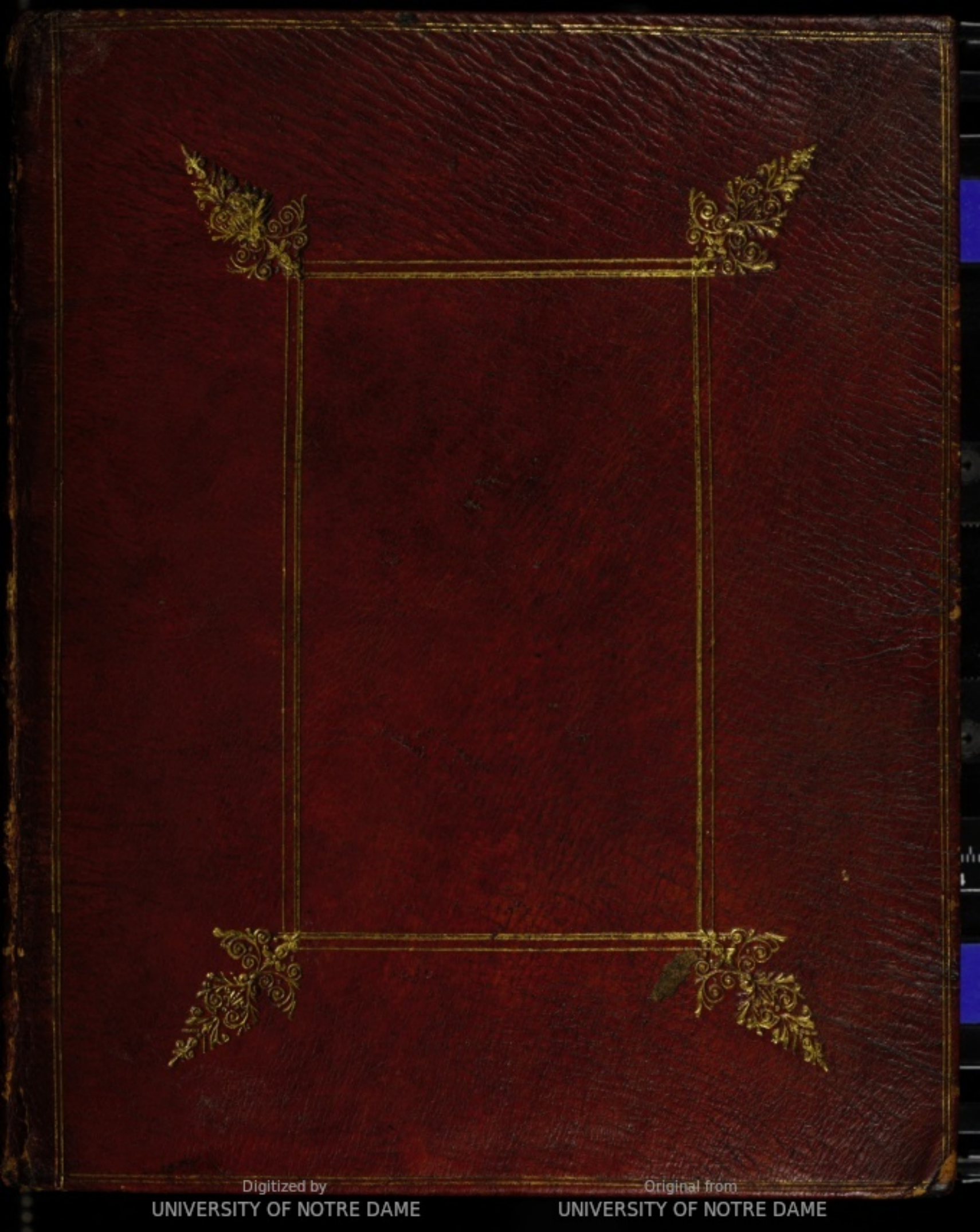
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OF THE

VSEFVLNESSE

OF

Experimental Philosophy.

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ROBERTVS BOYLE NOBILIS ANGLVS

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SOME

CONSIDERATIONS

touching the

VSEFVLNESSE

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.

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The PVBLISHER 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, vigebant Artes ingenuæ, ſummumque certamen inter homines erat, ne quid profuturum ſæculis diu lateret. Democritus omnium Herbarum ſuccos expreſſit, & ne lapidum virgultorumque vis lateret, ætatem 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*, ſaith 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 sæculis lateat*: and if the Discovery of one or two persons of this Kind be enough to expiate for, and take off the Dishonour of the Proletarian Lazinesse and Luxury of the Rest, I think I may justly esteem that the exhibiting to the World the History of the Studyes 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 Aurae.

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 Studyes: 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 dispair 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 unbecomming for Him to

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meddle with the Physitians 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

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Professors or Candidates of Learning is most desireable. 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

 of

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of *Democritus*, wch 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 Advertisement, that the Passages included within the *Parantheses* or *Crotchetts*, as the Press stiles 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

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The Author's
ADVERTISEMENT *about the following*
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 implyes. For it may, this notwithstanding, very well be, that when I writ them, no body had yet lighted on some of them, and that others of them did then but begin to be

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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 then 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 contein, to be Demonstrative; & that I would at present have my Fudgment 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

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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 incompleat, 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 meerly 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 endeavoured 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 acurate Treatise of the Usefulnes of true Physiology, but as Familiar Writings, that want only the formality of

Salve

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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.*

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Mr. BOYLE
Of Experimentall Philosophie.

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OF THE
VSEFVLNESSE
OF
Naturall Philoſophy.

The Firſt Part.

Of its Vſefulneſs in reference to *the Minde of Man.*

ESSAY I.

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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 endevouring to addict 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*,

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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 Philosopers 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,

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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 himſelfe 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 raviſht 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 Myſticall 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-*

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rophilus, 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 Oneſſe 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 inriching 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 madman, crying nothing but Ἕυρηκα, Ἕυρηκα, *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 formidableneſſe of the deſtructive flames vomited by *Veſuvius*, from indevoring by their Light to read the Nature of ſuch Vulcanian Hils; but in ſpight of all the diſſwaſions 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 approch'd ſo neer that he loſt his Life to ſatisfie 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.

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One would think, *Pyrophilus*, that the converſing with dead and ſtinking Carkaſes (that are not onely hideous objects in themſelves, but made more ghaſtly by the puting 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 diſſeramus, 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 propterea inſpectamus, quòd ingenium contemplamur quod illas condiderit, id eſt, artem pingendi aut fingendi; rerum autem ipſarum naturæ ingenio miráque ſolertia conſtitutam contemplationem non magis proſequamur atque exoſculemur, 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

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 skil 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 Imployments, 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 Imployment, 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 ſæpe* (ſays he) *divina quædem res, Alexander, admirationeq; digna viſa eſt Philoſophia; præcipuè 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*

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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 addreſſes 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 Naturæ 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 hæc admitterer, non fuerat operæ 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 hæc quærenda natus* (ſays he, having ſpoken of Enquiries concerning the Univerſe) *æſtima quàm non multùm acceperit temporis, etiam ſi illud totum ſibi vindicet, cui licet*

Seneca in Præf. lib. 1. Nat: Quæſt.

licet nihil facilitate eripi, nihil negligentia patiatur excidere; licet horas suas avarissimè servet, & usque in ultimæ ætatis humanæ 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 utrumq; facere me voluit & agere, & contemplationi vacare:

Sen: de Otio Sap: c. 32.

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 Prerogative, that can confer a Priesthood without Unction or Imposition of Hands. And as for Reason, that is so far from making us judge that Imployment 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

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knowledge of Natures Myſteries, if it were induſtriouſly imployd in the ſtudy of them, cannot, but like a great Commander, think it ſelf diſobliged by not being conſiderably employd. 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: The Qualifications of a Divine Being, are Underſtanding and Wiſdom.* 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.

De Part. Anim. lib. 4. c. 10.

'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-

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iected; 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 Imployments, 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 Imployment 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
Juſſit, & 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

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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*, expreſly affirms, that *Numerorum ſcientiam & ſiderum benignè illis communicavit: Nam ante Abrahami ad ſe adventum, Ægyptii rudes erant hujuſmodi diſciplinarum; quæ à Chaldæis ad Ægyptios profectæ, hinc ad Græcos tandem pervenerunt.*

Iſaiah 41. 8. James 11. 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 Delightfulneſſe of the Contemplations of Natures works, Give me leave to mind you of their almoſt unimaginable Va-

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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 ſeveral 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 *Famaica* (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

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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*: So the ſame [b] Author tells us, That *Amphilochus* writ a Volume *De Medica Herba, & Cytiſa*; and King [c] *Juba* another, of a ſort of *Nymphæa* by him found on Mount *Atlas*. 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 Blochwitius* 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*, *Perſicaria*, *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 throughly 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 Mercury

a *Plin. lib.* 25. *cap.* 8.
b *Id. lib.* 13. *cap.* 26.
c *Id: lib.* 25. *cap.* 7.

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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 *Baſilius* in his *Currus 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.

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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 inrich'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 Extreams 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 and 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

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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 Effluviums 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 Reprinting 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 Naturæ rerum artificio: In nothing elſwhere* (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 ſmaileſt Works.* To which *Epiphonema* he adds this Sober and Philoſophical Admonition, *Quapropter, quæſo ne hæc legentes, quoniam ex his ſpernunt multa, etiam relata faſtidio damnent, cum in contemplatione Naturæ nihil poſsit videri ſupervacaneum: Wherefore I would requeſt the Peruſers of theſe Diſcourſes, that although*

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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, cujus 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 quod am puerili spreviſſe, molesteq; tuliſſe dignum nequaquam est: Cum nullares sit Naturæ, in qua non mirandum aliquod habeatur. Et quod Heraclitum ferunt dixiſſe ad eos, qui eum alloqui eum vellent, quòd fortè in Casa furnaria quadam*

caloris

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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 quæque ſine ullo pudore debemus; cum in omnibus Naturæ rumen, & honeſtum pulchrúmque 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 containes 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 effectuall then probable) then in moſt other of his Writings: And in that Treatiſe he juſtly reprehends the Lazineſſe 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

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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 Wiſeſt 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 Treate 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) ennable 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 ennabled 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

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vouchsafes to Naturalists, that though he gives them not the power to produce one Atome of Matter, yet he allowes 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 ennable 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, ennabled 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 Soveraignty 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 the

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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 performes 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.

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ESSAY II.

OF THE SAME.

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 several 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 threatned Evill so considerable, that instead of inviting you to the Study of Naturall Philosophy, I should very earnestly Labour to Diswade you from it. For I, that had much rather have Men not Philosophers then not Christans, 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 unanswer'd

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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 peremptorily to define all the Ends and Aimes of the Omniscient 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 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*, 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, that though Man were not Created till the close of the Sixt 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

Job 8.9.

Prov. 16.4.

Rom. 11.36.

Psal. 19.1.

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mirers, 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 Languag, dress up in his finer and happier Expressions. *Curiosum nobis* (saith he) *natura ingenium dedit, & artis sibi pulchritudinisque conscia, spectatores nos tantis rerum spectaculis genuit, perditura 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 Viæ 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 hæc quæ obtulerat ejus oculis cupiditatem faceret etiam cæterorum: nec enim omnia nec tanta visimus quanta sunt, sed acies nostra aperit sibi investigando viam, & fundamenta veri jacit, ut inquisitio transcat 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, *Hæc qui contemplatur,*

Job 38. 5, 7.

Sen. de Otio Sap. Cap. 32.

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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 Fouls 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.*

Gen. 1. 28, 29.

Gen. 1. 14, 15, 16.

Is. 45. 18.

Psal. 8. 5, 6.

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-

Gen. 2. 28, 26, 29.
Psal. 8. 7.
Heb. 2. 7.
Job. 5. 23.
Ho. 2. 18, 21, 22.
Rom. 8. 28.
2 Cor. 3. 18.
2 Tim. 4. 3.

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tion, whilſt the three reſolute Jewes with their Protectour
2 King.6.5,6. 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 Traitours; 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 S^t *Peter*,
2 Pet. 3. 3,5,6, 7,8,10. *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 puniſht as ſilenc't by the unexpected Flames (perhaps haſtned by that very impiety) that ſhall either Deſtroy or Transfigure the World. For as by
Lev. 13.54,55. 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 diſcerne the Omniſcience, Almightineſſe and Goodneſſe of their Author in them, and returne Him praiſes for them. 'Tis not for themſelves that the Rubies

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Rubies flame, other Jewels ſparkle, the Bezar-ſtone is Antidotall; 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 diſcerne 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, *Juſtus 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 κήρυξ 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.

2 Pet. 2. 5.

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Gen.8.21,22. 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 truely, saies, *Non causa mundo sumus hyemem æstatémque referendi; suas ista leges habent, quibus divina exercentur. Nimis nos suspicimus, si digni nobis videmur, propter quos tanta movcantur:* Yet *Lactantius* (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, quæque generat ex se Mundus, ad utilitatem hominis accommodata sunt.* And *Seneca* himselfe 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.*

2do De Ira cap.27.

De Ira Dei cap.13.

De Benef. cap. 23.

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.*

2do De Nat. Deor.

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 discerne, that those who labour to deterre men from sedulous Enquiries into Nature, do, (though I grant, designelessely) 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

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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 usefulnesse of the Knowledg 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 Happinesse, which consists in an Union with and Fruition of God, during that endlesse Terme 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 contributer to his Happinesse. And we may therefore venture to affirme that the knowledg of the Creatures does lesse advantage Man, as it ennables 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 Inne*; but perchance it may be altogether as properly call'd *his Ship*: for whereas both Appellations suppose him a Traveller, the Inne, though it refresh him in his Journey, does not further him in it, but rather retard his progresse by detaining him in one place; whereas a Ship not only serves the Passenger for an Inne 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 lesse 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

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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 retaile 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

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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 discerne.

Now

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Now if you ſhould put me upon telling you, *Pyrophilus*, whatthoſe Attributes of God are, which I ſo often mention to be viſibly diſplay'd in the Fabrick of the World, I canreadily 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 Almightineſſe 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 Hils, 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, containes, 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 theaccurate *Gaſſendus* makes amount

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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 *Ptolomæans*, 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 *Ptolomæan*, 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 Sect 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-

Gaſſend. Inſt. Aſtr. lib. 2. c. 13.

Gaſſend. lib. 3. cap. 11.

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diameters of the Earth; or according to the former Computation of common Miles 17543400000o, which is a Distance vastly exceeding that which the *Ptolomæans* 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

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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.* Pſal. 104. 24. 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 curioſeſt 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

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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*, *Cæsalpinus*, *Padre Paulo*, and Mr *Warner* (for each of these four last are supposed 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 advantagious 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.

And though it be true, that the greater Works of God do as well declare his great Wisdom as his Power, according to
Prov. 13. 19, 10 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

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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

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(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 Greatneſſe, *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 πολυποικίλ☞ σοφία τ☞ Θε☞, *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.

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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 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 Ἄκαρι, 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 2880000 times. And yet though a Mite seem but a moving Atome, and unless there be divers together, is not easily discern'd by the unassisted Eye; yet in an excellent Microscope I have, you know,

Jer. 10. 16.

Gassend: in Vit. Peireskii, lib. 4.

several

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 skiltul 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 inimaginably 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 Johnſtonum*) 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

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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 *Corſica*, 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 Omniſcient 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.

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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) admiringly 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-

mite

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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.* Pſal. 86. 8.

The laſt of the three Properties of God, which we mentioned him to have manifeſted in the Creation, is his Goodneſſe; 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 Goodneſſe 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* remembred not only *Noah*, but *every living thing that was with him in the Ark*, His Goodneſſe 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.

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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 reſtleſſe Nature ſo to conſtitute and manage his Productions, as to furniſh him with Neceſſaries, Accommodations, and Pleaſures.

Of

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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 Silk-worm*. And if we impartially consider the Lucriferousness (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 usefulnesse 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 eximiæ tot arbores, frutices, & innumeræ herbæ, figura, foliis & fructibus a veteris orbis Vegetabilibus, paucis ex-*

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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 Physitiã 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 Dr *Usher*, *Primate of Ireland*: But of this Stone, the merit of the subject

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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 famousest 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 & Juquerii, venena Brasiliæ facile prima, propriam suam unaquæq; radicem oppositum habet Antidotum*: and a little after, *Barbari viperarum pinguedinem & capita, tum & integra Insecta quæ vulnera intulerint, ex arte parata, audacter & felici cum successu venenatis ictibus applicant; adeoq; per ipsos effectus comprobare nituntur in omni veneno contineri suum Antidotum*: And next, that the

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the noxiouſneſſe 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 Alimentũ non ſolum, ſed & Antidotum concinnatur.* (lib. 3°) 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. Acts 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 admi-

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rable 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 Cœlum, & intende Facta, & quære Factorem; aſpice quæ vides, & quære quem non vides, crede in eum quem non vides, propter iſta quæ vides. Nolite fieri ſicut equus & mulus, &c.*

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 Mankinde 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 Mankinde.* 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 ſtrengthned, by conſidering the meliorating death of Corn committed to the Earth: And the Royal Poet learns Humili-

D. *Aug. Hom.* 3.

1. Cor. 15. 36, 37.

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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?* 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. Pſal. 8. 3, 4.

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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 ſuppoſ'd 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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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 deſcry 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, D^r *Highmore*, has been pleaſed to Dedicate to me; and in the excellent Exercitations,

Habb. 2. 2.

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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. 1. Engliſhed by Dr. *Everard.*

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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 neceſſaries, 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 ſatisfie 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, ſciatq; 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

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And the Lofty *Seneca* (to mention now no other Heathens) in divers paſſages of his excellent Writings, ſtiles the World a Temple; and I remember in his Treatiſe, *De Beneficiis*, he avers in terms not unworthy his Mind or his Subject, *Totum mundum Deorum eſſe immortalium Templum, ſolum quidem amplitudine illorum ac magnificentiâ 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 the World the Name of Temple, but gives us this account of that appellation; *Templum Dei ſupremum & verè tale exiſtimare totum hunc mundum, qui ſacrarum quidem habet, puriſſimam rerum naturæ partem, Cœlum; ornamenta, ſtellas; ſacerdotes, adminiſtros potentiæ ejus, Angelos, & incorporeas animas. The whole World is to be accounted the chiefeſt Temple of God; the* Sanctũ Sanctorũ *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 enumerate 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 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 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.

Sen. lib. 7. cap. 7.

Philo Jud. de Monarchia.

Heb. 8. 2, 5.

Heb. 9. 24.

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

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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 acknowledg it; Man, as born the Prieſt of Nature, and as the moſt oblig'd and moſt capable member of it, is bound to returne 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 reſembler, 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 *Pſalm*, and numerous other Scriptures: which they may do (to borrow a barbarous but ſignificant Schoolterme) 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

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to praiſe him in the ſame ſenſe (though in an incomparably tranſcendenter degree) that *Solomon* ſaies of his virtuous Woman (in the laſt Verſe of the Proverbs) *Let her own VVorks praiſe her in the Gates*; that is, give the conſiderers of them occaſion to extol her: and thus by man's referring the knowledg 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 *Pſalmes*, *Bleſſe the Lord, all ye His Hoſts, the Miniſters of His that do His pleaſure. Bleſſe the Lord, all His VVorks, 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.

Prov. 31. 31.

Pſ. 103.

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.

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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 all things, and for thy pleasure they are and were created.*

Rev. 4. 11.

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 dispersst 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

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forbear the annexing of any, ſave that of the ancient Inſtitution of the Sabbath, which many eminent Divines do not groundleſly 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 diſuſ'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 μέν τοι (ſays he) καὶ τὴν κυριακὴν ἔσε τοιαύτας· ἔστι τὸ μὲν ἡμέρας ἐστὶν ὑπόμνημα 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, Ἐργαζέσθωσαν οἱ δοῦλοι, &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 miſ-inform 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 Learneſt of their Criticks are pleaſ'd to diſtinguiſh betwixt the Words *Zachôr* and *Smôr*,

Lib. 7. cap. 24.

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

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Smôr, *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. S^t *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 *Socinians* 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 ἀπὸ κτίσεως κόσμου 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

Rom. 1. 20.

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