymistry, 'tis very much out of hope, that it may be usefully imploy'd against stubborn Diseases, and relieve some languishing Patients with less pain and trouble, then otherwise they are like to undergoe for Recovery. And really, *Pyrophilus*, unless we will too grossly flatter ourselves, we can scarce avoid both discerning and deploring the ineffectualness of our vulgar Medicines, not onely *Galenical*, but Chymical ; (for an active Body may yet be but a languid Remedy.) For besides that many that recover upon the use of them, endure more for Health, then many that are justly reckon'd among Martyrs, did for Religion ; Besides this, I say, we daily meet with but too many in the case of that bleeding Woman, mention'd in the Gospel, of whom 'tis said, That she had suffer'd many things of many Physitians, and had spent all that she had, and was nothing better'd, but rather grew worse. And therefore I reckon the investigation and divulging of useful Truths in Physick, and the discovering and recommending of good Remedies among the greatest and most

Mark 5. 26.

most extensive Acts of Charity, and such, as by which a Man may really more oblige Man-kinde, and relieve more distressed Persons, then if he built an Hospital. Which perhaps you will not think rashly said, if you please but to consider, how many the knowledge of the Salivating, and other active Properties of *Mercury*, and of its enmity to putrefaction and Distempers springing thence, have cur'd of several Diseases, and consequently how many more Patients, then have recover'd in the greatest Hospital in the world, are oblig'd to *Carpus* and those others, who ever they were, that were the first discoverers of the medical efficacy of *Quick-silver*. And for my own particular, *Pyroph.* though my Youth and Condition forbid me the practice of Physick, and though my unhappy Constitution of Body, kept divers Remedies from doing me the same good they are wont to do others; yet having more then once, prepar'd, and sometimes occasionally had opportunity to administer, Medicines, which God hath been so far pleas'd to bless on others, as to make them Relieve several Patients, and seem (at least) to have snatch'd some of them almost out of the jaws of death; I esteem myself by those successes alone sufficiently recompenc'd for any toil and charge my Enquiries into Nature may have cost me. And though I ignore not, that 'tis a much more fashionable and celebrated Practice in young Gentlemen, to kill men, then to cure them; And that, mistaken Mortals think it the noblest Exercise of vertue to destroy the noblest Workmanship of Nature, (and indeed in some few cases the requisite-ness and danger of *destructive valour* may make its Actions become a vertuous Patriot) yet when I consider the Character, given of our great Master and Exemplar, in that Scripture, which says, *That he went about doing good, and Healing all manner of Sickness; and all maner of Disease among the people,*

Acts 10. 38.

Mat. 4. 24.

John 5. 14.
2 Kings 19. 35.

ple, I cannot but think such an Employment worthy of the very noblest of his Disciples. And I confess, that, if it were allow'd me to envy creatures so much above us, as are the Celestial Spirits, I should much more envy that welcome Angels Charitable employment, who at set times diffus'd a healing vertue through the troubled waters of *Bet esda*, then that dreadful Angels fatal employment, who in one night destroy'd above a hundred and fourscore thousand fighting men. But, of the Desireableness of the skill and willingness to cure the sick, and relieve not only those that languish in Hospitals, but those that are rich enough to build them, having elsewhere purposely discoursed, I must now trouble you no longer on this Theme, but Implore Your much needed pardon for my having been (beyond my first intentions) so troublesome to You already.

A N
A P P E N D I X
TO THE
F I R S T S E C T I O N
OF THE
Second Part.

P P

APPENDIX
TO THE
FIRST SECTION
OF THE
Second Part.

Advertisements touching the following
 A P P E N D I X.

I Scarce doubt, but it will be expected that I should annex to the foregoing Treatise, those Receipts and Procesſes, which seem to be here and there promis'd in it; But I desire it may be considered, that some Passages, which an un-attentive Reader may have mistaken for absolute Promises, are indeed but Profers conditionally made to a particular Person, and so not engaging me, till the condition (which was his desiring the things mention'd to him) be on his part perform'd. And as for the other things, which every Reader may suppose to be promis'd Him, I have at hand this general excuse, that at least I promis'd nothing to the Publick; whatever promises I may have made in the foregoing ESSAYS, having together with them been address'd to a private Friend. And I have two or three special Reasons to insist on this Excuse, for divers of my choicer Books and Papers, having not long since unhappily miscarried through the negligence of some Men, or the Fraud of others, it is not now possible for me to retrieve some of the things I was Master of, when I promis'd them. And then to revise carefully all the Papers that remain in my hands of Affinity with the past Treatises, would take up more time then is allow'd me by other Studies and Employments, which I think of greater moment, or at least wherein I am much more concern'd, then to give this Book at present a full or accurate APPENDIX.

But though I might upon these and other Reasons wholly excuse my self from the trouble of adding any Appendix, yet because the communicating of good Medicines, is a work of Charity, and those unpolish'd and immethodical Notes that may perchance disparage an Author, may yet relieve many a Patient, I am willing to do what my occasions will permit, and finding among my Papers many loose Sheets, concerning Spirit of Harts-horn, Blood, &c. written divers years since to a Friend, I choose rather to publish them just as I find them with *Pyrophilus's* name, employ'd in convenient places, and to adde some unpromis'd Receipts, instead of those that are lost, then be altogether wanting, to what may be expected from me. I know that what I deliver concerning some of the following Preparations may by severer Criticks be thought somewhat unaccurate, and I confess I am of that mind my self. But meeting with these Collections in loose Sheets among my old Papers, I must either publish them as I find them, or take the pains to Polish and Contract them, which would require more time, then I can at present afford them. And much less can I stay to subjoyn the Histories of the particular cures perform'd by the Medicines, whose preparations I set down, though divers of them would not perhaps appear inconsiderable. But if I find by the entertainment of these Papers, that it will be worth while to revise or enlarge them, I may, God permitting, be invited to do it, and either supply the things, that are here deficient out of After-observations) or Papers now out of the way, or make amends for their omission in substituting better things.

It will not at all surprize me if some Readers think me too prolix in delivering the preparations of Harts-horn, *Ens Veneris* &c. with such particular and circumstantial Observations. But my design being to gratifie and assist those
that

that would make and use the Remedies I recommend: The Experience I have had, of the difficulties most men find in the preparing things by the Direction of Chymical Processes not very expressly set down, makes me apt to hope, that (I say not the great Physitians or Chymists, who may if they please, leave them unperus'd; but) those for whom I principally intend my Directions will think my having made them so particular a very excusable fault. And I make the lesse difficulty to suffer such things as perhaps I judg to be in comparison of others, but trifles to passe abroad, because finding of late Years, that many Persons of Quality of either Sex, who scarce read any other then English Books, have (as I hope) out of Charity or Curiosity or both, begun to addict themselves to Chymistry, and venture to be tampering with Spagirical Remedies, it may not be unseasonable to supply them with some Preparations, that may both save them time and charges, and put them upon the use of Remedies, which without being languid, are, if any thing discreetly given, safe and innocent, and wherein a little Error, either in the making or the administering will be far lesse prejudicial to the sick, then if it were committed in the more vulgar (oftentimes, either falsly or obscurely prescrib'd) preparations they are wont to make of Acid Salts, Mercury, Antimony, and other Minerals, whose Activity for the most part makes them need to be skilfully prepar'd, and judiciously given.

To

To the Eightieth Page.

The Irish Lithotomists Receipt, for the Stone in the Bladder.

REc. *Aquar. Melon. Citrullor, Filipendula, Petroselin,*
syr. è 5 radicibus, syr. de Bisantiis, ana, unc. ij. Oxy-melit
comp. unc. j. misce, quarum mixti partem sumas manè jejunus, &
postea per octo horas à cibo & potu abstineas, aliam sumas par-
tem eodem die post coenam cum lectum intrare volueris; deni-
q; sequenti die reliquæ sumantur partes ut primæ; tertio verò die.

Rec. *Elect. lenit. dragm. iii. syr. Rosat. solut. dragm. ij. pulp.*
Tamarind. dragm. j. misceantur ac in seri lactis unc. iiij. dissol-
vantur: totum bibas mane quatuor horis ante jus, quarto die sumas
mane sequentis pulv. dragm. j. mixti in sequentis Apozematis
unc. iiij. & olei Amygd. dulc. unc. sem.

Rec. *Cinerum vitri*, & Scorpionum pulveris, Lapid. Spongia,*
& lap. Judaici, Acori, sem Althea, Millii solis, Saxifragii ana
dragm. i. sem lactuca, & sem. frigid majorum ana dragm. sem.
Trokiscor. Alkekengi, rad. pimpinella ana dragm. ii, fiat pulvis
subtilis.

Apozema.

Rec. *Parietaria, rad Alth. ana Mj sem. petroselini, Glychyr-*
rhiza ana unc. sem. halicacabi, unc. j. Coqu. in aq. pluviae, sext. 2.
& vini albissimi sext. i. ad medietatis consumptionem, & cola-
tura melle hybernico dulcoretur.

Tum quarto illo die passerulum Trogloditem sale antea con-
 ditum edas una cum cena, Et post coenam lumbi, pubes,
 & tota renum regio oleis è granis Citri & scorpion. liniantur,
 etsi possibile esset prædicta olea per meatum urinar. in vesi-
 cam injiciantur, sicq; deinde pulvere, Apozemate, Troglodite &
 Oleis

oleis omni die utere, donec arenula aut lap. fragmenta una cum expulsis apparuerint.

Loco cinerum vitri sumi possunt cineres Camini & vires cinerum scorpionum supplere potest pulvis lumbricor. terrestr. probè in vino lotorum & postea exsiccatorum.

* NB. [As far as I could conjecture by the Discourse I had with the owner of the Receipt, by Ashes of Glass he means the superfluous Saline substance, which the Glassemen are wont to call *Sandiver*; but because he did not explain himself so clearly, and we know not yet a way of Burning Glass to Ashes, I think it will be most advisable to substitute the Wood Ashes, which in the Receipt it self towards the close of it are appointed for a *Succedaneum*.]

To the One Hundred and Twentieth Page;

[*Where the Vertues of the Pilulæ Lunares are toucht at.*]

THE great benefit that has redounded to many patients, from the use of the *Silver Pils*, here briefly mention'd, and commended, invites me to communicate as a considerable thing, the preparation of them, of which I do not pretend to be the Inventer; having divers years since, learnt it by discoursing with a very Ancient and experienc'd Chymist, whose name that I do not mention, will perhaps seem somewhat strange to those Readers that have observ'd me not to be backward in acknowledging my Benefactors in point of Experiments, and therefore I hold it not amiss to take this opportunity of declaring once for all, that twere oftentimes more prejudicial then grateful to one that makes an advantage by the Practise of Physick, to annex in his life

time

time his name to some of his Receipts or Processes; because that when a Man has once got a repute, for having a Specifick in any particular Disease or Case, his Patients, and their Friends will hardly forbear to apply themselves to him for that Medicine, though the same Medicine, but not known to be the same, should be made use of by a stranger, or divulged in a Printed Book. Most Patients being not apt to rely upon Medicines, that come onely that way recommended; whereas if it were known that the Printed Receipt is the self same, which the Physitian employs, not only other Physitians would quickly make as much advantage of it as he, but many Patients would think themselves by that discovery dispens'd with, in point of good husbandry, from going to any Physitian at all, as knowing before hand the best prescription they are like to receive from him. The *Process* of the *Pilula Lunares* is this;

Take of the best refined Silver as much as You please, dissolve it in a sufficient quantity of cleans'd spirit of Nitre or *Aqua fortis*, then evaporating away the superfluous moisture, let the rest shoot into thin Chrystals; these you may in some open mouth'd Glass place in sand, and keep in such a degree of Heat, that by the help of very frequently stirring them, the greatest part of the more loose and stinking Spirits of the *Menstruum* may be driven away, and yet the remaining Chrystals not be brought to Flow: These Chrystals of Silver you must counterpoise with an equal weight of Chrystals of Nitre; and first dissolving each of them apart in distill'd Rain-water, You must afterwards mingle the Solutions, and abstract or steam away the superfluous moisture, till the remaining Mass be dry, which you must keep in an open Glass, expos'd to such a temperate heat of Sand, that the Matter may not melt (which you must be very careful

ful of) and that yet the adhering corrosive Spirits of the *Menstruum* might be driven away. And to both these ends You must from time to time stir the Mass, that new parts of it may be expos'd to the Heat, and new ones to the Air, till you cannot descry in the remaining white Powder any offensive scent of the Spirit of Nitre, or of the *Aqua-Fortis*. And lastly You must take the Crum of good White-bread, made with a little moysture into a stiff Past, and exactly mingle with the newly mention'd Magistery or Powder as much of this Past, as is necessary to give it the consistence of a Mass of Pills, which you may thence form at pleasure, and preserve in a well stopp'd Glas for use.

NB. First the Silver employ'd in this Operation, ought to be very pure and more exquisitely refin'd, then much of that is wont to be, which here in *England* is bought for fine Silver; for if the Copper wherewith Silver-Coyns are wont to be alloy'd, be not carefully separated upon the Cupel, it may, being turn'd by the Acid *Menstruum* into a kind of Vitriol, when it is taken into the Body, either provoke Vomits, or otherwise discompose it.

2ly, The Spirit of Nitre, or (which in our case comes almost to one) the *Aqua-fortis* that is us'd about this Medicine, ought to be clear'd, as our Refiners phrase it, before the Silver be put in, for (as I elsewhere Note) in Salt Peter, there is oftentimes an undiscerned Mixture of Sea-salt, whose Spirit coming over in Distillation with that of the Nitre, is apt to precipitate the Silver, which the Spirit of Nitre has dissolv'd. This I take to be the Reason of that practise of the best Refiners to purifie their *Aqua-fortis*, by casting in some small piece of Silver, that they may afterwards securely put into it greater Quantities of the same Metall to be dissolv'd. For the Saline Spirits fall to the bottome, together

ther with the corroded Silver, which they precipitate as long as there is any of these Saline Spirits left in the *Menstruum*, which after this may be decanted clear; and though you had put a little more Silver then needed to it, it neither does harm, nor is lost, the *Aqua fortis* preserving none unprecipitated, but what there were no more Saline Spirits to work upon, so that the superfluous Silver put in is already dissolv'd to Your hand.

3dly, The dry Mixture obtain'd from the Solutions of Chrystals of Nitre and Chrystals of Silver, must be often stirr'd, and kept longer in the Sand, before all the offensive Spirits will be driven away, then till Experience had inform'd me, I did imagine.

Fourthly, If the Chrystals of Silver be considerably Blew or Green, 'tis a sign the Silver was not sufficiently purg'd from Copper, else the Mixture we have been speaking of, will look of a White, good enough. And possibly 'twas by reason of the not being careful to take sufficiently Refin'd Silver, and of the not knowing how to improve the Chrystals of Silver, by the addition of those of *Nitre*, and especially how to free them from the stinking and Corrosive Spirits of *Aqua fortis*, that it is come to pass, that though there be in some Chymical Writers, Processes not very unlike this, yet the Chrystals of Silver have been censur'd and laid aside as not alwaies safe even by those, who otherwise much magnifie the Efficacy of those they us'd.

Fifthly, When You are about to make up this Mixture with the Crum of Bread into a Mass, and so into Pills, 'twill not be amiss to dispatch that work at once, for usually it leaves an ugly Blackness on the Fingers, that cannot under divers daies be gotten off.

Sixthly,

Sixthly, In taking of the Pills care must be had, that they be sufficiently lapp'd up either in a Wafer wetted with Milk, or the Pulp of a Roasted Apple, or some such thing, that they may not touch the Palat, or the Throat, because of the extreme and disgusting bitterness, which is to be met with in the Chrystals of Silver, and which is not the least thing, that with nicer Persons does Blemish these Pills.

Seventhly, The Dose is somewhat uncertain; because they work much according to the Constitution of the Body, and especially according as it abounds with Serous Humours; Wherefore 'tis adviseable to make the Pills of the size of very small Pease, of which one given at Bedtime, is a sufficient Dose for some Bodies, others will require two; and in some we must ascend to three; and if the Patient be Hydro-pical, or be otherwise much molested with serous Humours, it is observable that sometimes one Dose will work two Daies, or four Daies, (may be five or six) successively, but yet moderately and usually, without weakening the Patient, in proportion to such copious Evacuations.

Eighthly, Besides the Dropsie, wherein we have mention'd this Remedy as a Specifick, it often proves very available in other Cases, wherein Men are troubled with Serous Humours. But the first distempers, which I heard it Magnified for, were those of the Head, and *Genus Nervosum*; and a great *Virtuoso* of my acquaintance that inherits a Disposition to the Palsie, has several times told me, that if when he begins to find himself disordered, he take a Dose of these Pills, he is thereby constantly reliev'd. But of the particular Cases, wherein we have had opportunity to take notice of their Effects, we have not now, but may perchance another time have leisure to entertain You.

Lastly, That skilful and succesful Chymist Dr. N. N. who doth much both use and esteem this Remedy, being desir'd by me to let me know, if he had any Objections against it, informes me, that when he hath given these Pills oftentimes, and without intervalls, though they did not either Salivate or Vomit, or much weaken the Patient, yet they would at last be attended with a kind of Incipient *Leucophlegmatia*, which he easily prevents by intermitting for a while the use of the Pills, after every second or third time that he administers them, and giving, when he expects it to be requisite, some *Crocus Martis*, Extract of *Juniper*, or other Astringent or Hepatick Medicines to corroborate the *Viscera* and preserve their Tone.

To the One Hundred Twenty third Page:

(Where mention is made of the Cure of one concluded to have a Gangrene, by an inward Medicine.)

THE Cure mention'd in this place, having been perform'd by that Medicine, which from the Name of that Great Commander, as well as Virtuoso, who was the Author of it, passes under the Name of *Sr Walter Rawleighs Cordial*, and this being but one of many remarkable (and some of them stupendous) Cures which have been wrought by it from time to time, especially of late that it hath been more us'd, I am induc'd to annex here the yet unpublish'd Receipt, partly, because there are divers Receipts that are each pretended to be the true, magnify'd by their several Possessors; And I had the liberty of looking it out in a Receipt Book, preserved by the Authors Son; and partly because, though I will not affirm, that a skilfuller or more promising Composition

of

of the same Ingredients could not have been devised; Yet the following Receipt has been abundantly recommended by Experience. And I remember, that but a while since, a Person of Note having sent to me, to desire a taking of this Cordial for a certain Knight, who after all that Skilful Physicians could do, had long lain a dying; I the other day chanc'd to meet this Knight at *White hall*, well, lively, and with a Face whose Ruddiness argued a perfect Recovery, and yet he is not very farre from seventy Years of Age, and had before he grew so ill, long conflicted with a tedious Ague, and feaver, which had reduc'd him to that Extremity, when the Cordial was brought, that, as himself told me, he neither was sensible when they gave it him, nor had known what he did, or what was done unto him, during the space of several dayes before.

St Walter Rawleighs *Cordial*, after St R. K. his way:
(set down Verbatim as I received it.)

TAKE Burrage-Flowers, Rosemary-Flowers, Marigold-Flowers, Red July-Flowers, *Rosa-Solis*, Elder-flowers of each, one Pottle after they are dried in the Shade.

Take also of Scordium, Carduus, Angelica, Baulm, Mint, Marjoram, Setwall, Betony *ana* four handfulls, after they are dry'd in the Shade.

Take also of the Rinds of Sassafras of Virginia, *Lignum Aloës*, *ana*, four ounces beaten to Powder, of Kermes, Cubebs, Cardamoms, Zedoary, *ana*, one ounce, of Saffron half an ounce. Juniper Berries, Tormentil Roots, Round Birthwort Roots, of each one ounce, of Gentian Roots half an ounce.

Draw the Tincture or Extract of these with Spirit of Wine in *Balneo*, and save all the Ingredients after you have taken

taken out the Tinctures, and Burn them and put their Salt into their Tinctures.

Take six ounces of the Extracts of all these with their Salt, and put thereto of the Tincture of Coral three ounces, *Terra Sigillata* four ounces, Pearl prepar'd two ounces, Bezar-stone three dragmes, Hart's-horn calcin'd four ounces, Amber-greese four dragmes, Musk *gr. xxx*, Sugarcandy one pound and an half, ground very fine, and searfed through a fine Searse.

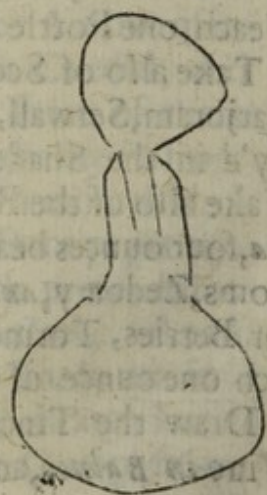
Then the Musk and Amber must be ground, and by little and little mingl'd with it, the more you grind the Amber, the better.

Then put to the Sugarcandy all the dry Materials before directed, and make all as small as possibly You can.

Then upon a great hallow grinding Stone mingle the Tinctures, and dry things together: (which must be done by a strong man used to that work:) and whil'st 'tis in grinding, put of Syrrup of Limmons, & Syrrup of Red-Roses equal parts into it, else it will be so dry, that twill neither grind nor mingle.

How to make the Tincture of Coral for this Cordial.

Take eight ounces of Coral, and put it unbeaten into a calcining Pot Unluted, and let it stand twenty four Hours in a calcining or Glass-furnace, 'till the Coral be as White as Snow; then put it in three quarts of distill'd Vinegar in a long Glass with a narrow mouth, and with another small Glass or Vial put into the Mouth of it, the Belly upwards, to save the Vinegar from wasting, *Thus* And set it in a Sand furnace, so as the Sand may be as high as the Vinegar.



Let

Let it boyl without intermission twenty four Houres, by which time the Vinegar will become red; so, when 'tis cold, pour off the Vinegar into a Glasse-Bason, or a Bell-Glasse, and vapor away all the Vinegar *in Balneo*, and gather the Coral, being perfectly dry, for your Use. You may strike down Your Pearl with Oyl of Vitriol, and Oyl of Sulphur requal parts, which is accounted the best way to prepare the Pearl. But S^r R.K. did use to prepare his Pearl by juyce of Limmons.

[The Dosis for a Man is about the bignesse of a small Hasil-nut, but where prevention onely is aim'd at, or some such use as the dissipating the Fumes of the Spleen, as they call it, the bigness of an ordinary Pease, may suffice; so in urgent Cases the Dose may be increas'd to the quantity of a Nutmeg. It is usually given by it self upon an empty Stomack (the Patient being kept Warm after it to promote Sweat) in Feavers, Want of Spirits, violent Fluxes, and several other distempers, where Diaphoreticks and Antidotes are proper, and (especially) where potent Cordials are requir'd.]

[To the One Hundred Twenty third Page;

Where a Receipt that cur'd Fistula's is mention'd.]

A Water for a Fistula, and all manner of Wounds, and swellings, or old Ulcers, Cankers, Tetters, Boils, or Scabbs in any place, or Green Wounds.

TAke of Bole-Armoniack four ounces, of Camphire one ounce, of White Vitriol four ounces; Boyl the Camphire and the Vitriol together in a little Black Earthen Pot till they become thin, stirring them together till they become

become hard in setting; then Bruise them in a Mortar to Powder, and Beat the Bole-Armoniack it self to Powder, and then mingle them together, and keep the Powder in a Bladder, till such time You use it; then take a pottle of Running Water, and set it on the Fire till it begin to Seeth, then take it from the Fire, and put in three good Spoonfuls of the Powder into that Water whilst it is hot, and after put the Water and Powder into a Glasse, and shake it twice a day to make the Water strong: But before You use it, let it be well settled and very Clear, and apply it as hot as the Patient can well suffer it; and lay a clean Linnen Cloath, four double, to the Sore, it being wet in that Water, and bind it fast with a Rowler to keep it warm, do it Morning and Evening till it be whole. This Water must be put into an Oyster-shel, not in a Sawcer when you dress the Sore, for the Pewter will suck it up. Remember You put three as good Spoonfuls of the Powder as you can presse into the Spoon. Take heed no one Drink of this Water, for it is Poyson. To make it stronger, beat an ounce of Alom to Powder, and mingle it with the other Powders.

Take of Bole-armoniack half an ounce, White Vitriol one ounce, of Camphire 2 ounces, make them all into Powder; then take a Pottle of Smiths-water, and as much Spring-water, and mingling them, set thew upon the Fire as soon as it begins to Seeth, put in the Powder very softly, stirring it all the while, as soon as the Powder is in, take it off the Fire, and dresse the wound with it twice a day, laying a Cloath folded four times and wetted in the Water, it being very Hot, and so apply'd to the Wound.

NB. [This is the Receipt *Verbatim* as I find it among my old Papers, but I am not sure that among those I cannot now come by, there may not be something concerning a way of

of making a small pliable Tent that may accommodate it self to the crooked Figure of the Cavity of many Fistula's: For methinks I remember, that the Chirurgion prescrib'd the conveying his Medicine by the means of such a flexible tent a great way into the cavity, if not to the bottom of the Fistula, which was thereby to be cleansed.]

To the One Hundred fifty first Page.

Where Soot is mentioned.

Soot, *Pyrophilus*, is a Production of the Fire, whose Nature is almost as Singular, as is the manner of its being produc'd, for it is (if I may so call it) a kind of volatile Extract of the Wood it proceeds from, made instead of a *Menstruum* by the Fire, which hastily dissipating the parts of the Body it acts on, hath time enough to sever it into smaller Particles, but not leisure and aptitude to reduce it into such differing substances as pass for Chymical or Peripatetick Elements, but hastily carries up the more volatile parts, which being not yet sufficiently free'd from the more fixt ones, take them up along with them in their sudden flight, and so the Aqueous, Spirituous, Saline, Oleaginous and Terrestrial parts ascending confusedly together, do fasten themselves to the sides of the Chimney in that loose and irregular Form of Concretion, which we call Soot: An enquiry into whose Nature, as it may be consider'd in the Survey of the distinctions of Salts, must be elsewhere look'd for; Our mentioning it at present, being only to take occasion to tell You, that as ill scented and despis'd a Body as it is, *Hartman*, (one of the most experienc'd and happy of Chymical Writers) scruples not to reckon the Spirit and Oyle of it among
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Hartm. prax.
Chym. p. 12.

the Noblest *Confortantia*, such as prepar'd Pearl, Coral, Ambergreese, and other eminent Cherishers of Nature. His preparation is for substance this; Take of the best Soot (such as adheres to the lower part of the Chimney, and shines almost like Jet) what quantity you please, and with it fill up to the Neck a very well coated Glais Retort, or an Earthen one, and luting on a capacious Receiver distil the matter in an open fire intended by degrees, whereby you will drive over the Phlegm, the whitish Spirits, and the Oyl first of a Yellow Colour, and then of a Red, separate the Phlegme, and for a while digest the Spirit and Oyle together, on which afterwards put half the quantity of Spirit of Wine, and Distil them several times, whereby you will obtain together with the Spirit of Wine, the Spirit of Soot, and also a very depurated Oyl, smelling like Camphire. Out of the Calcin'd *Caput mortuum* after the common way extract a Salt, which *Hartman* commends as a most excellent curer of exulcerated Cancers; This Salt, saith He, is drawn with Vinegar, in which Liquor in a Cold moist place, it is again Dissolv'd, and therewith the Cancerous Ulcers being once or twice anointed, the venenosity will be visibly drawn out like a Vapour, and then the foremention'd Oyl being lightly sprinkl'd upon the place will breed on it a kind of Crust like a skin, which Spontaneously coming off in five or six Days, will by its falling off, argue the Consolidation of the Ulcer. What this so extoll'd Remedy will perform I know not, having never made trial of it, nor thinking it very likely, that a bare Alcalizate Salt should have such *Specifick Vertues*, nor is it requisite I should insi st on it, being here to discourse to You of the distill'd Liquors of Soot, in prosecution of which design, let me tell You, that *Hartman* prescribes the administring of the Spirit from six to ten Grains,
of

of the Oyl from two to three drops in Wine, or any other convenient Vehicle, and concerning the Oyl he adds, That if three Drops of it be given in Vinegar to an almost gasping Man, he will be thereby wonderfully refresh'd, and as it were reviv'd, to which he annexeth this Prognostick, that if the Remedy produceth Copious Sweats, it will recover the Taker; but if not, he will Die.

That this spirit of Soot describ'd by *Hartman* may be a very good Medicine I am very apt to think; but because 'tis not a meer spirit of Soot, but a mixt one of Spirit of Wine, and spirit of Soot, we have rather chosen to proceed with the Soot (of Wood) without addition, both as to the distillation of it, and the ordering of the Distill'd Liquors, after the manners to be mention'd ere long, when we shall acquaint You with our preparations of Blood and Harts-horn, which if You please to apply to Soot, You may save Your self, and me, the labour of Repetitions. Yet it may be not amiss to advertise You here of two things: the one, that if You employ very good and fat Soot, and fill up the Retort with it to the Neck; You must be very careful to encrease the Fire orderly, and but by moderate Degrees, or else you may chance to make the matter Boil over out of the Retort into the Receiver, as it lately happen'd to us, when having warily order'd the Fire for several Houres we thought our selves past any such danger; And the other, that as to the Medicinal Vertues of the spirit, and salt of Soot, I shall not now particularize them, partly that I may save time, and partly because they may be well enough gather'd from their affinity to the Volatile salts and spirits of animal substances hereafter to be treat'd of, and from what I shall have occasion to say, of the perfuming of the salt of Soot towards the close of this APPENDIX.

To the One Hundred Fifty third Page.

URIN is a Body, which, as homely and despis'd as 'tis wont to be, may by skilful wayes of ordering it, be made either alone, or in Conjunction with other Ingredients, to afford such a variety of useful Substances, that I find *Reusnerus* publish'd an Entire Treatise, which yet I never could get sight of, under the Title of *Synopsis Remediorum ex Urina preparatorum*, besides what other Chymists have since divulg'd on the same Subject, which I forbear to mention; because several of them I have not try'd, and many others I think scarce worth trying. But because even all our own Observations concerning the Preparations and uses of things afforded by Urine, would take up more time and Room, then I can now allow them, I shall here only take this occasion to intimate thus much in general, that the Spirit and Salt of Urin may be made far greater use of, then Men yet are prone to think not onely in Physick, but in Chymistry, and perhaps I durst add in Natural Philosophy too. And though *Helmont* be not wont to lavish his praises upon worthless Remedies, yet he calls it *Nobile ad Ictericum, aliosq; morbos, Remedium*. And in another place, speaking of the Saline Christs of Urine, he hath this Expression: *Quaerquam ad Veteres Excrementorum Oppilationes conferunt, nihil tamen adversus Lithiasin*, which seems, by denying to the Salt of Urine some Vertues ascrib'd to it by many other Chymists, to bring some credit to his praises of it (And indeed a friend of mine, that has try'd it in the Jaundise, affirms it to deserve the Commendation he gives it in that Disease.) And though I fear our Author Hyperbolizeth, where He (elsewhere) thus writes: *Spernit eos sapientia* (he

De Lithiasi.
c. 3. n. 3.

(he means sure, that which is proper to the Spagyrist) *qui Materiam ex qua dispositiones, Contenta, Proprietates, Progressum & significationes Lotii addiscere recusarunt per ignem* ; Yet perhaps the Hyperbole is not altogether so extravagant as most Readers will think it. And I remember, that a while ago, conferring with the Publick Minister of a Foreign Prince, who is a very inquisitive and experienc'd Person, He freely told me, that though he had Travelled very much, and divers times not in a private Capacity, yet the greatest Chymist that ever he could make acquaintance with, us'd to tell him, that Salt of Urine was so precious a thing, that 'twas pitty it should be us'd in ordinary Diseases ; But what his Reasons were for valuing it so much, he would not declare, and therefore I shall lay no great weight upon his Testimony. And yet I must not at this time particularly declare, upon what account it is that I so value the volatile Salt of Urine, of whose Vertues (whilst 'tis single) I shall onely in a word observe to you now (what is pertinent to the occasion of my mentioning it at present,) namely, that when 'tis well prepar'd [*according to the way plainly enough, though but very briefly couch'd already* *] it differs so little in smell, tast, * p. 153. volatility, penetrancy and some other manifest Qualities, from the Salt of Harts-horn, and that of Mans Blood ; that such effects, though perhaps somewhat less powerful may be not improbably expected from it as are produc'd by the other.

To

To the One Hundred Fifty fourth Page.

Though I have not in this place made any absolute Promise, of annexing any thing, more particular touching the Spirit of Blood, and though I cannot now find, and I fear may have lost those of my Papers concerning that subject, which were the least unaccurate; Yet, setting aside former tryals, a recent Account brought me by a Physician, whom I had entrusted with some of it, represents it as so very good a Medicine, that I am content to subjoyn, what particulars I have lately found among my loose Papers concerning it, as I many years agoe sent them to a friend, and this I the rather do, because there being annexed to the Proceß divers Observations of general Import to such kind of Preparations, they will be better understood with it, then without it, and I have not now the leisure to new mould them.

Thus then;

--- Take of the Blood of an healthy Young man as much as you please, and whilst it is yet warm, adde to it twice its weight of good Spirit of Wine, and incorporating them well together, shut them carefully up in a convenient Glas Vessel, wherein the matter must be set to digest in Balneo, or Horse-dung, for six weeks, or more; then in a Glas head and body, placed in Ashes or Sand, draw off with a gentle Heat as much Liquor as will come over without necessitating you to impress any *Empyreuma* upon it, the remaining matter must be taken out and put into a strong and capacious Retort, which being placed in Sand, and accommodated with a large Receiver carefully luted to it, the matter therein lodged must be gradually pressed with a vehement Fire,

* This, if I mis-remember not, was the Proportion I employ'd in the exactest of my Experiments of this kind, but it seems to be Essential to the goodnesse of the Remedy: the Spirit of Wine serving chiefly but to keep the Blood from corrupting.

Fire, which must at length be encreased till it be strong enough to give the bottom of the Retort a red heat. There will first come over (after perhaps a little Phlegm) Spirit, either accompanied or closely followed by a copious volatile Salt, fastning it selfe to the sides and top of the Receiver; and much about the same time there will also come over an Oyl, or two, or more (for I have not observed the oleaginous part to come constantly and regularly after the same manner) the Receiver being taken off, all that it contains may be poured together into a convenient Vial, to be therein digested for a Moneth, if you please: or otherwise without that previous digestion, you may wash down the volatile Salt, adhering to the sides of the Receiver, with the Spirit and Oyl well shaken about it, and pour altogether into a large Glass Funnel well lined with Cap-paper, first moistned with the Spirit or fair Water, through which the Spirit and as much of the volatile Salt, as it and the Phlegm can dissolve, will pass first, leaving the Oyl behind them in the Paper, which must be seasonably set aside, or else the Oyl also, though more slowly, will pass through the Filtre: The Phlegm, Salt and Spirit, must be rectified with a very gentle heat, so often, till the Phlegm be perfectly separated, and they leave no *faces*: The Oyl also may be rectified two or three times from its own *Caput Mortuum* calcin'd, or else from Salt of *Tartar* to deprive it of its muddiness. The Distempers wherein this *Arcanum* or Spirit of Man's Blood is proper, are divers, but cheifely Astmah's, Epilepsies, acute Feavers, Plurisies and Consumptions. But to comply with my present haste, I shall advertise You in the general, as to the use of this and the other Remedies to be subsequently mention'd, that for Them I must refer you to the particular Narratives, which I shall scarce, if You seasonably

sonably desire them, refuse You: And in the mean time, because these volatile Remedies are near enough of kin to each other, I shall adde to this first Process (which is at least one of the noblest of them) some Observations of a more general nature, that they being applicable to divers other Preparations, we may both of us avoid the trouble of needless Repetitions.

Observations.

1. I ignore not that there are extant in *Burgravius*, *Beguinus*, and divers other Chymical Authors, very pompous and promising Processes of the Essence of Mans Blood, to which they ascribe such stupendous Faculties as I should not onely wonder to finde true, but admire that they can hope the Reader should believe them so. But of these Preparations, some being, as that of *Burgravius* in his *Biolychnium*, very mystical and unlikely; and others, like *Beguinus* his *℞. E. Sanguinis humani*, exceedingly laborious and not so clear, I have never put my self to the trouble of making them, but shall be very forward to acknowledge their excellency, if any Man shall vouchsafe me an Experimental Conviction of it. For though I think the present Preparation of Blood no bad one, yet I am far from daring to affirm there cannot be a better.

2. He that intends to have any considerable quantity of this Spirit and Salt, must provide himself of a large proportion of Blood, or else he is like to fall far short of his expectation; because as full of Spirits as Blood is supposed to be, it yields commonly (at least the best I have hitherto met with) no less then two thirds, or more, of Phlegm, besides a not despicable quantity of terrestrial and unserviceable Matter.

3. It

3. It is requisite, both that the Retort wherein the dried Blood is distilled be pretty large and strong, and that the Fire be very carefully and gradually administred, least either the copious Fumes break the too narrow Vessels, or the Matter too hastily urged boil over into the neck of the Retort or the Receiver; both which dangers this Advertisment may help you to avoid at a cheaper rate, then I, who have not been forewarn'd of them but by unwelcome Experience.

4. There is a Friend of mine, an excellent Chymist, whose rare Cures first gave me a value for Remedies made of Blood, who useth (as himself assureth me) to mingle with the Spirit that other Liquor, drawn over at first in a Head and Body, and twice or thrice rectified by it self. But that Liquor consisting almost totally of the Spirit of Wine, and the not over-grateful Phlegm of the Blood, though there may perhaps be passed into it some of the more fugitive Particles of the volatile Salt: Yet they being so few as are scarce discernable, this Liquor seems fitter to be made a Vehicle, then an associate of our Spirit, and perhaps too is not in all cases the most proper Vehicle in which it may be administred: (though if it were not for the Spirit of Wine, I should somewhat suspect that the Phlegm, though so destitute of the more active Ingredients, as to be fit to be kept separated from them, may not it self be quite devoid of specifick Vertues.) But my esteem of the Artift I have mentioned, doth make me think it fit to acquaint You with his Practise, notwithstanding that hitherto his authority be the chief thing that recommends it to me.

5. Divers ways may be propos'd of purifying this Spirit and Salt we are discourfing of, but having try'd several, that which I now use is this that follows: I put the Salt, Phlegm,

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and Spirit together, in one of the highest and slenderest Bodies I can get, that the Phlegm might not be able to ascend easily into the Head, and that the volatile Salt may be the better separated: Then in a very gentle heat (I most use that of a Lamp Furnace) there will ascend a pure white and volatile Salt, adhering to the cheeks and nose of the Glass-head, which if I desire by it self, I sweep it away before the Spirit begins to rise; but most commonly I suffer the Distillation to proceed, and the ascending Spirit to carry down part of the volatile Salt into the Receiver, and so I continue the same degree of heat, till there arise so weak a Spirit that it plainly begins to dissolve the volatile Salt: Then shifting the Receiver, I reserve the strong Spirit and volatile Salt by themselves, and take the succeeding weaker spirit by it self also; to which, if I please to fortifie it, I adde as much of the volatile salt, formerly reserved, as it is able to dissolve. In the bottom of the Cucurbit or Vial, there will remain a phlegmatick kinde of Liquor, which usually contains some of the salt or spirit, and sometimes too (which is somewhat odde) some of the oleaginous part of the Blood, which did not before appear to have been associated with the spirit, and to have passed through the Filtre with it. This nauseous Liquor may be kept by it self till you have a sufficient quantity of it, to be worth the trouble of severing from it the nobler parts: The spirit and salt above mentioned may be again rectified, *per se*, with the like gentle heat as before, so often, till they leave behinde them no *faces* nor Phlegm at all. But this is requisite to be done onely when to master some stubborn Disease, the Medicine is to be exalted either to its supreme, or at least to some approaching degree of Purity and Efficacy, for otherwise so exquisite a Depuration is not always necessary.

6. As for the Oleaginous part which the Fire forceth out of Blood, my Observations of it hitherto have so little agreed, that, I dare as yet speak but hæsitantly concerning it. For sometimes but one Oyl hath been drawn over, sometimes two: And I remember, last Year, a parcel of Blood, that was kept in a Dung-hill for many Moneths, yielded us a blackish and muddy Oyl, a purely red one, and another of pale Amber colour, which would not mingle with the darker; of each of which sorts I yet reserve some by me. This difference may possibly proceed partly from the previous preparation, or unpreparedness of the Blood, and partly from the various administration of the Fire employed to distil it. But for the most part we find these Animal Substances (if the degrees of Fire be orderly administred, and the heat sufficiently intended towards the close of the Distillation) to yield a double Oyl: the one more light and pure, which swims upon the Spirit; the other more muddy, adust and ponderous, which sinks to the bottom of it. The use of these Oyls hath, by reason of their Fetidness, been by most Authors absolutely rejected; and even those few that do not altogether reject them, forbid their inward use, and allow them to be but externally employed: But considering, *Pyrophilus*, how much of the efficacy both of Plants and Animals is observed to reside in their oleaginous part, it seem'd not improbable to me, that these Oyls might deserve a better usage, then either to be wholly thrown away, or confin'd to outward services; and therefore having not long since given a Friend of mine some pure yellow Oyl of Man's Blood, dissolved in Spirit of Wine, to try upon a Patient of his, sick of a Hæctick Fever (in which Disease I had seen the Spirit of Blood very successful) within a few days he brought me word of the unexpected recovery of his Patient, to whom he ad-

ministred our Medicine (that I may not conceal from you that Circumstance) in *Balsamus Samech*, made with spirit of Vinegar instead of spirit of Wine; the remaining part of this yellow mingled Oyl I keep yet by me, to make further tryals with it. And that such Oyls may not be lost, I have been attempting (for I am yet upon my tryals) several ways to make them serviceable. Some of them that are of a more pure and defecated nature, I have (which is not unworthy your noting) found capable of readily uniting with Spirit of Wine, with which they may be allayed at pleasure: In others I have separated the finer and more volatile part, by drawing them over with a very gentle heat in a Retort half full of Water, which will carry over the lighter part of the Oyl with it into the Receiver, wherein the Oyl will swim upon it; and may be afterwards sever'd from it by a Separating Glass, or any other convenient way (but I fear that this method, though it finely clarifie Oyls, may rob them of the best part of the Efficacy they may perchance derive from the latent admixtion of somewhat of the volatile Salt:) at the bottom of the Retort there will remain a dark and thick substance, whose nature I have not yet had opportunity to enquire into. Out of some Oyls (drawn from unprepared Materials) which would not dissolve in spirit of Wine, I have, by digestion with spirit of Wine, drawn much of the scent and taste; the spirit probably imbibing some of the finer parts of the Oyl, or else associating to it self some volatile salt that yet lay lurking in it: For sometimes I have observed Oyls, after long keeping, to let fall a volatile salt undiscerned in them before. Having also sometimes mingled the heavier and lighter Oyls of the same Body with dephlegmated spirit of Wine, and in a low Retort drawn over what will rise in a very gentle heat (inferiour to that of a *Balneum*) I have

have found the Spirit of Wine to carry over with it so many of the more subtle and active parts of the Oyl, that it was more richly impregnated therewith, then you will be apt to expect. But of what use this oleaginous Spirit may be in Physick, I have not yet had time to consult Experience, which I hope will, ere long, teach me better ways of improving the rejected Oyls we have been speaking of, then are those almost obvious ones hitherto mentioned, wherein I am very far from acquiescing; especially, since I cannot but suspect that such active Parts of such Concretes, would be found very capable of a great Improvement, if we were as skilful to give it them.

7. The Terrestrial Substance that remains after the Liquors are drawn off, if the Blood have been duely prepared, affords but so inconsiderable a quantity of fix'd Salt, that unless the *Caput mortuum* be exceeding copious, the *Alkali* will hardly be worth extracting: Besides that, if it could be obtain'd in a not despicable quantity, I should, what ever is pretended, very much doubt whether it would be endowed with very extraordinary Vertues, the violence of the Fire usually depriving fix'd Salts of the specifick Qualities of their Concretes: and even in the first Salt of Serpents themselves, I have not discerned other, Then the wonted Properties of *Alkalizate* Salts.

8. Because you may sometimes not have the leisure to wait six Weeks for the Preparation of Blood; and because oftentimes the occasion of using the Medicines we have been describing, may be so hasty and urgent, that unless some speedy course to relieve them be taken before the Physick can be prepared, the Patients will be dead. I think it not amiss, *Pyrophilus*, to advertise You, That though without any previous Preparation of Blood you should immediately
distil

distil it, provided an orderly gradation of heat be carefully observed, it will yield you a reddish Spirit, and (besides an Oyl or two) a volatile Salt; which being rectified, are so little inferiour, in any Properties discernable by the smell or taste, to the Salt and Spirit of predigested Blood, that 'tis very probable their Efficacy will emulate, though not altogether equal that of the more laboriously prepared.

9. And because it is difficult to get the Blood of healthy Men, and perhaps not so safe to use that of unsound Persons; and because many have a strong Aversion, and some an Insuperable, though groundless abhorrency, from Medicines made of Mans Blood, I have thought it not amiss to try whether that of some other Animals prepared the same way, might not afford us as hopeful Medicines: And because the Blood of Deer is chiefly (and perhaps not causlessly) commended by Authors, we have handled it according to the foregoing Process, and thereby obtained of it a Spirit, and Salt, and Oyl, whose penetrancy, and other resemblances, makes us hope that they may prove good *Succedanea*, in the defect of those Analogous Remedies (drawn from humane Materials) which we have been treating of.

And to this let me, *Pyrophilus*, on this occasion, annex this Advertisement, That though in these Papers, and what I have further written of Preparations of this nature; I name not any great number of Concretes, as having drawn their volatile Salts and Spirits, yet I have endeavored in these Discourses to give You in the Instances I insist on, so much variety of Examples, that either by the Processes therein set down, or by Analogy to them, You may, I suppose, be directed with the help of a few tryals, to obtain the volatile Salts and Spirits of most Concretes that belong to the Animal Kingdom, and that are capable of affording any. For
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by the method we prescribe, a little vary according to the exigencies of particular Bodies to be distill'd, we have drawn the Spirits, Salts and Oyls of Sheeps-blood, Eels, Vipers, &c. the latter of which yield a Salt and Liquor, which in *Italy*, by divers Learned Men, is superlatively extoll'd against Obstructions, foulness of the Blood, and I know not how many Diseases proceeding from these two general Causes. And though I dare not deny that divers of those Praises may be well enough deserv'd, by the Remedies to which they are ascribed, yet I am not apt to think them much superior to the generality of volatile Salts: And even the Spirit and Salt of Sheeps-blood it self, did, by their penetrancy of taste and fugitiveness in gentle heats, promise little else Efficacy then those others so much celebrated Medicines.

10. Nor is it onely by being administred it self, that one of this sulphureous and subtle kinde of Spirits may become a good Remedy, but also by its being made a *Menstruum* to prepare other Bodies: For it will extract Tinctures out of several sulphureous and resinous Concretes, whose finer parts, by being associated with so piercing a *Vehicle*, may probably gain a more intimate admission into the Body, and have their Vertues conveyed further then otherwise they would reach. And a Learned Doctor, to whom I recommended such kinde of Remedies, confessed to me, That by the bare extractions of appropriated Vegetables themselves, with Spirit of Urine, he perform'd no small matter. But one difficulty You may meet with in drawing the Tincture of Minerals, and other very compact Bodies, even with good Spirit of Urine. (for that I account to be the cheapest of these volatile *Menstruum*, and the most easie to be obtain'd in good quantities) For we have found, but with a little heat,
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the more fugitive Particles to ascend to the upper parts of the Glass, and there fasten themselves in the form of a Salt; by whose recess, the debilitated Liquor was disabled from drawing the Tincture so powerfully as was expected, wherefore we were reduc'd to make our Extractions in short neck'd Glass-Eggs or Vials exquisitely stop'd (which may also be plac'd stooping in the Sand) and when we perceiv'd much to be lodg'd in the necks of the Vessels, by barely inverting them, the hot Liquor soon reimbib'd the Salt, and was fit to be plac'd again in Sand; so that notwithstanding this difficulty, we were able by this means, in no long time, to impregnate the Spirit of Urine, or of Harts horn (for I do not perfectly remember which it was) with the Tincture of Flowers of *Sulphur*, which may probably prove a noble Medicine in divers affections of the Lungs, since in them these volatile Liquors alone have been found very effectual. And I remember, I have sometimes made a much shorter and more odde Preparation (which at any time You may command) of Crude *Sulphur*, whereby in not many hours I have, by the means of Salts, brought over such a sulphureous Liquor or Tincture, as even in the Receiver was of a red Colour, as well as of a strongly sulphureous Scent.

[To the Page 164, 165, &c. where *Ens Veneris* is treated of.]

BUt before I enter upon Particulars, I think it will not be amiss to tell You how this Preparation first occur'd to Us, because by that Information, Your happyer *Genius* may peradventure hereafter be prompted to improve this Remedy, or to devise one more approaching to the Nature and Excellency of that which we endeavor'd, but with very imperfect

perfect success to light on, or equal, by our *Ens Veneris*. I must then tell You, that an Industrious Chymist (of our Acquaintance) and I, chancing to Read one day together that odde Treatise of *Helmont*, which he calls *Butler*, when we had attentively perus'd what he delivers of the Nature as well as scarce credible Vertues of the *Lapis Butleri* he there mentions, we fell into very serious Thoughts, what might be the matter of so admirable a Medicine, and the hopefullest manner of preparing that matter. And having freely propos'd to one another our Conjectures, and examin'd them by what is deliver'd by *Helmont*, concerning the Preparation of *Butlers Stone*, or some emulous Remedy we at length concurr'd in concluding that either the *Lapis Butleri* (as our Author calls it) or at least some Medicine of an approaching Efficacy might, (if *Helmont* did not mis-inform us) be prepar'd by destroying (as far as we could by calcination) the body of Copper, and then subliming it with *Sal Armoniack*.

And because the Body of *Venus* seems lesse lock'd up in good Vitriol, then in its metalline form, we concluded that it was best to calcine rather the Vitriol, then the Copper it self, and, having freed the *Colcothar* from its separable Salts, so to force it up with *Sal Armoniack*. But the Person I discours'd with, seeming somewhat diffident of this Process by his unwillingness to attempt it, I desir'd and easily perswaded him at least to put himself to the trouble of trying it with the requisites to the work which I undertook to provide, being at that time unable to prosecute it my self for want of a fit furnace in the Place where I then chanc'd to lodge. And though at first we did not hit upon the best and most compendious way, yet during the Sublimation, he being suddenly surpris'd, as both himself and his Domesticks two daies after told me, with a fit of sickness, attended with very horrid and

seemingly Pestilential Symptomes, was reduc'd to take some of this Medicine out of the Vessels before the due time, and upon the use of it found as he told me an almost immediate Cessation of those dreadfull symptoms, but not of the Pale-nesse they had produc'd. This first prosperous Experiment, emboldned us to give our Remedy the Title of *Primum ens Veneris*, which, for brevities sake, is wont to be call'd *Ens Veneris*, though I am far from thinking, that it is the admirable Medicine to which *Helmont* gives that name, at least if his *Ens Veneris* did really deserve half the praises by him ascrib'd to it. But such as Ours is, I shall now (as time and my yet incompleat Trials will permit) acquaint you with that Process of it, which (among some others) we are most wont to employ, as the most easie, simple, and genuine.

Take then of the best *Hungarian*, or if you cannot procure that of the best *Dantzick*, or other good Venereal Vitriol, what quantity you please, Calcine it in a strong fire, till it be of a dark Red, Dulcifie it by such frequent affusions of hot Water, that at length the Water that hath pass'd through it, appear full as tasteless, as when it was pour'd on it. Let this thus exquisitely dulcified *Colcothar*, when it is thorowly dry, be very diligently ground with about an equal weight of good *Sal Armoniack*, and let this mixture be put into a Glass Retort, and either in as strong a heat as can conveniently be given in Sand, or els in a naked fire, force up as much of it as you can to the Top or Neck of the Retort, and this Sublimation being ended, out of the broken Retort (laying the *Caput Mortuum* aside) take all the Sublimate, and grind it well again, that if in any part the *Sal Armoniack* appear sublim'd by it self, it may be reincorporated with the *Colcothar*, Resublime this Mixture *per se* in a Glass Retort as before, and if you please you may once more elevate this second Sublimate,

Sublimate, but we have not found That allwayes needful.
And for the better understanding of this Proceſs, be pleas'd
to take notice of the following Particulars.

First, We have alwaies preferr'd ſuch Vitriol as abounds
with Copper, before our common English Vitriol, about
the making of which, thoſe that keep the Copperas work
at *Detford* are wont, as themſelves have upon the place in-
form'd me, to uſe good ſtore of Iron to increaſe the quantity
of their Vitriol.

Secondly, If You be unwilling to looſe the Phlegm,
Spirit and Oyl of that Vitriol with which You deſign to
make *Ens Veneris*, You may diſtill them away in an earthen
Retort, or one of Glaſs well coated. But though it be well
known that the diſtillation of Oyl of Vitriol requires a very
intense and laſting Fire (ſo that unleſſe you have need of the
Liquors, the beſt way will be without any Ceremony to cal-
cine the Vitriol in a naked Fire and open; yet afterwards it
will be for the moſt part requiſite further to calcine the *Caput*
Mortuum in an open Veſſel. For you muſt take notice,
that unleſs the Vitriol be very thoroughly calcin'd, it will be
very troubleſome for you to dulcifie it, and ſometimes we
have obſerv'd that the *Caput Mortuum* which look'd Red,
and ſeem'd indifferently well calcin'd, hath been, almoſt like
Crude Vitriol diſſolv'd in the fair Water which was pour'd
on it to dulcifie it. The weight of the *Calx* in reference to
the Vitriol, of which it was made, we cannot eaſily determine,
but we have ſometimes found it neceſſary to reduce the Vi-
triol to leſſe, perhaps much leſſe then half its weight to make
it fit for Dulcification.

Thirdly, The Water that hath been pour'd on the fiſt
and ſecond time to edulcorate, the calcin'd Vitriol, may be
filtrated and ſteamed away, till it come almoſt to the con-
ſiſtence

sistence of a Syrrup or Honey, and then may be put into a cold place to shoot; for after this manner we have sometimes had many very regularly figur'd Chrystals or Graines of Salt, I say sometimes, because sometimes also you may find it necessary to abstract all the Water, to obtain the Whittish Salt of Vitriol, which we have known us'd as a good Vomit, and which *Angelus Sala* none of the least sober of the Chymical Writers doth highly extoll as an excellent Emetick in his *Ternary of Vomitive Remedies*, where he discourseth at large of the Vertues of it, and the way of administering it. And of this Salt, as Chymists are pleas'd to call it, we have had out of calcin'd *Copperas* a very great quantity, and have sometimes observ'd it to have been almost as deeply colour'd as the Vitriol it self was before Calcination.

Fourthly, We several times tryed to sublime dulcified *Colcothar* with *Sal Armoniack*, in Retorts and Urinals plac'd in Sand, but whether by reason of the fixedness of the *Colcothar*, or because the Furnace we were fain to use, though no very bad one, was none of the best, we never could that way obtain any considerable Quantity of the desir'd Sublimate, and that which did ascend was but of a faint colour: wherefore, unlesse you have an extraordinary good Sand Furnace, if you will make use of Glasse Vessels, which is the cleanliest way, You will find it expedient to sublime Your *Colcothar* in coated Retorts with an open Fire, except you have the Dexterity to sublime in a naked Fire with Glasse, Retorts uncoated, which we have divers times seen perform'd by heating the bottome of the Retort by degrees, and then placing it upon Embers, with Coales round about it, but to be kindled at a distance from it; for if this course be watchfully follow'd, the Retort will be so well Neal'd, before it be reduc'd to endure any intense degree of heat, that after a while

while You may safely lay thorowly kindled Coales, not onely round about it, but upon the top of it, (which needs not to be done, till towards the end of the Operation) and thereby drive most of the Sublimate into one lump, and into the Neck of the Retort. And by this way you may sublime without any Furnace upon a bare Hearth, but if you desire to give a more intense heat, you may lay first some warm ashes in an ordinary Iron pot, and having with them, and a few small Coals well kindl'd, seal'd your Retort, you may afterwards prosecute the Sublimation in the same Pot, which being once thoroughly heated it self by the Fire, will afterwards considerably increase the heat of it.

Fifthly, Though it be most commonly requisite to resublime the Sublimate, that comes the first time up, that the Salt and *Colcothar* may be more exquisitely mix'd, yet as far as we can guess by some trials, it will not be expedient to resublime it above once (or at most) twice. For in those Trials we have found the *Ens Veneris* oftener resublim'd of a paler colour, then that which was resublimed but once. And (NB.) perhaps, by further sublimations, the Salt instead of being more intimately united with the *Colcothar*, may be almost totally sever'd from it, according to what we elsewhere in other cases declare.

Sixthly, Of these Sublimates, that which hath the highest Colour, seems to be the best, as being most enrich'd with the *Colcothar*, from whence the redness proceeds. But at the first Sublimation I have often observ'd a pretty part of the *Sal Armoniack* to come up first white by it self, especially if it had not been very diligently mix'd with the *Colcothar*. But at the second sublimation the Ingredients (which we have sometimes almost totally forc'd up without leaving a *Caput Mortuum* in the bottom of the Retort) will be more accurately

accuratly mix'd, and the Sublimate will appear Yellow, and perhaps Reddish, of which sort we have sometimes had, when the Operation hath been very carefully manag'd.

Seventhly, How great a proportion of the Ingredients committed to Sublimation, will arise in the form of *Ens Veneris*, we dare not precisely define, but a Sublimate amounting to the fourth part of the whole Mixture, you will scarce, if you work skilfully, faile off.

Eighthly, We sometimes made a Sublimate of equal parts of pure *Sal Armoniack* and Salt of Tartar, both of them very thoroughly dry'd (for else they will be apt to yeeld rather a Spirit then a Sublimate,) well ground together, and so sublim'd; And with this Sublimate instead of Simple *Sal Armoniack* we intended to make *Ens Veneris*, but by some intervening Accidents and Avocations we were not able to perfect the Experiment, of which we nevertheless think it fit to give You this hint, because of the great Efficacy, which an excellent Phyitian of my acquaintance, to whom I gave some of it, assures me he has found in it against Obstructions and some Distempers that are wont to spring from them.

Ninthly, When you are about to make Your first Sublimate, You may if You please, lute to the Retort, whereinto You put the Ingredients, a small Receiver to catch the Liquor that oftentimes comes over. For that Liquor, though you will very seldome get much of it, yet may be worth your preserving, by reason of the Volatile and Urinous Salt wherewith it will sometimes so abound, that it may passe for a weak Spirit of *Sal Armoniack*.

Tenthly, The *Caput Mortuum* that remains after the first Sublimation, may be put into a clean Glass, and set in a Cellar, where it will run *Per deliquium*, into a thick and high colour'd

colour'd Liquor, very richly impregnated (as we elfewhere
 manifeft on another Occafion) with the fomewhat opened
 body of *Copper*, from whence if half thofe praifes be true,
 which even the beft Chymifts are pleas'd to give to *Cop-
 per*, it may be very well concluded to have deriv'd no fmall
 Vertues againft Ulcers, and divers other Affections, which
 we are not here to infift on.

Eleventhly, We have fometimes doubted whether or
 no our *Ens Veneris* did really contain any thing of *Cypreous*
 or *Colcotharine* in it, partly, becaufe of the fixednefs or flug-
 giffneffe of *Colcothar*, and of the *Copper* therein contain'd;
 and partly becaufe, that if *Sal Armoniack* be two or three
 times fublim'd by its felf, its Flowers frequently enough will
 afcend Yellow, like the paler fort of *Ens Veneris*. But firft,
 that *Sal Armoniack* is capable of carrying up even fix'd and
 fluggifh Bodies feem'd probable to us, partly upon our incor-
 porating and fubliming it with finely powder'd Coralls
 (from which, though but very little of it afcended, yet fome
 of that little was no leffe red, then the Coralls themfelves
 before their being beaten) and partly upon our fubliming it
 from *Copper*, both Crude and Calcin'd, fince of either of
 thofe Bodies it carry'd up a little with it, as appear'd by the
 Blew Colour of fome parts of the Sublimates.

And fecondly, that the reddifhneffe of our *Ens Veneris*
 proceeded partly, if not altogether from the *Colcothar*,
 feem'd probable to us, not onely by the taft, and fome other
 Properties of it, but alfo by this, that having knowingly
 committed the firft fublimite to a Fire too weak to reſublime
 it; and having after ſome Hours, taken the Veſſel out of the
 Sand, we found that the Fire, which we ſuppos'd was not
 ſtrong enough to carry up the whole Matter, had rais'd the
Sal Armoniack to the upper part of the Urinal in Flowers,
 that

that were either White, or but of a pale Yellow; whereas the remaining part of the Mixture, that lay in good quantity in the bottome of the Vessel, was of a deep Red, and a fragment of it of about the bigness of a large Pease, being cast upon glowing Coales, and nimbly blown with a pair of Bellows, colour'd the Flame with a somewhat greenish blew like that, but more faint, which we elsewhere have observ'd to proceed from the well opened body of Copper.

But those Trials I confels would rather increase my Doubts then lessen them, because in our *Ens Veneris* the Colour is not Blew, but Reddish, if I did not consider, that *Colcothar* is a body that consists of some other matter besides common Copper (as it is also far more difficult to reduce, though but in part, into a mettall then is vulgar calcin'd Copper) and consequently when Corpuscles of differing Natures are by the *Sal Armoniack* elevated together, that which is not Metalline, may with the assistance of the Fires Operation alter the Nature of what is, and thereby produce a Colour differing from Blew. But to dispatch what ever further Trials shall inform us, touching this Question, whether or no any true and reducible Copper do make an Ingredient in our *Ens Veneris*, yet there being in *Colcothar* other parts as well as those, that by Fusion you may reduce into a pure Mettal, and our Remedy seeming by its Somniferous property to partake of them, it will not be necessary to the giving our Medicine a Right to the Appellation I commonly choose of *Flores Colcotharis*, that in it there is something of the *Colcothar* carry'd up, though possibly the quantity be but small, and not all reducible into a Metalline form, but perhaps the Question is not worth a longer Debate, it being sufficient to excuse the name, and recommend the thing to such a Person as You, that *Colcothar* is employ'd
in

in the making of it, and that the thing prepar'd is a noble Medicine, and hath some of the great Vertues ascrib'd to Vitriol; whether that Mineral be an ingredient of it or no.

The Dosis of *Ens Veneris* may be very much vary'd; To little Children, we give sometimes one, sometimes two, and sometimes three Grains for many nights together, as we find them able, without inconvenience, to bear the Operation. To persons of ripe Years we commonly administer four, five, or six Grains at a time. But one, to whom we have given quantities of it to ly by him, tells us, That he hath taken to above thirty Grains at once without any inconvenience. We are wont to give it in two or three Spoonfuls of Sack, or other Wine, if the Constitution of the Patient, or the Nature of the Disease do not forbid it, and in such cases we give it in any Cordial Liqueur, that is temperate, or any other convenient Vehicle.

To Children it may be given in Beer, or Ale, or clear Posset-drink, but not in Milk. If the Patient hath supp'd at a seasonable Hour, we commonly administer it, when he is going to sleep. It works for the most part by sweat and a little by Urine, but more by sweat at the beginning, then after the body is us'd to it, yet to some bodies it proves so Sudorifick, that two Grains or lesse of it, have often made me sweat. That it hath once prov'd Emetick I have heard, but never observ'd it my self to provoke Vomits.

As for the Medicall use of *Ens Veneris*, divers great Physicians will perhaps think it were not despicable, though it were no other then oftentimes to prove a safe and moderately somniferous Medicine in Feavers, without having any thing in it of *Opium*, whose Narcotick power they find as difficult to correct, as it oftentimes proves dangerous, when being not well corrected, it is administred without very great Circumspection. But —

To the 166^h, 167th, 168^h, 169th, and 170th Page.

[*Finding among my loose Notes, together with those that doe immediately concerne the Preparations of Sulphur and Harts-horn (deliver'd in these Pages) some other Particulars that may also serve, either to afford some light to Readers lesse skill'd in Chymistry, or contribute somewhat or other towards the relief of some Patients, I am content to let those Papers goe together, as I long since address'd them to a Friend.*]

HArts-horn, *Pyrophilus*, is a Heteroclite Body in Nature, which hath but few resemblers in the universe, for it grow's to a considerable bulk like a Vegetable, and is (unlike most other Hornes of Animals) at certain set Periods of time, deciduous, and though it be of a Bony substance, yet that middle part of it which differs from the rest in Colour, does (at least in grown Hornes) much more resemble the pith of some Plants then the Marrow of Bones: and yet this Plant-Animal (if I may so call it) does, when skilfully expos'd to the Fire, afford the same differing substances, with the Blood, Flesh, and other parts of Animals. 'Tis no wonder therefore, if Physitians and Chymists have hoped to find extraordinary Vertues in so extraordinary a Subject, of which we shall passe by the Usual Preparations as not so pertinent to our present design, insinuating only in the generall, That though even the more Vulgar Preparations, as well as that which Physitians have been pleased to call Philosophical, afford us Medcines not despicable; yet these are much inferiour to those Remedies wherewith dexterous Distillations are capable of presenting us; and certainly if we allow of the Chymical Theory, (whose Truth in these Papers I question

question not) Harts-horn being generally acknowledged to be endued with properties very friendly to our Nature, and even those wayes of preparing it wherein the nobler and more active parts are not truly freed from those cumbersome ones that fetter them, and hinder them to display their powerful energies, proving yet oftentimes not unavailable; The Spirit and Salt of Harts-horn would be in more request, were not Men deterred from making tryals of it, partly by the over-apprehended unpleasantness of the smell, and partly by the difficulties commonly met with in its distillation; the latter of which Deterrements hath so frightened even Chymists from distilling this Cordial Substance, that we have very rarely seen any, either Spirit or Salt of Harts-horn, save what our selves have been reduced to prepare.

There are three ways proposed by the Authors I have met with, to distil Harts-horn: The one in coated Glasse Retorts; the other in Earthen ones; and the third in *Glaubers* second Philosophical Furnace.

In the first of these ways, some very skilful Distillers that have often practised it, have so complained of their frequent breaking their Vessels by the copiousness and impetuosity of the Fumes that rush out of the Matter, when it once begins to be prest with a considerable heat, that I confess to You ingeniously, *Pyrophilus*, they have hitherto frightened me from making tryal of that way, though I see no very great reason why, by a slow and regular gradation of the Fire, the mischances incident to this way of distillation may not (at least most commonly) be avoided.

To distil the Matter we discourse of in Earthen Retorts, is a safer way then the former, if the Earth be close and good, and have been sufficiently bak'd; as we finde in the right *Hessian* Retorts, wherein we have known the Operation

proceed very prosperously, though a considerable quantity of the Matter hath been distill'd at once; but the Retorts made of Earth that is spongy or any other ways unfit, or in whose baking Fuel hath been spared, are commonly (as Experience hath informed us) improper for this service, wherein they are easily broken: Besides that, it is much to be feared that all Retorts made of Earth, except it be extraordinarily compact and baked, are apt to imbibe the more subtle and more penetrant parts of Harts-horn, and other volatile Substances distill'd in them; which we have observed in some, wherein the Matter hath transudated quite through the substance of the Retort, and been manifestly discernable on the out-side of it.

The third way of distilling Harts-horn, is performed by the Instrument described by *Glauber*, in his second Philosophical Furnace: But neither is this way without its Inconveniencies; for besides that, if the Earth whereof the Vessel to be employed is made, be not of very good and well baked Earth, it will be apt to crack, in so violent a Fire as is requisite in this way of Distillation, or else it will imbibe part of the finest Spirit it should transmit into the Receiver: And besides that, it is difficult to work long this way, without letting some of the active part of the Spirit escape between the wide Orifice of the Retort and the Cover: Besides these Inconveniencies, I say, it is to be feared that the Matter being to be cast immediately into the Vessel, made red hot before-hand, it will receive a stronger *Empyreuma* or Impression of the Fire, then it would do in the ordinary way of Distillation, wherein the Fire being orderly and successively increas'd, much of the Spirit and Salt comes over into the Receiver, before that last degree of Fire is administred; which is requisite chiefly to force over the more sluggish and heavy Oyl, which therefore (to speak
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congruously to the most receiv'd Theory of Distillation) favors much more of the Fire, and is grown almost infamous for its aduſtion.

But notwithstanding these Inconveniencies, *Pyrophilus*, we have found these Retorts of *Glauber's* not unserviceable, when we have had occasion to Distil considerable Quantities of such Materials, as were not so pretious, as to make the loss of a part of what they were to afford us considerable.

And this Advertisement may take place, especially if you take along with you, what we have declar'd, touching the Ways we substitute to avoid as much as may be, the newly objected Inconveniencies. But having in other Papers taken notice particularly enough of the Ways we mean, I shall forbear to mention them in this place, though one of them may easily be made applicable, as Experience hath assur'd us, even to ordinary Retorts; for 'tis not difficult to apply to *These*, the perforated Receivers, which being almost of the shape of Pears, open at both ends, by holes of about two or three Inches Diameter (according to the capacity of the Vessel) may be with great facility taken asunder and made clean; and may, by the convenient Insertion of their Extremities into one another, be easily luted together (in a level) two, three, or as many of them, as necessity shall require; and then provided there be applyed to the remoter extremity of the last of them, some convenient Vessel open but at one end, the Receivers will very seldom break: The Fumes that come over too copiously to be contain'd in one of them, passing freely thence into the second or the third (for we very rarely exceed three in all) which will be manifestly cool, and so, speedily turn into Liquor, the Fumes it receives, whilst the first Recipient is perhaps hotter then the Hand can endure: But of these Mechanical Contrivances, elsewhere.

Now

Now whereas *Glauber* prescribes to mingle with the Distill'd Liquors of Harts-horn rectified Spirit of Wine, to wash out the volatile Salt, and directs the Distilling again of both those Spirits (of Wine and Harts-horn) together; his method of proceeding may be justly question'd: For first, dephlegm'd Spirit of Wine will not so readily, in the way he supposeth, dissolve the volatile Salt of Harts-horn; And next, the Spirit this way drawn is not a simple Spirit of Harts-horn, but a compounded Liquor of the Spirit of Harts-horn, and that of Wine; the latter of which may possibly, in divers cases, rather impair then improve the vertue of the former. For Spirit of Harts-horn, by reason of its opening and resolving, as well as Cordial Vertues, is safely and successfully given in Feavers, wherein it is not observed to inflame the Blood, whereas Spirit of Wine in such cases is counted dangerous. And this brings into my thoughts a very questionable Preparation of the Experienc'd and Ingenious *Hartman*, who much extolls, for the Worms in the Stomach, Spirit of Harts-horn in general, but especially that which he is pleased to call *Essensificated* (that is, as himself expounds it) with which its own fix'd Salt, extracted with some convenient Water, and its volatile duely depurated, have been dissolved and united. For first, The fix'd Salt of Harts-horn hath been perhaps never yet prepared by any Man; and if Harts-horn doth yield a fix'd Salt (as I dare not absolutely deny, but that out of many Pounds a few Grains may be extracted) it may well be doubted whether that Salt be endow'd with specifical Vertues: And next, The Spirit of Harts-horn, if it be well dephlegm'd, will not (for ought I could ever finde) dissolve its own Salt, unless assisted by the External warmth of the Ambient Air; Insomuch that I usually keep the Spirit and Salt in the same Vial, where they remain unmix'd;

unmix'd; and the Spirit that will dissolve any of its owne Salt. I account not sufficiently dephlegm'd, but to have yet an Aqueous alloy whereby the Salt is imbibed. And I remember that having once exquisitely rectified some Spirit of Hartshorne, and closed it up in a Viall, after divers months it let fall a considerable quantity of Volatile Salt, so far was it from being able, without the help of some peculiar way, to have dissolved more, had I cast more into it. I deny not that the Spirit of Hartshorn may, by the mediation of heat, be brought to take in some of the Salt of the same Body, but of what use this violent Impregnation of the liquor can be, unlesse it be quickly administred, I do not yet understand, having often seen the Spirit let fall againe in the cold, the volatile Salt it had dissolved by the assistance of heat.

And having thus, *Pyrophilus*, laid before you the difficulties we have met with in the above-mentioned waies of making of Spirit of Hartshorne proposed by Authors (neither of which we would yet have you altogether reject) I must acquaint you with our having attempted a fourth way, which when the matter to be distilled is not very much, I choose rather to practise then any of the other, as hitherto seeming more safe and free from inconveniences. Take then (for Instance) two pounds of Hartshorne broken on an Anvill into pieces, each of about the bignesse of ones finger (for if it be rasped there is danger that it should emit its fumes too plentifully at once) and put it into a strong glasse Retort uncoated, big enough to containe at least twice as much matter; Set this in Sand, and fit to it a pretty large and strong (either single or double) Receiver; then give a flow fire for three, foure, or six houres, to send away first the Phlegme, and more fugitive parts of the Spirit; then encreasing the fire, but warily, and gradually for divers houres, drive over the Spirit (which is
wont

wont to drop downe somewhat tincted) and the more volatile parts of the Salt; and at length intend your fire till the bottom of the Retort be glowing hot, and heap also at last quick coals upon the sand round about the Retort to give, as it were, a fire of Suppression, and so force over the more sluggish remaining remaining parts of the Salt, and with it the Oyl: all which are to be afterwards proceeded with, according to the Directions given concerning the Spirit Salt and Oyl of Mans Blood: which having bin sufficiently insisted on before, will not (I suppose) need to be repeated now. Only it may not be impertinent to advertise you. 1. That we have more then once had the bottom of the Retort melted, yet not broken, the melted glasse being supported by the substrated sand. 2. That sometimes in Filtration, some of the thinner parts of the Oyl have unperceivedly passed through the paper with the Spirit, and Salt, and have not been discovered, but by Rectification, wherein I have almost admired to see the Oyl with a gentle heat of a Lamp ascend to the top of a very tall head and body; touching which circumstance it may yet be further enquired, whether it proceed barely from the volatilenesse of the Oyl it selfe, or also from its being carryed up by the Salt and Spirit wherewith it was associated. 3. That by this way of distillation we usually have out of a pound of Hartshorne between foure and five ounces, (seldome or never so little as foure, and often nearer five) of volatile Salt, Spirit, Oyl, and Flegme; (of the last of which, if the Hartshorne be not recent, there will be no great quantity) and when we distill'd two pound of the matter at a time, we found the operation to succeed altogether as well, and to yeeld us a fully proportionable quantity of Liquor.

The vertues of the Spirit and Salt of Hartshorne, which differ not much in Dose, or Efficacie, are probably very great
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in divers distempers, wherein we have yet made no tryall of them. For they are considerable in resisting Putrefaction, comforting nature, opening Obstructions, mortifying the the Acidities it meets with in the blood, and, by rendring that volatile, promoting its Circulation, we have knowne considerable effects of it in Feavers, Plurifies, Obstructions of the Mesentery, and Spleen; and chiefly (which perhaps you will think strange) in Coughs and Distempers of the braine, and nervous parts; in so much that I have by Gods blessing sometimes stopt very violent (but not inveterate Coughs) with this medicine in a few houres. And prescribing it to one who was almost daily assaulted with Epilepticall fits, a few *Doses* of it did in a pretty while at first make his fits come but seldome, and after not at all: But whether he be perfectly cured not having heard of him of late, nor having had oportunity to make further tryall of the medicine in that disease, I am not certain. Wee prescribed it likewise, not long since, to a Person who had long lain both distracted, and almost bed-rid, and was in a short time strangely reliev'd by the use of it, though not perfectly cur'd (perhaps because the Patient tooke but little of the medicine, we being then not well stored with it;) and on some that have been by Feavers rendred stupid, it hath had very eminent Operations: but for a further account of its vertues, I must referre you to the particular Narratives, I may when wee meet, give you, by word of mouth: and till then it may suffice to tell you that it workes chiefly by Sweat (and somewhat by Urine) without being observed to leave behind it such heat as divers Sudorificks are wont to do: only there must be care not to administer it when the *Primæ viæ*, and passages are too much stuff'd and choaked up by grosse Humours, lest by agitating the blood, and putting it into a nimble Motion, it occasion greater Obstructions. The Dose

is from five drops, or graines to a drachme (ten or fifteene drops are wont to make mee sweat) in Wine, *Carduus Benedictus* water, or any vehicle appropriated to the disease; onely taking care that nothing acid be administred with it, because Acid and Sulphureous Salts mortifie, and disarme one another. *Hartman* commends it against the wormes of the stomacke, against which it may very probably be available, by reason of its penetrant, and saline nature, and its emnity to Putrefaction: *Glauber* writes that the Oyl rectified from Salt of Tartar, cures Quartanes, and inward wounds, and cures the paines produced by Falls, Contusions, &c. being administred from six to twenty drops to a patient placed in his bed to sweat after it: but of this my Experience will not enable mee to say any thing. And I feare *Pyrophilus*, that I have already too long entertained you about Hartsh-Horne: and yet I feare too, that you expect that before I forsake this Subject I should say something to you concerning a much controverted particular relating thereunto. The Inquiry is, Whether or no, when it is distill'd, the Salt dispose it selfe in the Receiver into the figures of Hartsh-horne, the Affirmative is maintained by many Chymists, and a friend of mine who is very severe, and not at all credulous, having assured mee that he himselfe had observed the inside of his Receiver overlaid with such figures or hornes, I dare not deny, but that accidentally the particles of the volatile Salt may sometimes represent as well the shape of Hartsh-hornes, as of divers other things. But for our parts having severall wayes, and not unfrequently distilled that matter, we could never see the pretended Saline Hartsh-hornes so clearely as we thought wee saw cause to esteeme that those who affirm'd they constantly saw them so distinctly lookt through the spectacles of prepossest Imagination: not to mention that it is the usuall method.

method of nature in Salts to make the bigger Concretions of the same figures with the smaller graines, as we observe in Nitre, Rock-allum, &c. And the graines of the Salt of Hartshorne, though I have attentively enough consider'd their shapes, I remember not ever to have observed of a figure like that of the hornes they came from: but it is the nature of volatile Salts to fasten themselves to the Receiver in various figures, according as the degree of fire that urges them up, and other concurrent circumstances do chance to exact; and consonantly hereunto we have often observed the volatile Salt of the same Hartshorne to be very variously figured in the same Receiver: and I remember that not long since subliming some volatile Salt of Urine, it adher'd to the upper part of the vessell in figures, much liker Hartshornes, then ever I had seene their volatile Salt make up; so that unlesse wee will merrily say, that the man whose urine was distill'd, had hornes given him by his wife, wee must acknowledge that nature seemes to give her selfe liberty to play in the Configuration of volatile Salts, and that casualities have no unusuall influence on them; or to speake more properly, that the various degree of Fire, the differing copiousness of the Fumes, and many other intervening accidents do keep those Configurations from being constantly regular; and I remember that a while since filtering through Cap-paper a Tincture of glasse of Antimony, made with Spirit of Vinegar and Spirit of Wine, almost according to *Basilius*; the matter which remained in the paper (which was placed in a glasse funnell, and was of the same shape) did of it selfe, when it began to grow dry, cleave into the figures of trees, whose trunks, greater boughs, and smaller branches, were both for their shape, and proportion, as lively represented as if they had been drawne by the curious penfill of some skilfull Painter; which paper I shewed to some persons

that beheld it not without wonder, and for ought I know I am yet able to shew it you; nor is this the only instance I could give you if need were, if I had not trifled too long already to manifest at present, that, now and then, Chance may make Nature seem to emulate Art.

But as long as I have dwelt, *Pyrophilus*, on this Subject before I passe to another; I must not forget to advertise you, that in case Stags Horns cannot be procured for the preparation of the above mention'd Remedies, you may without much disadvantage substitute Bucks-horns in their stead; for almost all the trialls we have had opportunity to make of the Medicines we have been lately discoursing of, have been made with Remedies whereto Buck-hornes afforded Materialls.

I had almost forgot, *Pyrophilus*, to tell you, That to keep the rectify'd Spirit of Harts-horn, Blood, or the like, is more uneasy, then any thing but trial would make one think; and yet to keep the Volatile Salt is more difficult, then to preserve the Spirit; for more then once, when I have kept these fugitive animal Salts by themselves, they have penetrated the Corks, and scarce left me in the well stopp'd Glasses any footsteps of their having been there, and therefore those Chymists that are not strangers to these Salts, have taken much pains to no great purpose to keep them from Avolation, some of the recentest and ingeniousest are wont, that they may moderate their uncurb'd wildness, to pour on them as much of some such Acid Spirit, as that of Salt of Vitriol &c. as will produce any manifest conflict with the Volatile Salt, never considering, that as this course doth indeed devest them of their fugacity, so it doth in effect devest them of a great part of their Nature, and consequently of their peculiar Vertues. For I have elsewhere shewn, that the Saline Corpuscles, obtainable by the
Fire

Fire from Urine, being united with a sufficient proportion of Spirit of Salt, will cease to be what they were, and with the Saline parts of the Acid Liquor, will make up a kind of *Sal-Armoniack*. But 'tis easier for me in this our case to shew that another mans Expedient is not good, then to substitute a good one, especially in this place, where for some Reasons I must not set down, the way that I the best approve of, onely I shall tell You, that my way long was, nor do I yet despise it, to preserve volatile Salts in their own rectify'd Spirit, which swimming over them, kept them from the immediate contact of the Air, and preserv'd them so well, that by this means I have secur'd even small parcels of the fugitive Salt of humane Blood for many Years.

[But since the Spirit and Salt even of this sort of Horns, will not, I fear, be found so easie for every Man, especially, if he be a Novice in Chymistry to procure in any considerable Quantity; and since the declared intent of my communicating to the Reader my Observations about these Spirits of Harts-horn, Blood, &c. was to furnish him with such Chymical Remedies, that men may by their easiness and cheapness be invited to provide them for the use of the Poor; I presume it will not be improper to present him with a succedaneum or two, that may be easily enough obtain'd from Sal-Armoniack, though these Preparations have such Connexion with divers other Passages, wherewith they were Written to the Person, I here call Pyrophilus, that to avoid the too much dismembring those Papers, and to make these Processes the better understood, I must content myself to leave out those Particulars that can best be spar'd, hoping that the rest will be easily excus'd, at least by those who know how much some Chymists themselves have been deluded in their Trials of the divulg'd Processes, divers of which are either false or very uncertain, and others, though they should succeed, would give but a sophisticated

phistickall spirit, much of the obtained Liquor comming from the Distillable Concretes that must according to such Processes be mingled with the Sal-Armoniack, of which I could easily give instances, ev'n out of modern and applauded VVriters.]

The Spirit of Salt-Armoniack, *Pyrophilus*, hath such wonders ascribed to it by Chymists, that, if I should conclude these Papers touching Spirits of an Urinous nature, without saying something to you of that, you might think I had left the considerablest of them unmentioned; but as I the rather acquaint you with the little I know of it, because, though I have met with divers Authors that extoll it, I have scarce met with any that teaches intelligibly, and candidly how to prepare it, which perhaps most of them did not know themselves, so I hope you will exact an accurate account of it the lesse rigidly, because I can present to you but little on that Subject, besides the few Observations wherewith my own Curiosity has supplied me; having scarce ever (to my knowledge) seen any Spirit of *Sal-Armoniack* save what my own Furnaces have afforded me, and therefore without presuming to set down solemn processes about a subject, wherein I have found a small variation of Circumstances hinder the operations made on it from producing uniform effects, I shall content my self to give you as true an information as my memory will afford me of a few of my proceedings with this nice Salt, and the successles of them: only premising in a Word, that by *Sal Armoniack* I here mean the Factitious and Venal, consisting of Urine, Soot, and Sea-salt.

And first, according to the way proposed by *Glauber* (in the second part of his Philosophicall Furnaces) we distilled it out of an open retort (with a Cover to clap on and take off as occasion requires) with a mixture of *Lapis Calaminaris*, and once we, that way, obtained a quantity of Liquor, which seem'd exceeding

ceeding strong, but before we could make any trials with it, the Viall that contained it having bin accidentally broken, we lost the opportunity of satisfying our selves of the efficacy of it: and having not long since attempted to make such a Spirit the same way, there came over indeed a Liquor which seem'd to be the Spirit of *Sal-Armoniack*, but when we came to Rectify it in a gentle heat, the greater part of it to our wonder, coagulated in the Retort, whereinto it was put to be distill'd, into a perfect *Sal-Armoniack*, (a pretty quantity of which I yet keep by me) and thereby betray'd the above mentioned Liquor to have been little else then the *Sal-Armoniack* it self, forced over by the violence of the Fire, without having suffer'd any separation of its Ingredients. Nor is it by us alone, that the Process set down by *Glauber*, hath been unprosperously attempted, and yet perhaps it might have constantly enough succeeded with him, and the difference of the *Lapis Calaminaris* (in which we have observ'd much disparity according to the places it comes from) may have produced the complained of variety of Successes.

We also attempted to distill a Spirit from *Sal-Armoniack* (to pretermitt divers other trials) by mixing it with equall parts of Salt of *Tartar*, but in this experiment we met with variety of success, for having exquisitely incorporated the two Salts by the help of a little fair Water, we have divers times had the upper part of the receiver (carefully luted on to a somewhat large retort) all candy'd over on the inside; with Volatile Salts of severall shapes, and the Liquor afterwards forc'd over hath sometimes remained long enough in the forme of a very subtle and penetrant spirit, and sometimes again, it hath in the very receiver almost totally coagulated it self into a lump of Chrystalline Salt; and when we had mixt the Salt of *Tartar*, and *Sal-Armoniack*, without any Water

or

or other moisture at all, our successes have been very like those above mentioned. Upon this occasion I dare not omit acquainting you with an Experiment, which yet I learn't not upon this occasion, Take of pure Salt of Tartar and of good *Sal. Armoniack* equal parts (let them be both very dry, or else you may loose your labour) and grind them very accurately together, though you be deterred from continuing that toyl, by a very subtle and fetid Urinous steam, wont to exhale from the mixture; these Salts being thus exquisitely incorporated, you must put them into a large Glass Retort, to which you may fit a Receiver to catch a fetid Liquor that sometimes we have observed to come over; then administering by degrees a very strong Fire, the top and Neck of the Retort, will be lined with a pure white Sublimate, which seems to partake as well (though nothing neer so much) of the Salt of *Tartar* as of the *Sal. Armoniack* and of it's Qualities, and yet to differ from either; and though this Sublimate be far enough from being the true Volatile Salt of Tartar so highly extolled by *Paracelsus* and *Helmont*, yet it is no ignoble Medicine in obstructions, and some other distempers: And I remember one of the most expert Chymists I know, having made trial of some I presented him, told me he found such effects of it, as made him divers times very pressing and sollicitous for more. The Fetid Liquor that will come over we have found sometimes to be very little, and at other times much more copious, without being able to discern clearly whence the disparity proceeded; and the *Caput Mortuum* remaining in the Retort, by Solution, Filtration, and Coagulation, affords a pure Salt of greater Diureticall efficacy, then almost any I have hitherto met withall: Another way by which we attempted to obtain a Spirit of *Sal. Armoniack*, was by accurately mixing two parts of it, with three

or

or foure of Quick-lime, whose vertue had not bin impair'd by being expos'd to the Air, this mixture being distilled in a Retort, plac'd in sand, with a strong fire afforded us (together with some dry Sublimate in the neck of the Retort, and as I remember a little volatile Salt in the Receiver) a very strong and yellowish Spirit, so exceedingly penetrant, and stinking, that 'twas not easie to hold ones nose to the open mouth of the Vial wherin 'twas kept, without danger of being struck downe, or for a while disabled to take breath, by the plenty and violence of the exhaling Spirits: But the Liquor forced over by this method, though exceeding vigorous as to its Qualities, was inconsiderable, as to its Quantity; and therefore wee now chuse to vary a little this way of proceeding, and let the Quick-lime ly abroad in the open Air; (but protected from all other moisture, except that of the Aire) for divers dayes, in which time the imbib'd humidity of the ambient Air would in some degrees flake it, and make it somewhat brittler then it was before, and the Lime thus prepared, being mingled with Salt-Armoniack, and distilled in all circumstances after the former manner, afforded us a Liquor so copious, and yet so strong, that we hitherto acquiesce in this way of distilling this wild Salt, as the best we have yet met with. But note, that, we us'd towards the latter end to encrease the fire to that degree, by heaping up Coales on the upper part of the Retort, that, the mixture in the Retort hath been brought to flow. Note also, that though even the Spirit thus drawne persevered long in the forme of a Liquor, yet yesterday coming to looke upon a Viall of it, which we reserv'd, to try what effect time would have on it, we found that about a fourth or fifth part of it had spontaneously coagulated it selfe into exactly figured graines of a Chrystalline Salt, the Liquor swimming above it, retaining, neverthelesse,

a very strange subtlety: Which Observation concurring with divers others makes mee apt to doubt, whether or no this so celebrated Spirit of Salt-Armoniack be really much, if at all, other then the resolved Salt of Urine, and Soot, of which that body consists, somewhat subtiliated by the fire, and freed from the clogging Society of the Sea-salt, to which they were formerly associated and united; though I confesse it seemeth not improbable, by the great Energy which may be observed in this Spirit, when it is dextrously drawne, that the entire Concrete, and the Quick-lime, may afford it something that it could not receive from either of the Ingredients, whence the Mixture did result, as we see in *Aqua Regis*, which dissolves crude gold, though neither the Salt-Armoniack, nor the Peter, nor the Vitrioll alone affords, by the usuall wayes, Spirit capable of producing that effect. The great vertues, and uses of Salt-Armoniack, especially in Physick, I cannot now stay to treat of, but you will find them largely enough set downe by *Glauber*; whose Encomiums neverthelesse, must not be all adopted by mee, who in this place mention the Spirit of Sal-Armoniack, but as a Medicine that is neer of kin, and may serve for a *Succedaneum* to the Spirits of Hartshorne, Urine, Blood, &c.

But although the last mentioned way, *Pyrophilus*, be the least imperfect one we have hitherto met with, of distilling Salt-Armoniack, yet because you may sometimes need a Spirituous liquor impregnated with the activest parts of that noble concrete when you want either Retorts to distill in, or Furnaces capable of giving strong fires, I dare not omit to inform you, that, we have sometimes drawne over such a liquor of Salt-Armoniack after the following manner. Dissolve pure Salt-Armoniack in a small quantity of faire water, then in a Cucurbit put such a quantity of strong Quick-lime powder'd,

as

as may fill up a fifth or sixth part of the vessell, and water it very well by degrees with the former Solution of the Salt-Armoniack, and immediately clap an Alembick on the Cucurbit, and fasten a Receiver to the Alembick, closing the joynts very accurately, and from this mixture, by the gentle heat of a Bath or a Lamp, you may obtaine a Liquor that smells much like Spirit of Urine, and seemes to be much of the same nature; and this volatile liquor being once or twice rectified *per se*, with a very mild heat, growes exceeding fugitive and penetrant, and workes by Sweat, and a little, perhaps, by Urine; and I remember that when I first made it, having been induced by some Analogicall Experiments, I had formerly made, to give it to one that had a patient troubled with an extremely violent Cough, I had an account quickly brought me, that he not slowly, but wonderfully mended upon the very first or second Dose; and indeed the tryalls that have hitherto been made of it, make mee hope that it will prove little inferiour in efficacy to the other above mentioned more costly Spirits, scarce any of which being preparable by so safe, and compendious a way, if this Medicine emulate them in vertue, the Easinesse of the preparation (wherein little time needs be spent, and lesse danger of breaking vessels incurr'd) will much endear it to me. But, *Pyrophilus*, because I would assist You to make variety of Experiments about Volatile Salts, and because diverse tryalls may be more conveniently made, when the Saline Corpuscles are in a dry form, then when they are in that of a Liquor; I will take this occasion to mention to You a way by whose Intervention a change on the fixt body employ'd about the newly mentioned Experiment, hath sometimes afforded mee store of volatile Salt. This way was only to mingle exquisitly a quantity of Sal-Armoniack, with about thrice its weight of strong Wood-ashes. For the Spirit that

we this way drave out of a Retort plac'd in Sand, did quickly in the Receiver Coagulate into a Salt; and this Method was again experimented with like successe. And the Salt thus made we found so extreamly subtile and volatile, that it seem'd to be much of the same Nature with that of Urine, and if it be indeed, (as probably 'tis) onely the Volatile Salts of the Urine, and perhaps also of the Soot, whereof the *Sal Armoniack* consists, this may passe for a more compendious way of obtaining such Salts, then others that are hitherto wont to be practis'd amongst Chymists. But I will not undertake that this way of obtaining rather Salt then Spirit shall constantly succeed, Yet if you find it do not, I shall not perchance refuse You a better way. But if you could devise a Method (which possibly is not unattainable) of bringing over into a Spirit, not the bare Urinous and fuliginous Ingredients of *Sal-Armoniack* but the whole Body, it may be, you would have a *Menstruum* that would make good, if not surpass even *Renanus's*, and *Glaubers* Elogies of the Spirit of *Sal-Armoniack*.

The affinity betwixt Volatile Salts and Sulphurs, doth, *Pyrophilus*, as well as your Curiosity invite me to acquaint you, with some of the Trials we have made about the Preparations of Sulphureous Fetid Liquors, which I am the more inclined to do, because, though I find mention made of some of them in Chymical Books, yet they are there delivered with so little Incouragement, amongst many other processes of which it appears not that the prescribers made trial, that when I had distilled some of those Sulphurs, divers expert Chymists were very desirous to have a sight of them to satisfy themselves that such Liquors could be so prepared. The way of making the common Balsam, or Ruby of *Sulphur*, is too well known to need to be long insisted on. Onely, be-
cause

cause there is some little variety used by several in the preparation, it will not perhaps be amiss to inform you that we are wont to make it by mixing about three parts of Oyl of Turpentine, with two of good Flower of Brimstone, and setting them in a strong Urinal slightly stop't in an heat of Sand, only great enough to make the Liquor with a little crackling noise (whencesoever that proceeds) work upon the *Sulphur*, till it be all perfectly resolved into a Bloud-red Balsam which will be performed in six, eight, or ten Houres, according to the quantity of the Ingredients to be united; this Balsam which is indeed in some cases no despicable Remedy, is by vulgar Chymists, according to their custome very highly extolled, and sometimes employed in Distempers and Constitutions, wherein instead of performing the wonders by them expected, its Heat doth more harm, then its drying and Balsamick properties do good: but yet apparent it will be, by what we shall say anon, that by this preparation, the Body of the *Sulphur* is somewhat opened, and therefore (as we said) in some cases the Ruby of *Sulphur* may prove no ineffectual Remedy, which may probably be improved if it be prepared by bare Digestion in a very gentle heat, by which course we have prosperously prepar'd it, though not in so short a time, when we made it not in order to some other Medicine.

To Volatilize the *Sulphur* thus Resolved we took the Balsam made the former way in a few Houres, and putting it in a Retort, either with, or without fair Water, which is supposed to help to carry up the superfluous Oyl, we placed the Vessel in a Sand Furnace, and with a gentle heat drawing off as much of the Oyl of Turpentine as would in that heat come over, we shifted the Receiver, and carefully luted on the new one; and lastly, giving Fire by degrees, we forced over a Liquor of a deep and darkish Red, extremely penetrant, but of a smell

so sulphureous and diffusive of it self, that it was scarce to be restrained by Corks, and was by great odds stronger then that of the Rubie before distillation.

The like Experiment we tryed in a Glasse head and body placed in Sand, and through that way, likewise we obtained a Volatile Balsam of *Sulphur*, yet we found it too inconvenient to be equallable with the former; what long Digestions of this Liquor will do to take away, or lessen its Empyreumatical and offensive Odour, we have not yet been by experience satisfied no more then of its medical Vertues, though probably the great penetrancy of the Liquor considered, they will not be languid.

Authors also prescribe the making a volatile Balsam of *Sulphur*, by driving over, after the above mentioned manner, a Solution of Flower of Brimstone in Linseed Oyl, and this Remedy they highly extoll; but though it may probably prove a good Medicine, yet since they commend it but by conjecture, and not upon Experience, I see no great reason why it should be preferable to the other; for we find that express'd Oyles are much more apt to receive an offensive *Empyreuma* then Oyl of Turpentine, which being much more volatile then they, requires nothing neer so violent a heat to make it ascend; and unless it be found, that the Sulphureous particles are able to mitigate the corrosive ones, the distilled Liquor of an express'd Oyl may prove noxious in the Body. For by purposely (for trials sake) distilling Oyl Olive, by it self, though not in a naked Fire, we obtained a Liquor of that exceeding sharpness, that it would (taken inwardly) probably corrode, or fret either the Stomach or some other of the internal Parts.

There is another way of preparing a Sulphureous Balsam, to which *Penotus* no ignoble Chymist, ascribes such stupendous

dous Vertues that though I have not yet made trial of it in Diseases, yet I dare not leave it altogether unmentioned; the process being briefly but this. Take good Balsam of *Sulphur* made with Spirit or Oyl of Turpentine, and having freed it from its superfluous Oylineſs pour on it well deplegm'd Spirit of Wine, and therewith draw by affuſion of new Spirit as often as need requires a ſufficient quantity of a Red Tincture, which by filtration and abstraction *in Balneo* must be reduced to a Balsamick consistence; this Liquor you may if you please by degrees of Fire drive through a Retort placed in Sand, and thereby obtain a volatile Balsam of very great penetrancy, and probably of no small efficacy; but the Trial I have made of this process, gives me occasion to advertise You;

1. That unlesse your Balsam be reduced to a stiffe thicknesse, and almost to drinesse it self, the Operation will hardly succeed, we having fruitlessly digested for some months Spirit of Wine upon Balsam, whose consistence was somewhat too Liquid.

2. That as soon as the Spirit of Wine is sufficiently Tincted, it ought to be Decanted, and succeeded by new, lest by too long digestion, instead of heightning its Tincture, it let fall that which it hath already acquired.

3. That upon a very slow abstraction of most of the Tincted Spirit in a digesting furnace, we once found the remaining Liquor not to be in the forme of a Balsam, but to consist partly of Spirit of Wine; and partly of a seeming distinct Oyl, whereinto the Sulphureous Tincture was reduced. The Balsam of *Sulphur* thus made without Distillation seems likely to be an innocenter and nobler Medicine then the common Ruby of *Sulphur*, made with a hot and ill scented Oyl of Turpentine: and by this preparation may also appeare
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the truth of what we formerly said, when we told you, that the body of the Sulphur was opened by Solution in Oleaginous Liquors, for out of the common thickned Balsam, as you may be informed by this proceſſe, well Rectified Spirit of Wine will, in a ſhort time, extract a blood red Tincture, whereas by long digeſtion of Spirit of Wine alone upon pure, but undiſſolved, flowres of Brimſtone, we could not diſcerne any change of colour in the *Menſtrum*; though I dare not deny the poſſibility of what ſome Authors affirme, who write, that Spirit of Wine very excellently Dephlegm'd, will in time, of it ſelfe draw a Tincture from flowers of *Sulphur*, which Tincture they yet pretend not to make of a higher then a Lemmon colour. And by the way let mee tell you, that our red tincture formerly mentioned is (if it be well made) ſo ſtrong of the *Sulphur*, that probably it would make a very penetrant, and effectually outward remedy in Aches, and divers other cold diſtempers of the nervous parts; for it hath been already found, that good Spirit of Wine alone is one of the powerfullſt Fomentations in divers caſes of that nature; (inſomuch that it hath been ſometimes found to arreſt the ſpreading Mortification of Gangrenes;) and therefore being ſo richly impregnated with *Sulphur*: which is even without the aſſiſtance of ſo ſubtle a vehicle very available in many diſſaffecti- ons of the *Genus Nervosum*; 'tis probable that the ſkilfull aſſociation of two ſuch active remedies may produce conſide- rable Effects.

Take of pure flowers of *Sulphur* one part, of the beſt Oyl- Olive ſoure or five parts, mixe them well together in a ſtrong earthen pot, able to contain a much greater quantity of the ingredients then is to be put in it: ſet this veſſel over a moderate fire

fire of Charcoales, throughly kindled, till the Oyl though slowly, have perfectly dissolved all the Flowers of *Sulphur*, which will (if you worke it well) be perform'd in about halfe an houre, or an houre, (according to the quantity of your Materials;) But you must have a great care, during the whole Operation, first, that the Oyl catch not fire, whereby it would not only be lost it selfe, but perhaps endanger the firing of the house; and next that the Mixture be kept nimbly, and constantly stirring from the first beginning of the Oyl's action on the *Sulphur*, till the Solution be fully made; and the Pot (having been taken off the fire) be grown cold again.

The chiefe Signes whereby you may perceive, that, you have not erred in the Operations are, *First*, if the *Sulphur* be perfectly dissolved in the Oyl, which you must often try before you take it from the fire, by taking up with the tip of a stick a drop or two of the Liquor yet in Preparation, and letting it coole on white paper, or on your naile, whereby you may discern, when the Solution is perfectly made by the deep Redness, and Transparency of the Liquor, and by its containing no more in it any undissolved Fowers of the Brimstone; *Next* by the Consistency of the Balsam which ought to be neither too Liquid (as you will find it if it hath not staid its due time on the fire) nor too thick (as it is apt to become if you remove it not seasonably from the fire;) but of the consistence of somewhat thin Hony; and lastly, by the smell which ought to be strong of the *Sulphur*, but not of the fire; for though the Sulphureous Stink is, in this Remedy, to be expected, that Emphyreumaticall one, which proceeds from burning (and by skiltull nostrils may be easily discerned,) is very possible to be avoided.

The *Dosis* of this Balsam, when it is to be inwardly used, may be from two to fifteen, or twenty drops, according as

the greatnesse of the distemper, and chiefly the strength, and Constitution of the Patient shall require and bear. It may be given upon a fasting Stomack, either alone, or brought to the Consistence of Pills, or of a *Bolus* with powdered Sugar, Liquorice, &c. or else dissolved in any convenient Vehicle, wherewith its Oleaginous nature will permit it to mingle. Outwardly it may be administred either by bare Inunction of the part affected, or else by incorporating it with any other convenient Oyntment, or Playster: after which we are wont to prescribe to have an application made to the part of two or three little Bags fill'd with Sand, as warme as the Patient can easily endure it, and shifted as soon as either of them begins to cool, that by this meanes, the Pores being open'd, the Vertue of the Balsam, by being made more penetrant, may reach the farther.

I have been thus particular, *Pyrophilus*, in the mention of this Remedy, because though it seem but a slight and triviall Preparation, yet Experience hath given us better opinion of it, then I feare the slightnesse of the Preparation will as yet allow You. And indeed its Vertues, I am apt to thinke more then I have yet had occasion to observe, and therefore must referre you to *Rulandus* his Centuries, where they are often mentioned: but outwardly in Straines, old Aches, Bruises, and the like, it is wont to be very effectuell; in the beginning of Fits of the Gout it hath severall times (though not constantly) been prosperously applyed both to Mr. B. B. and divers other persons, and sometimes it hath been found not ineffectuall even in the *Sciatica* it selfe. And as for Paralyticall distempers, I have had by a skilfull Physitian an account sent me of scarce credible things which it hath therein performed: to which I shall onely adde, that a while since I had great thanks returned mee on the behalfe of a faire young Lady

Lady, to whom I prosperously prescribed it against a great Tumor in her neck, which was supposed to be the beginning of the Kings-evill; But this Tumor was recent enough, which circumstance I thinke fit to specifie, because I feare that if the Scrophulous Tumor had been inveterate, the successe would not have been so good. Inwardly the chiefe Use we made of it hath been in Coughs and Distempers allyed thereunto; but its Balsamicall nature, making it both healing, and resistive (if I may so speake) of Putrefaction, makes it probable that its Vertues may be more extensive; to which purpose I remember that a while since a friend of mine tryed it with wonderfull success *in mictu sanguinis ferè deplorato*, having first by a gentle heat reduced it to such a Consistence, as allow'd him to make it up into Pills. But of the particular Cases, wherein our Remedy hath been succesfull, no more at present; We shall rather subjoyn, That though this have been the way which we have the oftenest employ'd in the making of the Balsam, yet we must not conceal from You, that we have divers times met with Accidents, which frustrated our endeavours and expectations. For if the fire administred be too languid, the Solution of the *Sulphur* by the Oyl proceeds not well, and on the other side have found, that not only a strong heat is apt to burne the matter, or to make the Oyl boyl over, and perhaps take fire, but even that upon a very little excesse in the degree of heat, the Oyl and *Sulphur* would, before it could be expected, degenerate together into a heavy and viscus Lump (almost of the colour of the liver of an Animall) which coagulated Matter prov'd afterwards exceeding difficult to be by the affusion of fresh Oyl dissolved and reduced to a due consistence. Wherefore we tryed to prepare this Balsam by putting the proportion of Ingredients formerly mention'd into a strong Urinall, which we placed in Sand, and making

under it no more fire then was sufficient to make it slowly worke upon the Flowers, (which did often during their Solution make a crackling noise,) we continued the Operation for divers (perhaps many) houres, at the end of which we found the *Sulphur* dissolv'd, and the mixture reduced to a Balsamick colour and consistence. So that if you distrust your dexterity to prepare this Balsam by the former way with a naked fire, we must advise You to make use of this latter way, as that which is the safer, though it be the longer way of proceeding. Nay when we had leisure enough, we did for tryalls sake, prosperously attempt the Solution of Flowres of Brimstone, with common Oyl by the far gentler heat of bare Digestion, and by that meanes obtained a Balsam perfectly free from adustion, but of somewhat too liquid a consistence, which may be easily remedied by the mixture of powder'd Liquorice, Sugar, or any other such convenient Concrete. We must also advertise you that this Balsam may also be prepared with Oyl of Nuts, of Poppy seeds, of *Hypericon*, instead of Oyl-olive, or any other exprest Oyl, appropriated to the particular distemper against which the Physitian intends to employ the remedy, only care must be had, that the Specifick qualities of the Oyl be not so fugitive, as to be destroyed by the Ebullition requisite to the making of the Balsam, which if it be to be enrich'd with specifick vertues in relation to any particular disease, may perhaps be best prepared by the last mentioned way (of digestion) wherein the subtile Spirits that impregnate the Oyl are not in such danger to be dissipated by the fire.

The knowingest Chymists themselves (*Pyrophilus*) are wont so much (and perhaps not altogether undeservedly) to extoll the efficacy of Antimony, that we were thereby invited, besides divers Preparations of it for internall use, to attempt

attempt the making of some remedies of it, that might also be externally applicable; and in prosecution of this designe, we found that by boyling foure or five fingers height of good Oyl of Turpentine upon very finely powdered Antimony, put with the Liquor into a strong Glasse Urinall, placed in Sand, the Oyl after some houres would grow exceeding high Tincted; and being gently in in great part abstracted, would leave behind it a body of a Balsamick consistence, and a deep rednesse; which may, I presume, be applyed to resolve, and discusse hard Tumours, and remedy divers other outward Evils, with more effect then the simple Balsam of common *Sulphur* formerly described. And from this Antimoniall Balsam abstracted to a stiffer consistence, we found that Spirit of Wine would draw a Tincture, which I likewise suppose might prove a very powerfull Fomentation; though the Spirit we used (perhaps because it was not sufficiently Dephlegmated) did not in a few dayes attaine to more then a very pale rednesse :) but this Tincture being slowly freed from the most part of the Spirit of Wine, became of the consistence of somewhat liquid Hony, and of a deeper colour, thereby affording us a purer Balsam; which we have not yet, (being hindred by some accidents) attempted to bring over the Helm. Nor did we here desist, but by divers tryals found that the Antimoniall Balsam, above mentioned, being put into a Retort, placed in Sand, and pressed by degrees of fire, would at length emitt Steams, which would condense in the neck of the Retort, and fall thence into the Receiver in sanguine drops: this volatile red Balsam (especially if by this volatilization the Antimony have lost its Emetick property) we cannot but think endowed with more then ordinary Vertues, outward and perhaps inward too; considering the great penetrancy of the Liquor, and the Energy of the Minerall, with whose

subtle parts it is richly impregnated, if it consist not mainly of them. But we are yet in prosecution of this Preparation, and therefore till we have seen how far we are like to improve this Remedy, We shall forbear any further mention of it especially since we have already in this very Paper, given you as we suppose, sufficient prooffe, that We are more solicitous for your Satisfaction and proficiency, then for our owne Reputation, (of being a severe Critick in estimating of Medicines) For otherwise we should not have been so indiscreet, as to acquaint you with any Preparation, of whose medecall Vertues we have not yet made much tryall, whilst we are not destitute of other remedies, whose efficacy hath been manifested to us by Experience. But we have often observed, that divers usefull Chymicall Preparations are mentioned so obscurely, and unintelligibly by the Authors that write of them, or else are without any particular, or encouraging note of Distinction mentioned amongst a crowd of other Processes, some of which have perhaps already been found to be false, or triviall, and others of which may be rationally enough distrusted; that most Physicians, and Chymists themselves, are deterred from attempting to prepare those remedies, not so much because they seem unlikely to prove considerable, as because they are afraid that the Processes are false, or fraudulently set downe, and consequently, that concretes of such a Consistence, Colour, Scent, and other obvious qualities, as are ascrib'd to the Remedies proposed, are not preparable by the publish'd Directions. And that you might see, *Pyrophilus*, what discouragements I have met with even from Artists themselves to keep mee from trusting to Printed Chymicall processes, I thinke it not amisse to mention here a memorable passage of the famous, and experienced *Alexander Van Suchten*, who is reported to have gotten more by the practice of Chymicall Physick

then

then any of the Contemporary professors of it; for he towards the end of his Booke of the secrets of Antimony (of which he clearly discloseth not any in that Treatise,) gives this account of his Crypticall way of writing; *Quod in hoc Tratu nullum Recipe proposuerim ob id factum est, quod vos seducere nolo, Recipe enim illa seducunt juniores Medicos: sed neque à Theophrasto ullum Recipe Scriptum est, quod ad Medicinam, quin occultum sensum habeat, & in quo nihil vel de-erit, vel abundet; & hoc non fit sine magnis causis.* Wherefore make account, that besides that such changes of the qualities, of Bodies, may afford much light to Naturalists, he doth Chymists no useles piece of service, that acquaints them with the success of the nobler sort of processes mentioned in Authors, though he should give them little or no account of the Vertues of the Remedies prepared by those Processes; but this I hope is not altogether our case, for besides that our Observations are likely to save You much trouble, and perhaps some mistakes, and mis-adventures, besides that (I say) we have had oportunity to observe such eminent effects of severall of the volatile Liquors described in these Papers, as may justly give us promising Expectations of the Properties of the rest, which are in their obvious qualities so neer of kin to them. And this sort of Medicines having been found sometimes to do wonders, and generally to be safe (which of a few of the known operative, and not Specifick Medicines can be truly affirmed) I not apt to thinke, that he that shall bring these Remedies in spite of their ill Scent, into the good opinion of Physitians, may make no inconsiderable number of Patients beholden to him.

I should not, *Pyrophilus*, proceed to make You repent Your Curiosity to know my thoughts of the Urinous, and Sulphureous Remedies it hath hitherto made me treat of, were it not, that

that there yet remains something to be said, without which, all that hath been said, will scarce signify very much towards the effectuall recommending of those medicines to Your esteem and practise.

For I do not ignore, *Pyrophilus*, that not only the Generality of the Galenicall Physitians, but divers of the more eminent, and judicious of the Chymists themselves, have been pleas'd to condemne the internall use of Liquors driven through a Retort, by the violence of fire, upon the scores of their being offensively Empyreumaticall, and Stinking; among which sort of Liquors I cannot expect, that our Spirits of Blood, Hartshorne, &c. will escape the being reckon'd. But forasmuch as the prosperous Effects I have had opportunity to see, of divers Remedies of that Nature, have given mee for them rather an esteem, then either a detestation or contempt; I suppose it may prove no unseasonable piece of Justice to the Spirit of Blood, and the other Noble, though fetid Remedies I have been setting you down; nor no unserviceable piece of Charity to Men, if in this place, and once for all, I spend some lines in endeavouring to rescue these criminated Medicines from the great Prejudice they suffer under, and from a reputation, which whilst it renders them more odious then even their smell can do, is likely to make men deny themselves the benefit of them.

I might *here* on this Occasion call in Question, whether not only Galenists, but even many Chymists themselves, be not somewhat more afraid, then they need be, of what they call *Empyreuma*. But I will suspend a *while* that Question, and at present confess to You, that I have sometimes doubted whether or no that stink which is generally call'd by the newly mention'd name, do alwayes, and necessarily proceed from the Impressions of a violent fire. For to make a pure Spirit,
and

and Salt of Urine, there needs nothing, but to let it in a well stopt vessel putrifie for a competent time (as we elsewhere teach) in a Dunghill, or any resembling warmth, (and that it selfe, perhaps, is not necessary to its Putrefaction;) and then to draw off an eight or tenth part of the Liquor that first ascends by the gentle heat of a Bath. By which, or by the yet milder warmth of a Lamp-furnace, it may be sufficiently rectified, and brought to yield, besides the Spirit, good store of Salt. And since the Spirit thus made differs so little in Smell or Tast from those of Blood and Hartshorne, that most mens Noses are not criticall enough to distinguish them, (and We have sometimes taken pleasure to make Chymists themselves to mistake the one of those Liquors for the other.) It seems worth considering, whether or no the fetid and urinous Tast and Smell, which in these Spirits is said to be Empyreumaticall, and to proceed from the Adustion of the fire, be not the Genuine Tast and Odour of the Spirituous and Saline particles of the mixed Bodies themselves, which they would manifest if they were copiously extricated, (to speak in the Kings language) separated from the other *Principles* or *Ingredients* & associated into one Body, though without the violence of the Fire. For to distill the Spirit of putrified Urine, wherein the like Smell and Tast are eminent, there needs (as we said) no greater heat, then that of a Lamp-furnace, or of Hors-dung, (since in the latter of these only, Urine too long kept, and but negligently stopt, hath been observ'd to have lost its volatile Salt and Spirit, before it was taken out of the Hors-dung. And such a Heat seems not great enough to impress an *Empyrema* upon such a Liquor. For we see that most things distill'd in the greater heat of a Bath, are commended by Physitians and Chymists, for their beeing free from Empyreume. And what Activity may be acquired by the subtile parts of a mixed

Body, by the convening (if I may so speak) of such Spirituous Particles disengag'd from those other parts which clogg'd or imprison'd them, without any Empyreumaticall Impression, from any violent externall Heat, may appear by the Chymicall Oyles of Spices. For though though they be usually drawn by Chymists and Apothecaries, by the help of Water in Limbecks; and though they have by us been drawn after another manner (which we may elsewhere teach You) with a much gentler heat (sometimes not exceeding that of an ordinary *Balneum*) yet these well Dephlegm'd Liquors retaining so well the Genuine Taste and Smell of the Concretes they were drawn from, that they pass unaccus'd of Empyreume, are some of them much stronger and hotter then the Spirit or Salt of Mans Blood, or of Hartshorn: As may appear especially by the Oyl of Cinnamom, which if pure, is more penetrant and fretting, then any thing but tryall could easily have perswaded mee. And lest you should object, that the Fire doth considerably contribute to the strength of these Liquors, otherwise then by disengaging the Particles they consist of from the unactive parts of the Concrete, and assembling them together, I must advertise You, that I have observ'd little less Heat & Penetrancy then in diverse of these, in some Liquors separated without the assistance of Distillation: As for Instance, in the purer sort of the true Peruvian Balsam, and in another kind of natural Balsam, almost of an Amber colour, which belonged to an Eastern Prince) who carried it up and down with him as a Jewel) whose Domesticks at his death sold it, whereby I came to procure some of it, and found cause to wonder at its strength both upon the tongue, and in its Operation. But granting, *Pyrophilus*, that the Volatile Remedies treated of in these Papers, may have their offensive Smell and Taste imputed to the Fire, yet perhaps Physitians would

would more slowly, and more tenderly censure the Remedies in question for their Empyreumaticall stink, if they did but consider, that they themselves scruple not to use (to name those among many others) *Senna* and *Scammony*, though the former be wont to gripe the Guts, and the latter have an Acrimony, Heat, and Mordacity so unkind to the Bowels, that a few grains exceeded in the Dose turnes it into poyson; because the ill Qualities of these Medicines, may by proper Correctives be somewhat mitigated, and the Good they doe, doth more then countervail the Inconveniencies that attend the use of them. For the very same Considerations, *Pyrophilus*, will be applicable to the excuse of those fetid Medicines, for which we Apologize: For though the *Empyreuma* or Impression of the fire, for which they are rejected, be the Quality, whose absence from them were very desirable, yet may that *Empyreuma* by dextrous Preparations be in some measure corrected (insomuch that I have known highly rectified Spirits of Urine, by being digested for divers months in an exquisitely stoppt Glasse, brought to be of a Scent, which to mee seem'd scarce at all stinking, and to others even pleasant) and the prejudice that may be justly fear'd from what remains, is advantageously recompenc'd by the benefits accruing from the efficacy of their more friendly Endowments. And in effect we find, that the Dogmatists themselves are grown not to scruple the administering the Spirit of Salt, though extorted (if it be of the best) by a much greater stress of Fire, then is requisite to the Distillation of any of the Medicines we defend. And not only the famous *Riverius* (as we have elsewhere noted) extolls the Spirit of Tartar, and Soot, which are yet sufficiently fetid and Empyreumaticall, but severall other (and among those some of our eminent English) Physitians frequently use, and commend the Oyl of *Guajacum* forced through a Retort.

And no less do divers learned Doctors esteem, and employ the Emphyreumaticall Oyl of Amber: Though (to note so much by the way) That be in divers cases far inferiour to the Volatile Salt, which (if the fire be skilfully administred) may at the same time, and by the same Operation be obtained. This Salt, besides the Efficacy ascribed to it in the Convulsions of Children, having been lately found by Experience to be an excellent Medicine against the Epilepsies, even of well grown Persons, being administred in the Dose of not above a Scruple, or halfe a Drachm, in a due Quantity of Peiony water, or some other proper Vehicle.

And on this occasion You may also be pleased to take notice, that foliated Gold, is ordinarily and without Scruple employed by Physitians, not only to cover Pills, but as a main Ingredient (though how properly I define not) of severall of their richest Cordiall Compositions extant in Dispensatories; and yet to how great a fire Gold is wont to be exposed before it be melted out of the Oare (wherein 'tis usually (at least as far as we have observ'd) blended with other Metals, and Minerals) and to Purifie it upon the Cupell either with Lead or Antimony: he that is unacquainted with the Operations of Mineralists, and the Art of Refiners, will not easily imagine. And, *Pyrophilus*, to satisfie You yet farther, that the strong Impression of Fire in the Medicines, doth not alwaies make them so noxious as they are commonly reputed; let mee desire you to take notice, that there is scarce any Medicament more generally given, and applauded, even by Methodicall Physitians then Steel, which is often administred in Substance, made up with other Ingredients, into the Form, either of Pills, or Electuaries. And yet we have wondred to see what great Fires, and violent Blasts of huge Bellows moved by Water-engines, are used to melt Iron first out of the Stone,

Stone; and if it be to be farther refined into Steel (much of that us'd in Physick being factitious) a new violence of the Fire is requisite: And though after all this to make astringent *Crocus Martis per se* (which is accounted one of the best preparations of it) they are wont to keep *Mars* (as the Chymists speak) amidst reverberated flames, or in some glaismans Furnace for many houres, yea sometimes for divers dayes; Yet this Medicine is with more successe then Scruple daily administred by learned Physitians, in Dysenteries, Fluxes, and other distempers where astringion is required. And 'tis somewhat Strange to mee, that the having been expos'd to no greater a Fire then is requisite to distill Spirit of Blood, or of Hartshorn, should be much urg'd against those Medicines, by those that scruple not to commend, and do almost daily and oftentimes successefully, prescribe the lixiviat Salts of Plants, and particularly of Wormwood, though these are not rightly made, but by the exposing the Concretes even to the violence of an incinerating fire. And as for the unpleasantness of the Smells of our Spirits of Blood, Hartshorn, &c: besides that, to very many Persons there is no Odour so loathsome, as that of a Potion. We find that the Galenists themselves scruple not in the Fits of the Mother (which yet very rarely prove mortall) to repress (as Men are wont to suppose) the unruly Fumes by the Smell of *Castoreum*, *Assa fetida*, and even the Emphyreumaticall Odour of the burnt feathers of Partridges: nor do they decline to use these homely, and ungratefull Remedies to Patients of tenderest Sex, and highest Quality. and indeed in dangerous cases I have known fair Ladies content to thinke it fitter to take down an ill Scented Medicine, then venture the having their own bodies in few daies reduc'd to worse Perfumes. And certainly we may justly say of Health, as no less then an Emperour said of the gain brought
him

him in by Urin, That it Smells well from what thing soever it comes.

But, *Pyrophilus*, if Your Nostrils were so nice, that they must needs be comply'd with, though with the hazzard of impairing the Vertues of the Salts they are offended with, I Could propose an Effectuall Expedient to gratifie them; and being now invited by so pressing an Occasion, I shall not scruple to annex something of it, and tell You, that if we may judge of the Vertues of the Spirit and Salt of Soot (which I am wont to make without addition) by their sensible Qualities: they must be much of kin to those of the Spirit of Hartshorn, and of Urine; (though these be animall Substances.) And therefore having elsewhere more particularly, and by divers Experiments declared the affinity between these Salts in divers regards; it will not, I presume, be look'd upon as an unusefull or unseasonable Hint, if I give You a summary, though but imperfect, Account of what I remember my selfe to have done, in order to the freeing of the Volatile Salt of Soot, from that very offensive Smell, which may possibly make many, even of those that need them, abominate those Medicines, how Piercing and Noble soever, which it Blemisheth. The Process is as followeth.

Take a Quantity of well Deflegm'd Spirit of Wine proportionate to the Quantity of Salt, whose Odour You desire to correct; into this Spirit drop as much Oyl of *Rhodium*, or of any other Odoriferous Chymicall Oyl, as will suffice to make the Liquor as strongly Scented as You desire it: shake the Oyl, and Spirit well together, and if they were both well made, the latter will imbibe the former, and sometimes be thereby turn'd into a whitish Substance; with which if it smell not strong enough of the Oyl, You may by Agitation incorporate more Oyl, and if You judge the mixture too strong already,

ready, You may dilute it at pleasure, by the affusion of more Spirit of Wine. This done put the Salt of Soot into a Bolthead, or Glass Egge (according to the Quantity that You intend to sublime,) furnish'd with somewhat a long Neck or Stem, and afterwards powring on leisurely Your Odoriferous Liquor, You may with it wash down the Salt that is wont to stick in the Neck of the Glass. After this you must very carefully stop the Vessell with a Cork, and store of hard-wax, if you cannot conveniently, make use of an exacter way of closing it. This Glass You must place in a Lamp furnace, or some other, wherein You may give a very moderate heat, for that will suffice to elevate to the neck and upper part of the Vessell the pure white Salt of Soot, imbued (at the second time, if not at the first) with the Scent of the Odoriferous Oyl, which You imploy'd about the Preparation.

This Experiment, *Pyrophilus*, may prove of that Use in Physick, that it may deserve as well for its Nobleness, as the watchfulness, which is requisite in him that makes it, to be illustrated by the ensuing

Observations.

1. Then it is requisite that the Spirit of Wine be very good, For that which is not sufficiently Dephlegm'd, will not readily and perfectly receive into it self the odoriferous Oyl, wherewith it is to be perfum'd. Nor would every Chymical Oyl, although it were well scented, be fit for this Preparation for divers of them as Oyl of Turpentine, and Oyl of Amber will not sufficiently mingle with Spirit of Wine, unless they be previously subtiliz'd after a peculiar manner.

2. The Proportion betwixt the Spirit of Wine, and the Oyl that it is to be dissolv'd in, 'tis not easie to determine; for a lesser Quantity will suffice of some Oyl's, then of other. And the Proportion of them must be vary'd, according as You
would

would have the sublim'd Salt to participate more or lesse of their Odour, and other Qualities.

3. Great diligence must be us'd in closing the top of the Glass, because of the great fugacity, and subtilty of the Salt, whose Avolation is to be prevented: But then much greater care is to be had, that the Heat be not too stoong, but as equal as may be, and much inferiour to the Moderate heat of an ordinary Chymicall *Balneum*. For 'tis scarce Credible how easily this unruly Salt will be excited either to make an escape at the mouth of the Glass, or to break it in pieces. And I remember among such other Accidents which have befallen us in the Preparation of this Odoriferous Salt, that having once set some of it to sublime from a perfum'd Chymicall Oyl, though though we administred so gentle a heat, that we thought the Vessel out of all danger of being broken, or found open: Yet in a short time the fugitive Salt did with a great noise blow out the Cork that was waxed to the top of the Vessel, leaving in the bottom not a limpid Oyl, but a Liquor of a red colour, and a Balsamick Consistence. But if the Glass be wide enough to allow these fumes competent Roome, and if the heat be warily administred, the Sublimation may be well enough perform'd.

Of the Medicinall Quality of this Aromaticall Salt, *Pyrophilus*, we have not yet had opportunity to make tryall, but some esteem may be made of them by calling to mind the Vertues of the simple Salt of Soot, and considering the Nature of the Liquors, from which in this Our Preparation it hath been Sublim'd. The Principall, if not the only thing, that seems to be fear'd, is, that the Salt of Soot being it selfe hot, and Chymicall Oyles being for the most part eminently so too, our Salt may prove unfit for Men of Hot and Cholerick Complexions, and in such distempers, as proceed from Ex-
cesse

cesses of Heat. But then it may be considered in the first place, that the Salt of Soot, being of an extremely apertive, resolving, and Volatile Nature, and carrying up with it in Sublimation only the more fugitive parts of the Liquor from which it is sublim'd; It is very likely that the heat produc'd by a Medicine, which by reason of its fugacity would stay but a very short time in the Body, will not be so lasting as that of ordinary Sudorifics, which are nevertheless often administered with good Success, even in hot Diseases.

Secondly, That there are divers Bodies and Distempers, wherein Remedies may be the more proper, for their being somewhat hot, and Experience shewes, that in Dropsies (to mention now no other Diseases) these Volatile Saline Remedies, that set the Blood a whirling and powerfully promote its Circulation, may prove very available.

Thirdly, The Heat that may be fear'd upon the use of our Salt, may be either prevented, or at least moderated by the seasonable use of such cooling Remedies, as may be no Enemies to the Operation of this Salt, and yet no friends to the Distemper, against which it is administered;

And Lastly, Supposing that the inconveniencies proceeding from this Heat were not to be altogether avoided, yet the advantageous efficacy of so powerful and searching a Remedy, may very much outweigh that Inconvenience; And therefore *Riverius*, as we formerly told You, commends the Spirit of Soot (though that seem at least as hot as the Salt) in Pleurifies; and in the same hot sickness, we have, as we elsewhere relate, successfully administered the Spirit of Hartshorn, whose Qualities are very near of kin to those of Salt of Soot. Other instances of this Nature You may meet with dispers'd in other passages of my Chymical Papers, to which I must adde, that upon the Consideration above mention'd,

the Methodists themselves make no difficulty, in Pills and other Medicines, to use the Chymical Oyl, either of Cloves, or of Nutmegs, or even of Cinnamon. And some of our eminentest English Doctors, as I lately noted, have not scrupled of late Years, to use the strong and fetid Chymical Oyles of Amber and of *Guajacum* (and the latter of these in large Doses) whereas in our Preparation, onely the finest and most Aromatick parts of the Oyls, seem to be associated with the fuliginous Salt, since the Oyl remaining after the Sublimation, has been observ'd to be thick and ropy almost like a Syrrup.

But whether or no this Aromatick Salt be a safe Medicine in all Hot Bodies and Diseases, it seems very probable, that it will prove a very powerful Remedy in those Distempers for which it is proper. For first, whereas Spagyristes have with much study, but without much success, endeavour'd to emak Oyls capable of being mixt with other Liquors, by depriving them of their oleaginous form, in which *Helmont* himself complains that they are offensive; we have by our Preparation their finest parts associated with the penetrant and volatile Salt: by whose assistance they are not only fit to communicate their Vertues to Liquors, but assisted to penetrate exceedingly; and perchance also, thereby to obtain such an access to the innermost parts of the Body, as is seldome allow'd to Vegetable Medicines. Secondly, We may have by this Preparation one of the most noble and volatile Salts of the World, not onely free'd from its stink, but imbu'd with the Odour, and perhaps divers of the Vertues of what Chymical Oyls we please. And since these Chymical Oyls are by Chymists and Naturalists thought to contain the most noble and active parts of the Vegetables whence they have been destill'd; And since also the Salt of Soot sublim'd from them,

them, carries up with it the finest parts of these Oyls, why may it not be hop'd, that no small number of distinct Remedies may be afforded us by this single Experiment? These Remedies too may be the more acceptable both to Physicians and Patients, because they have not in them any thing that is Mineral, and notwithstanding their great Penetrancy and Efficacy have in them nothing of Corrosive, as many of the Saline Remedies prescrib'd by Physicians in their Dispensatories. And thirdly, That the Salt of Soot thus sublim'd may be also enrich'd with the *Sulphur* or Balsamick part of the Spirit of Wine, which was employ'd about its Preparation, may appear probable enough to him, that shall examine, by his tast and otherwise, such rectify'd Spirit of Wine as has had a sufficient quantity of Volatile Salts sublim'd from it. And how Balsamical a substance is diffus'd through pure Spirit of Wine, may be guess'd at by the great change which is made in the Caustick Salt of Tartar, when it is so dulcify'd as to make that Excellent Medicine, which *Helmont* extolls against inward Ulcers, and calls *Balsamus Samech*; which if one had the abstruse Art of so preparing the Salt and Liquor, as to fit them for Conjunction, might be made onely by destilling very frequently pure Spirit of Wine from very fine Salt of Tartar. For by this means the fix'd Salt, retaining the Sulphureous Salt or Balsamick parts of the Spirit of Wine, (as may appear by the Aquosity of the Liquor that comes over the Helm in this Preparation) is thereby so depriv'd of its caustick tast, that when it will rob no more Spirit of Wine, but suffer it to be drawn off as strong as it was pour'd on, it will easily in a moist place run *per deliquium*, into a liquor not of a Caustick, but Balsamick (and as it seem'd to us a pleasant) Tast.

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And

And whereas, *Pyrophilus*, we have complain'd of the Difficulty we have met with, to manage the unruly Salt of Soot, and keep it from breaking Prison, we must, to make this Experiment be more practicable and useful, advertise You, that You may, if You please, instead of Salt of Soot Aromatize that of Harts-horn, or mans Blood. And I might adde, that a very ingenious Friend of Ours Dr N-N. has lately Practis'd yet a more easie and preferable way of preparing Medicines of this Nature: But though I have partly try'd his Method, and found it to succeed well enough; yet since I had it but by communication from him, and that he makes a considerable Advantage of it, I must forbear imparting it to You, 'till I shall have obtain'd his Consent to disclose it.

I know not, *Pyrophilus*, whether I shall need to adde, That of these fetid Remedies, which are Volatile, and somewhat Sulphureous, as I chose to mention to You but a few, to comply with my present haste, which would not allow me to insist on many; so in what I have deliver'd concerning these few, I have set down Particulars the more fully and explicitly, because I find the Doctrine of Volatile Salts (though in my poor judgment worthy of a serious Enquiry) perfunctorily, and indistinctly enough handled by the Chymical Writers I have yet met with, which made me the willinger to contribute the few Observations I could readily find of those I have had opportunity to make about them, towards the Illustration of so important a Subject, of which having elsewhere spoken in relation to Physiologie (as these fugitive Bodies belong to the Commonwealth of Salts) I thought it might not be unacceptable to You, if I also consider'd them a while in relation to Physick, and presented You with some hints concerning their Medical Uses.

[To the 166th Page, where the Author promises a Declaration, how he would have his Praises of Medicines understood.]

ANd now, *Pyrophilus*, having finished what I thought fit to adde (at present) in the past APPENDIX, I should likewise put at end to the present Exercise of your Patience, but that this being my first Treatise written to You concerning Medical Matters, and not being likely to be the last which you will meet with among the Papers design'd You, I think it requisite, and not unseasonable to declare to you here once for all, with what Eyes I desire you should look upon what I have writtten, and shall write to you concerning matters of that Nature. And first, I must advertise You that I am not so much a Mountebank as to recommend to you the Remedies I mention as certain Cures in the Cases wherein they are proper. For he must have been extraordinarily happy, or very much unacquainted with the Practise of Physick, that has not found, that even those Medicines which are most celebrated by the best Authors, both Galenical and Chymical, do sometimes prove ineffectual as well as often prosperous, and the Remedy prescribed by the same Physitian to twenty Patients sick of the same Disease, has more then once been Observed, though it have succeeded in nineteen, to fail in the twentieth. And indeed the Causes of Diseases, the Constitution of Patients, and the Complications of Distempers are so very various, intricate, and obscure, that it is extreamly difficult even for the most knowing and experienc'd Physitian to make an accurate, and constant Experiment in the Therapeutical part of Physick; and consequently such Experiments are much lesse to be expected
from

from Me, whose Condition as well Disabilities forbid me to make the Practise of Physick my businesse, and allow me onely to administer it occasionally, either to my own particular Acquaintance, or to such poor people as are not able to gratify Physitians, or such as I meet with where there are not any: And thereby I am reduced to learn the Vertues of divers of the Remedies I have prepared by very few or none of my own immediate Trials, but the Relation of Physitians, who do me the Favour to administer them for me. And therefore, though I endeavour to put them into the hands of faithfull, as well as ingenious men, Yet not being allowed to be my self a constant eye-witnesse of the Effects they produce, I must here for all these reasons solemnly proteste to you, that as I do not set down Medicinal Experiments, with the same positivenesse that I do Physiological ones, so I do not intend to venture the repute of being a faithful Relator of Experiments, upon the successe of any Medicinal Receipt or Proceffe.

Yet in the next place I must tell You, that You would perhaps do Me but right, to think not only that the Chymical preparations of Remedies are, if you understand them aright, candidly set down, though the Vertues ascribed to them do not constantly upon all Trials display themselves; but that I have not rashly and inconsiderately, or upon uncertain Rumors recorded the vertues of particular Remedies, which may be good, though they be not infallible. It being sufficient to make a Medicine deserve the Title of Good, that it be often (in some degree at least) succesful, though now and then it prove not availeable; especially if it be otherwaies so safe and innocent, that even when it proves not prosperous, it weakens not nature, nor is otherwise noxious; And we must not, *Pyrophilus* be so timid as to suffer our selves to be perswaded, that

that if a patient miscarry after the use of the Remedies, the fault must necessarily belong to the exhibited Medicine. For oftentimes Nature will in spight of Remedies make a *Metastasis* of the peccant matter, and so empair the Condition of the patient; and much oftner before death, the Conflict of struggling Nature, and the conquering Disease doth manifest it self in horrid and dreadful Symptomes, which some envious or ignorant Doctors (for the more learned are wont to be more equitable, and lesse partial) injuriously impute to the Chymical Remedy, given before the appearing of those Symptomes, never considering that the like Accidents are wont to attend dangerous Diseases, and dying persons, where Galenicals Remedies onely, and no Chymical ones at all have been administred. And that divers of the most eminent, and Methodical of our Modern Physitians scruple not to use frequently both *Crocus Metallorum*, *Merc. Dulcis*, and some other Chymical Remedies, and to impute the miscarriages of the Patients that use them to their Diseases, though not many years, since all the frightful Symptomes accompanying the dying persons to whom they had been exhibited, were confidently imputed to those Medicines. To which let me adde, *Pyrophilus*, that oftentimes it may be very just to prize an Empirical Remedy more then a Galenical, though the Methodist and the Empirick have each of them by his respective Remedies, performed cures of divers patients in the same Disease; *partly* because Empirical Chymists are seldome resorted to but in desperate cases, or till Nature be almost spent, either by the violence of the Disease, or the unprosperous operation of the Medicines employed to remove it; and *partly*, because the Methodist helps his Remedies by premising the wonted Evacuations (by Vomit, Seige, or by Phlebotomy) by varying them according to Emergent Circumstances,

stances, by skilfully and seasonably administering them, and by strict rules of Diet; whereas the Empirick oftentimes useth but a single Remedy, and usually without premising general Evacuations, exhibits it not to the greatest Advantage in relation to time, and other circumstances, and is much more indulgent to his patient in point of Diet: So that when an Empirick, and a rational Physitian do both in several patients Cure for instance the same Plurisie, the Disease may be very often judged to have been removed in one of the Patients chiefly by the Physitian, and in the other by the Remedy.

In the third place, *Pyrophilus*, I must advertise You, that though I mention more Chymical remedies then Galenical, yet it is not out of any partial fondnesse of the former, and much lesse from any undervaluation of the latter, but *partly*, because Chymical processes being wont to be more unfaithfully, or obscurely set down by Authors then Galenical Receipts, I thought it might save You some labour to receive from me a frequenter account of those, then these; and *partly*, because in many Chymical preparations, divers considerable Changes being to be wrought upon the Concretes to be prepared by them, there is oftentime so much of Philosophy to be learn'd by such Processes, that the succeſſe of them may prove instructive to you, though it should acquaint you with their Truth only, as they are Chymical preparations, and not as they are Medicinal Receipts. But otherwise I love to look upon both Chymical and Galenical Remedies, with an impartial eye, and think that neither the former ought to be despised for the latter, nor the latter for the former; for as Chymical Remedies have commonly the advantages of being more durable, lesse clogging by their quantity, and lesse nauseated by Patients; so Galenical Remedies have when they are

are of equal Efficacy, the Advantages of being more cheap, (at least quantity for quantity) more procurable, and sooner prepared. And such is the variety of Cases arising from the variety of Constitutions and Distempers, that in some of them the former sort of Remedies may be more proper; and in others, the latter may seem requisite; and in some also both sorts may alternately be so useful, that neither of them can well be spared.

In the fourth place, *Pyrophilus*, let me advertise You, that divers Chymical Remedies, and some Specificks also which are not Chymical, have seem'd upon triall lesse effectual then indeed they are, because they have been tryed by such Physicians as weaken their Efficacy by not administering them as they should. For some Physicians will never exhibite a Chymical Remedy, till the Patients strength hath been almost tired, if not quite spent with the unprosperous use of divers other clogging and debilitating Medicines. Others are so diffident of Chymical Remedies that they never dare to exhibite them in a full Dose, nor by themselves, but will blend a small quantity of a Chymical Medicine or a Specifick with other Ingredients, which either constitute with it a Medicine of new qualities resulting from that mixture, or at least much clog or enervate the activity and vertue of the Chymical or Specifick Ingredients: by which, even in so inconsiderable a Dose, these distrustful Doctors dare yet require that great matters should be performed. Of which injurious way of administering the Remedies I recommend to you *Pyrophilus*, I do not causelessly desire you to beware; as I may hereafter have occasion to shew you by particular instances of the Reasonableness as well of this Advertisement as of the others which I either have given You, or shall give you in this and other Papers. And another sort of Physicians there is

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who are of so despondent and rather partial an Humour; that if a Chymical Remedie or a Specifick do not presently perform the hop'd-for Cure, though they find that even upon their disadvantageous manner of administering it, it doth good; yet they will quickly desist from the Use of it: And because it doth not do Wonders, they will not scruple to affirm that they have tried it and found it do nothing; whereas they are wont to continue their own Courses of Physick without discouragement, though it be usually some weeks before the Patient find any good by them, and oftentimes (as numbers of the printed Observations of Physitians as well as daily Experience testify) the patient is by the tedious Course of Physick he has gone through very little better'd, if not much impair'd. Which I speak, *Pyrophilus*, not with an Intention to disparage Physitians in general, the most learned and ingenious of them being free enough from the Partiality I here take notice of, but to keep good Remedies from being disparaged by the envious or unskilful trials of bad Administers: And though indeed some Chymists are so vain-glorious or unwary, as to promise that the Operation of their Remedies should be as well suddain, as effectual; yet if the Medicines themselves be found availeable, although not swiftly so, that slownesse ought to make us but condemne the Boastings of the man, not reject the use of the Remedies.

And in the last place, *Pyrophilus*, I must Advertise you, not to expect that every one of the Remedies I commend should be Physick and Physitian too; I mean, that it should of it self suffice to performe the Cures of those Diseases against which it is commended. For Medicines are but Instruments in the hand of the Physitian, and though they be never so well edg'd and temper'd require a skilful hand to mannage them; and therefore I cannot but admire and disapprove their
boldnesse

boldnesse that venture upon the Practise of Physick, wherein it is so dangerous to commit Errours, barely upon the confidence of having good Receipts. For though by Conversation with eminent Physitians I have found the learnedest of them to disagree so much about the Nature and causes of Diseases, that I dare not deny but that he may prosperously practise Physick that either ignores or dissents from the received Doctrines of the Schooles concerning the causes of Diseases, and some other Pathological particulars; yet I cannot but dislike their boldnesse who venture to give active Physick, either in intricate or acute Diseases without at least a Mediocrity of knowledg in Anatomy, and so much knowledg of the History of Diseases, as may suffice to inform them in a competent measure what are the usual Symptomes of such a Disease, what course nature is wont to take in dealing with the peccant matter, and what discernable alterations in the Patients Body do commonly forerun, and thereby foretel, a *Crisis*, or otherwise the good or bad event of the Disease. To all which is to be added some tolerable measure of Knowledg, not only of the *Materia Medica*, and the chief waies of compounding several ingredients into Medicines of several Formes and Consistencies, as circumstances may require; but also of the orderly and seasonable administration of the helps affordable by them. These particulars, *Pyrophilus*, might easily be enlarged on, but having neither the leisure nor designe to handle them commonplace-like, I shall only give you this account of my requiring in the Profess'd Practiser of Physick some knowledg both of the *Materia medica* and the Method of compounding and administering Remedies, that (excepting perhaps the *Arcana majora* as Chymists call them) even the best Medicines by being unseasonably or preposterously administred, especially in acute Diseases

where Nature's motions are to be diligently watcht, and seconded, may do a patient as much harm as the orderly and skilful administration of them can do him good. And that he that has nothing but one good receipt for a Distemper, and knowes not how to vary it by adding, omitting, or substituting other parts of the *Materia Medica*, as urgent occasion shall require, may oftentimes find himself reduced either to suffer his Patient to languish helpless, or to venture by curing him of one Disease to cast him into another. For sometimes the Patients constitution makes the Medicine prescribed by the Receipt unfit to be administred, and sometimes too, the Disease for which the Receipt is proper, is in the Patient complicated with some other Distemper which may be as much encreased by the Specifick, as the other Disease may be lessened. I know for instance some eminent men that are wont to Cure very stubborn Venereal distempers, by a Chymical preparation (which some of themselves have been pleased to disclose to me) of the *Indian Plants*, *Sarsaparilla*, *Guaiacum*, &c. But if these men met with Patients, such as those which *Eustachius Rudius* mentions himself to have often met with, who upon the use of the least quantity of *Guaiacum*, though corrected with cold ingredients, were wont to be presently affected with such sharpnesse of Urine, and Inflammation of the parts, to which Urine relates, as hazarded their lives; they would be reduced, as well as our Author confesseth himself to have been, to have recourse to *Mercurial* or other Remedies. To which we may adde, that the use of *Sarsaparilla*, and *Guaiacum* is generally forbidden by the warier sort of Physitians, in those Patients, whose Venereal Distempers are complicated with heat or Inflammation of the Kidnies or Livers. And sometimes also it happens, that the very outward forme of the Medicine prescribed by the Receipt is not fit,

or perhaps possible to be administred. For not to mention that divers Patients can retain no purgative Physick exhibited in the form of a Potion; and some others are as apt to Vomit up whatever is given them in the form of Pills, not to insist on this I say, I shall content my self to relate to You a memorable Case that hapned a while since to a Physitian of my acquaintance. He was called to a lusty young Woman, who upon an accidental but violent Cold was suddenly taken with such a Constriction of the Parts inservient to Speech and Deglutition, as made her altogether unable either to speak or swallow any thing at all; and having thus continued some daies in spight of Glysters or other Remedies prescribed by a very Learned Physitian, and in spight of Endeavours to excite Vomiting, by making Her hold emetick things in her Mouth; the poor Woman was in great danger (when my acquaintance came to her) of perishing for hunger: what in this case could be expected from the best Remedies that must necessarily be taken in at the Mouth? Wherefore the Physitian finding her yet strong enough, and without Feaver, and yet her case almost desperate, did as judiciously as luckily prescribe a Glyster, wherein to ordinary Ingredients were added (as himself a very few daies after told me) about four *ounces* of the Infusion of *Crocus Metallorum*, with an advise that it should be kept in as long as possibly She could, and by this Medicine, Nature being sufficiently irritated, there quickly followed upon it some violent Vomitings, and upon them a liberty both of Swallowing and Speaking. [And since this a young Gentleman and Fellow-traveller of mine, had the Organs of deglutition so strangely weakned without any manifest cause, that though he were able to make me a Visit, and acquaint me with his Case, yet he was very apprehensive, he should in a very few Dayes be starv'd, and being unable to swallow

Remedies,

Remedies, had quickly perish'd in despite of the *Arcana Majora* themselves, had he been master but of such of them as (like those wont to be magnify'd by Chymists) must be taken into the Body; if a very happy Physitian to whom I directed him, had not by a very Efficacious and Specifick Medicine externally to be apply'd, seasonably rescued him from so unusual and desperate a Case.] But, *Pyrophilus*, as I would not upon the score of good Receipts have the Physitians skill despis'd, or thought uselesse, so I wish that the Physitians skill may not make him despise good Receipts; For we have often seen (especially in outward affections) not onely Empericks and Chirurgeons, but even Ladies and old Wives, with a lucky composition prescribed by a Receipt, performe more constant and easie Cures of the particular Distemper, for which that Receipt is proper, then even Learned Physitians by their extemporary, though pompous and Artificial Prescriptions. And the illustrious Lord *Verulam* (one of the most judicious Naturalists that our Age can boast,) thinks fit to take notice of it as a Deficiency that Receipts by long Experience approved, are not more closely, and as he speaks *religiously* *adher'd* to, but alter'd upon every light occasion; And in the same Chapter to answer the Principal, as well as the most obvious Objection in this Matter, "That, sayes He, any man induc'd by some Specious Reason should be of opinion, that it is the part of a Learned Physitian (respecting the Complexions of Patients, their Age, the season of the Year, Customs, and the like) rather to accommodate his Medicines as Occasions suggests, then to insist upon some certain Prescripts is a deceivable Assertion, & which attributes too little to Experience, too much to Judgment. And a little above He goes much farther then we pretend to do, for speaking of the Neglect of the use of particular Receipts, which, as He

*De Augment.
Scient. Lib. 4.
cap. 2.*

He speaks, by a kind of propriety, respect the Cure of particular Diseases, He addes, (severely enough,) "That the Physicians have frustrated and taken away the fruit of Traditions, and approved Experience by their *Magistralities*, in adding and taking out, and changing Ingredients of Receipts at their pleasure, and almost after the manner of Apothecaries, putting in *Quid pro quo*, commanding so presumptuously over the Medicine, as the Medicine can no longer command the Disease. Thus farre our Judicious Author: But I will rather choose to expresse to You my sense on This whole Subject of Receipts, in the Words of that Experienc'd Physitian to three Emperors, *Johannes Crato: De morbi Natura* (sayes He) *causa, locoque affecto Medicus diligenter cogitet, atque in eo plus quam in certis medicamentorum mirificis formis situm putet: Medicinam tamen expertam cum ratione adhibitam plus valere quam ea quæ interdum subito à Doctissimo etiam Medico magnâ ratione exhibita excogitatur, non dubito: Atque hac in parte Rationales etiam Medicos Empeiricis cedere debere de sententia Hippocratis statuo.* Onely I must adde by way of Explanation, That this Sentence is to be understood to expresse my sense, when the Medicines used are not very extraordinary, but such as *Crato* employ'd, and has left us in his Writings: for there may possibly be such effectual Specificks, and such powerful and commanding Remedies, that the Efficacy of the Medicine may (at least in some particular Diseases) excuse and repair much want of skill in the Prescriber.

If the Testimony of *Helmont* concerning the *Arcana* of *Paracelsus* be considerable, even in a Tract (where either out of Emulation or Judgment, he endeavours somewhat do depreciate both them and their Author) much greater things might be boldly affirmed of some *Arcana*; for *Fateor Lubens*, (saies he, speaking of *Paracelsus*) *Me ex ejus scriptis profecisse multum,*

Consil. 322

Helmont. in. Arcan. Paracelsi, pag. 787.

Helmont. in
Arcan. Paracels.
pag. in 790.

inultum, illūmque potuisse, per Remedia ad unitatis Symbolum adfendentia, sanare Lepram, Asthma, Tabem, Paralyfin, Epilepsiam, Calculum, Hydropem, Podagram, Cancrum, atque ejusmodi vulgo incurabiles morbos: attamen Paracelsum fuisse ignarum radicis vitæ longæ, tam ex ejus scriptis & medicaminibus quam ex Obitu collegi, &c. And in the same Tract just before He comes to enumerate Paracelsus's Arcana. Concedo, saith he, *Universales aliquot Medicinas, quæ sub unisono Naturæ longe gratissimo, insensibiliter post se victum educunt hostem, cum egregia Organorum depuratione, Concedo pariter appropriatas aliquot quo universalis amplitudinem in specificis morborum directionibus amulantur.* And among those Arcana themselves that is ranck'd but in the second place, of which he gives this Characters: *Sequitur dein Mercurius Vitæ, Stibii proles integri, quæ omnem morbi nervum penitus absorbet.*

And because another Arcanum does not so powerfully renovate, as that last mention'd, and two more; He allowes to those three others the precedencies of that whereof He yet saith: *Quarto loco est Mercurius Diaphoreticus, melle dulcior & ad ignem fixus, solis Horizontis omnes proprietates habet: perficit enim quicquid Medicus & Chirurgus possint optare sanando.* But because, that any Medicines should be qualify'd to deserve such superlative Encomiums, may seem a thing fitter to be wish'd then credited, I would not dissuade You till the Chymists Cures have made good their Masters brags, to be altogether of our Authors Mind, who somewhere professes: *Se morbum non dinguere, si Remediis* (sure he speaks of such Remedies as he thought he had) *fit summa bonitas.* But yet you may perchance ascribe much more even to Remedies far inferiour to the Arcana Majora, in the cases wherein they are most proper, then many are willing to believe. Inso-much that I have sometimes observ'd with wonder, that an
Excellent

Excellent Person (whom I need not name to You) cures the Rickets generally in Children of several Ages and Complexions without having hitherto fail'd (as she professes) in any one, by prescribing no other Remedy then the single use of the above describ'd *Colcotharine Flowres*, which I presented Her; and which a couple of Physitians also, to whom I recommended them, tell Me, They have try'd in the same Disease with the like success, as this Lady hath hitherto met with. And I remember that eminently Learned and experienc'd Physitian Dr *G. Boat*, (of whose skill both your Excellent Mother and You have had good Proof) solemnly assur'd me, as I elswhere also note, That he knew a Physitian who constantly cur'd within two or three Fits all Agues, whether recent or radical, in Persons of all Ages, Sexes, and Complexions, indiscriminately with one single outward Application to the Patients Wrists; but that this Envious Doctor would never part with it to our Friend, or any else, no not upon his Death-bed: onely Dr *Boat* discovered, That Spiders or something coming from them were main Ingredients of his *Pericarpia*.

And indeed there are certain Preparations and Compositions of Remedies so lucky, and whose Successes doth so much exceed Expectation, and the Efficacy of common Compositions; that the same Physitian, whose they are, may upon several Occasions prescribe an Hundred others, each of which he may think as rational as any of those, which nevertheless shall be all of them much inferiour thereunto. And therefore I wonder not that the most Learned of the Methodists themselves have much valued and celebrated some peculiar Processes and Receipts, as here amongst us (to mention no others) the Famous *Sr Theodore Mayerne*, was wont almost in all Obstructions, Cachexies, and Hydropicall Distempers to magnifie and use that peculiar Salt of Steel of his,

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which he was pleas'd to call *Anima hepatis*.

And to these Domestick Instances (which I might easily accumulate) of the esteem eminent Physitians have made of Receipts, I might adde very many Forreign ones. Nay *Galen* himself, who has so copiously treated of the *Materia medica*, and the *Composition of Medicaments*, though he were sufficiently expert at drawing up Receipts, doth yet in his Book *De Compositione Medicamentorum*, and elsewhere transcribe, and sometimes commend (and mention his having us'd) divers of the Compositions of Auncienter Physitians, and especially magnifies *Andromachus* His Treacle.

I might, *Pyroph*: here mind You, That we see that Chymistry, as Incompleat as it yet is, has been able so much to improve the preparations of Remedies, as to afford us some, which are so Innocent as well as Efficacious, that in the Diseases they principally respect, they require not, as of Necessity, neer so much of Theorical skill, as others do in the Administer; I might likewise take notice, That Experience also teacheth, especially by what we see perform'd by the *Spaa*, and some other Mineral Waters, that one Medicine may be so richly endow'd, as to be more Effectual against several differing Diseases, then even the better sort of other Remedies against any one particular Disease.

I might further represent as some thing that makes yet more to my present purpose, that though every Body can advise his sick Friends to an Air that is famously healthful, if there be any within a convenient Distance from them; Yet there are some Aires so eminently good, and that not upon the Account of any one Predominant Quality that makes them opposite to a Disease springing from its contrary, but from a hidden Temperature, or certain friendly *Effluvia*, that they alone often cure Variety of Diseases in Persons
of

of differing Ages and Complexions : as Navigators observe in the Isle of *S^t Helen* where the *Spaniards* and some other *Europeans* in their passage to the *Indies*, often leave without Physicians great numbers of Sick, whom they find for the most part recover'd at their return. And that sometimes ev'n the acutest Diseases may by the Sanative Steams that enrich the Air be cur'd almost in a trice is assur'd by those that have liv'd in grand *Cairo*, who have affirm'd to me, what the Learned *Prosper Alpinus*, who so long practis'd Physick there, assures Us, That upon *Nilus's* beginning to over-flow, though in the Heat of Summer, there ensueth a suddain Recovery of those multitudes of Persons of differing Ages, Temperatures, Sexes, &c. which there happen at that time to ly Sick of the Plague. These things I say, *Pyrophilus*, and more I might adde, to what You may find dispers'd here and there in the **E S S A Y E S** which this Paper accompanies towards the inferring that we should not hastily conclude it *Impossible* that there May be found such Medicines as may be more then particular and Specifick Remedies without requiring the Giver be a great Physician. But to draw at length to a Conclusion, I shall rather Summe up my present thoughts of this Matter Thus.

Ordinary Receipts without an Ordinary Measure of skill in Physick are not rashly to be rely'd on, especially in Acute Diseases; where by giving Medicines otherwise innocent enough, to loose the opportunities of administring proper ones may be very prejudicial, and where sometimes the several seasons of the Disease do require such differing Remedies if they be but Ordinary ones, that a Medicine proper enough for the Disease at one season of it may do Mischief at another: But if indeed there be Noble and Extraordinary *Arcana*, that work rather by strengthening and restoring Nature, and Re-

solving, or otherwise destroying the peccant Matter they find any where in the Body, then by irritating and weakening Nature or putting Her as it were to a troublesome Plunge; the use of such Remedies may deserve to be a little otherwise consider'd, as that which may not Ordinarily (for I say not Ever) require more Instruction then may be afforded to Persons not Indiscreet by such Directions and Cautions as may be Divulg'd, or otherwise Communicated, together with the Remedies themselves: As we sometimes see that by the help of such Instructions unlearned Persons and ev'n old Wives do with some one Sovereign Plaister, Balsam, or other outward Remedy, Cure many and various Tumors, Ulcers, and other Sores in Persons of differing Sexes, Ages, and Complexions. And because You will easily grant that this Example does farre lesse accomodate our present purpose then does the Case it self, as I just now put it, I hope You will allow me to represent further, That at least it seems not so Rational to judge of all the Remedies that Art improving Nature can afford us by those that are hitherto in Use either among Methodists or Vulgar Chymists, but rather to think that the Nobleness of Remedies will be advanc'd according as the Art of preparing them shall be promoted; and that it tis not so safe and easy, positively to determine the Efficacy of the former, otherwise then in Proportion to the Discoveries we have attain'd to in the Latter.

The End of the APPENDIX.

The



The CITATIONS *English't.*

AD Pag. 6. *In Corpore &c.* But I dare not try those things upon Humane Body, which have not been before try'd upon former Experiences, For the End of such rash Experiments may be the ruin of all Lives.

Ad Pag. 9. Naturalium &c. This is the Course of Naturalists and Physitians who prosecute their Art Philosophically, The Naturalist ends where Medicine begins, and Medicine begins where the Naturalist endeth.

Ad Pag. 11. Sunt enim &c. The parts of Humane Body are unknown, and therefore we ought to consider them by the parts of other Animals to which they are like.

Ad pag. 19. Hoc in &c. This I have more then once Observ'd in *Lizards* which I kept in my own House. For my Children being at play, when with a Rod they had strook off the *Lizards* Tails I saw them within a day or two come out to Feed, and their Tayles then by little and little still encreasing and growing bigger.

Ad pag. 73. Neque &c. Nor may we be ignorant that in acute Diseases the Notes of Life or Death are more fallacious.

Ad pag. 75. Quidam &c. One who before he fell into the French Pox was blind of a Cataract in one of his Eyes, by being anointed with Quicksilver, was recover'd, not only from the cheif Disease, but (which was most strange) from his Cataract.

Cataract. Nor is it irrational that Cataracts should be dissolv'd by such anointing; when Experience teacheth, That hard Tumors clogg'd together of pituitous Matter are powerfully dissolved by Mercurial Inunctions.

Ad pag. 78. Ejusque &c. And they urge many Instances of it even to my admiration.

Ibid. Ajunt &c. Yet they say that the Seed of the *Galchoos*, ground and taken in any proper Water doth dissolve the stone into a very Durt, which being voided doth harden again into a stony substance. I saw a Young Man to whom (upon my knowledg) this accident befell. When he was tormented with the Stone in the Bladder, which I understood both by the Lithotomist who felt it, and by the Symptomes which he suffered: I sent him to a Fountain, which takes its name from *S^t Peter* when he had staid there two Moneths he return'd Free from the Stone, and brought home with him all the Durt which he had voided by degrees, in a Paper, coagulated as it were into fragments of Stone.

Ad pag. 85. Hic &c. He loaths nothing that stinks, or is otherwise unpleasant, He hath been often seen to chew and swallow Glasse, Stones, Wood, Bones, the Feet of Hares, and other Animals, together with the Hair, Linnen and Woollen cloath, Fishes and other Animals alive, Nay, even Mettals, and Dishes, and Globes of Tin. Besides, which he devours Sewet, and Tallow Candels, the Shells of Cockles, and the Dungs of Animals, especially of Oxen, even Hot, as soon as it is voided. He drinks the Urin of others mixt with wine or Beer: He eats Hay, Straw, Stubble, and lately he swallow'd down two living Mice, which for half an Hour continued biteing at the bottome of his Stomack; and to be short, Whatsoever is offer'd him by any Noble Persons, it goes down with him without more adoe upon the smallest reward, insomuch that
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within a few Daies he hath promised to eat a whole Calfe Raw, together with the Skin and Hair; Among divers others I my self am a Witnesse of the Truth of these &c.

Ad pag. 86. Causam &c. To find in the Carcas the cause of this Vocacity will be questionlesse very difficult: Some one perchance would referre it to that which *Columbus* observ'd in the Carcasse of *Lazarus* the Glasse-eater, and resolve that the fourth conjugation of Nerves which nature ordain'd for tasting, comen neither to the Palate nor the Tongue: But so there would onely be rendred the cause of his want of Tast, and not why he should be able to take such uncouth things without offence to his Stomach and digest them, which without doubt ought to be the particular and singular constitution of his Stomach and Guts, which yet may not appear to the Eye by the Effects.

Ad pag. 91. De Laudano &c. Of his *Laudanum* (that Name he gave to little Pills, which in the extremity of Diseases he administred as a most Divine Medicine allwaies giving them in an odde Number) he scrupled not to affirm that by that Medicine he could put life into those who were as good as Dead; and that while I was with him he made good in some Experiments.

Ad pag. 94. Oportet ubi &c. Where a Medicine answers not we ought not so much to esteem the Author as the Patient, and to try somewhat farther and farther.

Ad Pag. 97. Idem fit &c. The same is made of *Mandiocca*, Potato's, Turkish Mullet, Rice, and other things which being chew'd by old Women, and Spit together with much Spittle, This Liquor is strait put up into Vessels, and there kept until it ferments and cast down a Sediment.

Ad pag. 103. Hoc est &c. This *Birchwater* hath a sweet Sharpnesse and very pleasant Tast, it allaies Thirst, and the drinesse

drinesse of the Entrails; It tempers the Heat of the Blood; It opens Obstructions and drives out the Stone.

Ad pag. 111. Conficiunt &c. They make Drink of that *Mulli* rubbing it gently in their hands in Hot-Water, until they have rubb'd out all the Sweetnesse; they strain that Water, and keep it three or four Daies, until it settle, and then it becomes a very clear Drink: The same Water boil'd turns into good Hony. — Of this Fruit boil'd with Water according to different Manners is made Wine, or good Drink, or Vinegar, or Hony.

Ad pag. 112. Porro. Then by cutting the Shoot with a Razor-blade made of a Flint, there runs out of the Cut a certain Liquor in such a quantity that (which is wonderful) out of one single Plant, sometimes Fiftie or more *Arobae* run out: From which Liquor there is made Wine, Vinegar, Hony, and Sugar. For the Liquor Sweet of it self, is by being boil'd made much sweeter and thicker, so that it is at length kernes into Hony.

Ad 113. Semel &c. If once in a Moneth one eat or Drink to excesse, the Day following, if he be weigh'd (though he hath suffred no sensible Evacuation) Yet then he will weigh lighter then is Usual. A constant Diet wants the help of those that once or twice in a Moneth do exceed: For the Expulsive Faculty being oppress'd by too great Repletion stirr's up so much of perspiration, as vvithout the Staticks no one would believe.

Ad pag. 123. In urbe &c. In the Citty *S^t James's* that is in the Province of Chyle, certain Captive *Indians* cut off the Calves of their Legs, and for hunger eat them, and (which is strange) applying the leaves of a certain Plant to their Wounds immediatly they stanch the Blood.

Adde pag. 124. *Memini* &c. I remember that the Limbs of Souldiers wounded with Gunshot, to have been cut off by the advice of our *European* Surgeons, both *Dutch* and *Portugall*, those Barbarous people by recent juices Gums and Balsams to have freed them from Knife and Cauteryes and happily cured them. I also am an Eye witnesse, that which the juyce of Tobacco alone they have cured Wounds given over by our Surgeons.

Adde pag. 131. *Experimentis* &c. It is approv'd by many Experiments, that its Vertues are excellent against the Plague, Malignant Feavers, the bitings of Venemous Creatures, the *Diarrhaea* and other Fluxes.

Adde pag. 135. *Nam Venena noluit* &c. He made not *Venome* to be our Poison, for neither made he Death nor any Deleterey Medicament upon the Earth, but so, that by a slight industry and endeavour of our own they might be turn'd into great pledges of his love, for the Use of Men against the cruelty of Diseases which were in proceffe of time to arise. For in those Vemomes is the help that more benigne and familiar simples cannot yield, and those most frightful Poisons are yet preserv'd in Nature for the more great and Heroick uses of Physitians.

Adde pag. 136. That the *Lapis Cancrorum* resolv'd into the forme of its first Milk affords an Antidote against the violence of many Vegetables that are infamous for their being over laxative.

Adde pag. 150. *Mille* &c. Our Court hath try'd the Efficacy of this Salt in a thousand Experiments in the Diseases of Melancholly, in all Feavers, continuous and intermittent, in the Stone, Scurvy &c. Nay more we have observ'd more then once that it hath procured sleep, especially in persons
 e e e Melancholly,

Melancholly, The Dose is from one, to two Scruples, we use divers pounds of it in a Year.

Adde pag. 150, 151. *Ceterum quantum* &c. But for the exceeding and portentous Vertues of the Bezar-stone, I have found by a thousand trials that they are not so very great.

Ib. Nil porro &c. I speak no more of these Stones, least I should seem by my Commendation of their Vertues to provoke Lithotomists to make dissections at any rate. This I have most certainly Experienc'd, That the Stone found in Mans bladder doth well provoke Urine and Sweat. And particularly in the time of that Plague, which in the Years 1624 and 1625 miserably vexed Ours, and all other the Citties of *Holland*, for want of the Bezar-stone, I remember, I prescribed this and found it, (let me tell You) a more great and excellent Sudorifick.

Adde pag. 159. *Credo* &c. I believe Simples in their own simplicity are sufficient for the Curing of all Diseases.

Adde pag. 19 *Quod* &c. But if You come not to that *Arcanum* of *Pyrotechny*, learn at least to make the Salt of Tartar Volatile, that by means of it You may perfect Your Solutions. Which though it leave those things which it dissolveth equally Homogeneous, being digested in Us; Yet it borroweth some of their Vertues which it carrieth along with it self to overcome Diseases.

Adde pag. 199. *Dicam* &c. I will speak it for their sakes, who are ingenious that the Spirit of Salt of Tartar, if it dissolveth Unicorns Horn, Silver, Quicksilver, Crabbes Eyes, or other like Simples, it will Cure not onely Feavers but other Diseases in great abundance.

Ib. Mirum &c. It is a wonder what the very Salt of Tartar alone being made Volatile will performe, for it cleanses the Veins of all the feculencies and the causers of Contumacious

macious Obstructions, and doth disperse the congregated Matter of Apostems. Of this Spirit of the Salt (and not of the Oyl) is that saying of *Paracelsus* true. That whether this Medicine cannot reach, there is scarce any other more powerful that shall reach it.

Ad pag. 201. Ars &c. Art is Long, Life is short. But where the End is by gift, there Art is short, and Mans Life long, if it be compared to Art. Therefore *Hippocrates* had reason to make the complaint, for it even happen'd to his followers according to his Words. The Art of Medicine consists in Philosophy, Astronomy, Chymistry, and Physicks, and therefore it may truely be said that the Art is long. For there is much time required, throughly to learn and search these fower Pillars of Medicine.

Ad pag. 202. Est enim &c. For this Art is conjectural, and not onely Conjecture, but Experience it self doth not allwaies answer.

Ib. Hs̄e mēpa &c. Experience is Uncertain, and Fallacious Judgment is difficult to be made.

Ib. Hoc modo &c. And this was the fashion of Medicine in the beginning, that it had no Theory, onely Experience, that such a thing was Laxative, such a thing Astringent: But how, or why they were so that was not found out, and therefore one was heal'd another perish't: but now &c.

Ib. Per rationem &c. By Reason it is not easy in a Disease to give Judgment, but is as difficult as any thing imaginable.

Ib. Neque, &c. For if the truth were easie to be found, so many and so excellent men as have made it their business to find it, had never been divided into so many Sects and Opinions.

Ad pag. 203. Non titulus &c. It is not a Title, nor Eloquence Nor Skill in the tongues, nor the Reading of many books (though these are Ornaments) which are to be considered in a

but a prime knowledg of Matters and Myfteryes which alone may stand in the steed of all the rest; It is the part of a Rhetorician to speak eloquently, to be able to perswade and to draw the Judg to his own party. It is the part of a Physitian to know the severall sorts of Diseases, their Causes and Symptomes, and then which skill and industry to apply Medicines and to make Cures of them all, according to their severall Natures and Fashions.

Adde pag. 207. Imo &c. Nay, I saw divers, as it was in an instant, redeem'd from death who had been poison'd by the eating of Venomous Mushrooms and other unwholsome things, onely by drinking a Recent Infusion of the Root *faborand*, whilest my self and other of *Galens* Disciples blush't to see the ineffectual endeavours of all our *Alexipharmaca*, Treacles and other Antidotes: So that afterwards I suffred my self to be joyn'd in Consultation with those barbarous Collegues, not so much to be *arbiters* of the condition of our men by their Pulse, as to give their assistance and Council in the foremention'd way (*viz.*) the prescribing of proper Medicines.

Ad pag. 208. Hujus &c. The Vertue of this Stone is much above that of any other gems, for it stops the Flux of Blood in any part. — When the Women perceive a fit of the Mother coming upon them, by applying this Stone they are immediately eased, and if they allwaies weare it, they are never troubled with those Fits more. Of this they make faith, by many Instances.

Ib. Vidimus &c. We have seen some that were troubled with the Flux of the *Hæmorrhoides* who found Remedy by wearing Rings made of that Stone continually on their Fingers, and the Monthly Flux is stai'd by the same way.

Ad pag. 209. Prægnantibus &c. This Stone is not proper for those who are with Child, for it is so sure to cause Abortion

tion that the Women of *Malaica* told me, that if at any time their Monethly Evacuations were obstructed, that if they only carried this Stone in their hands they found Remedy thereby.

Ad. pag. 210. Hoc loco &c. In this place I cannot but relate the admirable Vertues of our *Electrum* which I have observ'd with my own Eyes, and therefore can attest with a good conscience. For we saw Rings of it which he that wore neither felt Cramp, no Palsy, nor other pain. He was subject to no Fits of Apoplexy, nor Epilepsy, insomuch that if one of these Rings were put upon the Ring Finger of a person actually in any vehement Fit of the Falling sickness, the Fit would immediately assuage, and the person as soon come to himself.

Ad 225. In the Citty *Posto* where I liv'd certain Years, a certain Indian cured all sorts of Diseases by the juice of one Plant alone, wherewith he anointed the Limbs and any other part particularly affected, and then covering them warm with Blankets provoked Sweat. The Sweat that came from the parts so dawbed was meer Blood which he wiped off with Linnen Clothes, and so he proceeded until he thought they had Sweat enough. In the mean time he gave them Diet that was most Nourishing. With this Remedy many desperate Diseases were cured, and the sick person upon the Use of this Physick improv'd, so as to appear younger and lustier after it. But we could never prevail, neither by Mony, nor intreaty nor foul means upon him to shew us the Plant.

Ad pag 227. Mira &c. Wonderful things are daily found out in Physick to the Confirmation of the Operation of the Learned Naturalist *Petrus Servius's* Weapon-Salve. For he assured us that a piece of Cloth dipt in the Blood, and put under hot Ashes stops the Monthly Flux, the Experiment having been often prov'd

prov'd. And my Master *Petrus Castellus* affirms that He found by Experience, that the *Hemorrhoids* if they were touch'd with the tuberous Root of *Chondrilla*, did dry away if the *Chondrilla* dry'd, and did Run to Corruption if the *Chondrilla* was corrupted. And therefore after such, touching of the Hemorrhoids the *Chondrilla* was usually put to dry in the Chymny.

Ad pag. 229. Podagra &c. The Gout is strangely eas'd if Puppies lie with the Person that hath the Gout, for they contract the Disease so as not to be able to go, but the Patient thereby finds Ease.

Ad pag. 236. Primo, &c. At the first, Physick was accounted part of Philosophy, so that the Cure of Diseases, and the Contemplation of Nature, did both arise under the same Authors. Those being most set upon Medical Enquiries, which had made their Bodies infirm by disquieting thoughtfulness and nocturnal Watchings.

Ad pag. 201. Est, &c. Besides it is altogether drying, and therefore I should not despair that it, being hung about Childrens Necks, might cure the Falling-sickness in them. I truly saw a Lad, that sometimes would be eight whole Moneths free from the Falling-sickness, and then, when by chance this fell from off his Neck, he became immediately surprized with a Fit; and again, hanging another Root in its place, he would continue well: Therefore, for Experiment sake, I thought good to take it again from his Neck, which when I had done, and found that the Lad fell into his former Convulsions, we took a great piece of a green Root, and hung it about his Neck, and from that time He continued well and felt no more Convulsions. It was therefore most probable, either that certain parts did exhale from the Root, and were drawn into the Body by Inspiration, which did so work upon

upon the affected parts; or that the ambient Air was continually changed and altered by the Root: For after this manner the *Succus Cyrenaicus* cures the *Phlegmone* upon the *Uvula*; so Catarrhs and other Rheums are dry'd up by *Melanthium*, if it be tyed up warm in fine Linnen, and the hot fume of it be drawn up into the Nostrils by Inspiration. Nay, if you strangle a Viper with divers sorts of Threeds, and especially with the Sea Purple, and then you tie those Threeds about the Neck of your Patient, you shall cure the swelling of the Almonds of the Ears, and all other swellings in the Neck.

Ad pag. 257. Pestis Cayri, &c. The Plague at *Grand Cair*, and in all parts of *Agypt*, is wont to invade the Inhabitants from the beginning of the Moneth *September* until *June*: For in all these Moneths, from *September* unto *June*, the Plague from other Nations is brought thither, and is wont to infect that Nation: But in the Moneth of *June*, of what nature and how great soever the Pestilence be, when the Sun first enters *Cancer*, it is immediately removed; which thing many (and that not without reason) take to be a particular Mercy of God. But (what is more admirable) all Household-stuff, however infected with the Contagion of the Disease, at that time shews no effect of any Contagion, so that then the whole Nation passes into a most secure & healthy condition, from a morbid and dangerous: And then those Diseases, which are called by the Greeks *Sporadici*, begin to appear, which in no part of the World are seen to be rife together with the Plague.

Ibid. Hac, &c. These things are first observed about that time. From which, I think, and perchance not without reason, the cause of the extinction of the Plague, and the change of the state from Morbid to Wholesome doth depend; For no other of the conservative Causes, which are wont to be called
by

by Physitians, *Res non Naturales*, appeareth then, besides the Air; to which we may refer this change from Disease to Healthiness, and therefore we must refer this change to the change of the Air.

Ad pag. 259. The Inhabitants do strange things, both in preserving Health and curing Diseases, by Friction and Unction, using the first in cold and Chronical, the latter in acute Diseases. And Strangers who arrive there, are, as they ought, willing to imitate their ways of Physick, and by Rules of Art to preside and moderate these ways of Empirical Healing.

Ib. Cholera Sicca is Cured by the same Remedies, especially if their Horny Cupping-glasse be apply'd to the Region of the Liver, of which I must attest the same thing that *Galen* doth of Cupping-glasses; which he affirm'd to Work as Miraculously as if their Operation had depended on Enchantment.

Ad pag. 271. Neque &c. Nor doth he say that a Physitian needs nothing of Counsel or Deliberation, or that an irrational Man may professe this Art. But that those Conjectures of hidden things are nothing to the purpose. Bec. use it matters not what causeth the Disease but what removes it.

Ib. Interim &c. In the mean time the *Brasilian* Botanists make all sorts of Medicines of Simples they find every where in the Woods: which they make with so great Sagacity, and apply them both internally, and externally, especially to Diseases that Spring from Venome that a man may more securely give himself over to their hands then to our unskilful Physitians, who brag much of Secrets they have learn't in private, and for the knowledg of these will be called Rationals in Physick.

Ad pag. 272. Fortassis, &c. Perchance some Sciolist in Physick may affirm that these things may not be used by reason

son of the Narcotick and Stupefactive property. But these pretenses are as vain in effect as specious at first sight: for besides that the hot temper of this Country requires it; It is sure, that without these Remedies there can be no Cure. Adde that here we prepare *Opium* so well that you may give it to an Infant. And truly, if in Hot Diseases we had no Opiats we should in effect find that the use of all other Medicaments would prove altogether vain and fruitlesse.

Ad pag. 287. Sic medicinam &c. Such was the Origin of Physick, by the Recovery of some and the Death of others it first made distinction between things Soverain to heal, and things which were Improper, and Deadly. And thus the Remedies being found out, Men began to dispute of the Reasons of them. Nor was the Art of Medicine found out by the light of Reason, but Medicine being found, the Reason began to be enquired into.

Ib. Ubi res &c. Where the Matter is certain, if it be against the common Opinion, the Reason must be sought, and not the Matter of fact scrupled.

Ad pag. 297. Paucissimos &c. You will find very few of those who dwell at the *Spaa* who are troubled with the Head-ach, Stone, Obstructions of the Kidnies, Liver, Spleen, or Mesariaick Veines, none at all who were troubled with the Jaundice, Dropsie, Gout, Itch, or Falling sicknesse.

Ib. Inter cetera &c. Among other Qualities it moveth the Monethly Evacuation as hath been prov'd by a thousand trials. And yet it stops the immoderate Flux of them more happily then any other Medicine.

Ad pag. 299. Rerum &c. The Contemplation of Nature, though it maketh not a Physician, yet it fits him to learn Physick.

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FINIS.

Man of words to man

