

An essay towards a natural history of Westmorland and Cumberland. Wherein an account is given of their several mineral and surface productions, with some directions how to discover minerals by the external and adjacent strata and upper covers, &c.; To which is annexed, a vindication of the philosophical and theological paraphrase of the Mosaick system of the creation, &c; / By Tho. Robinson.

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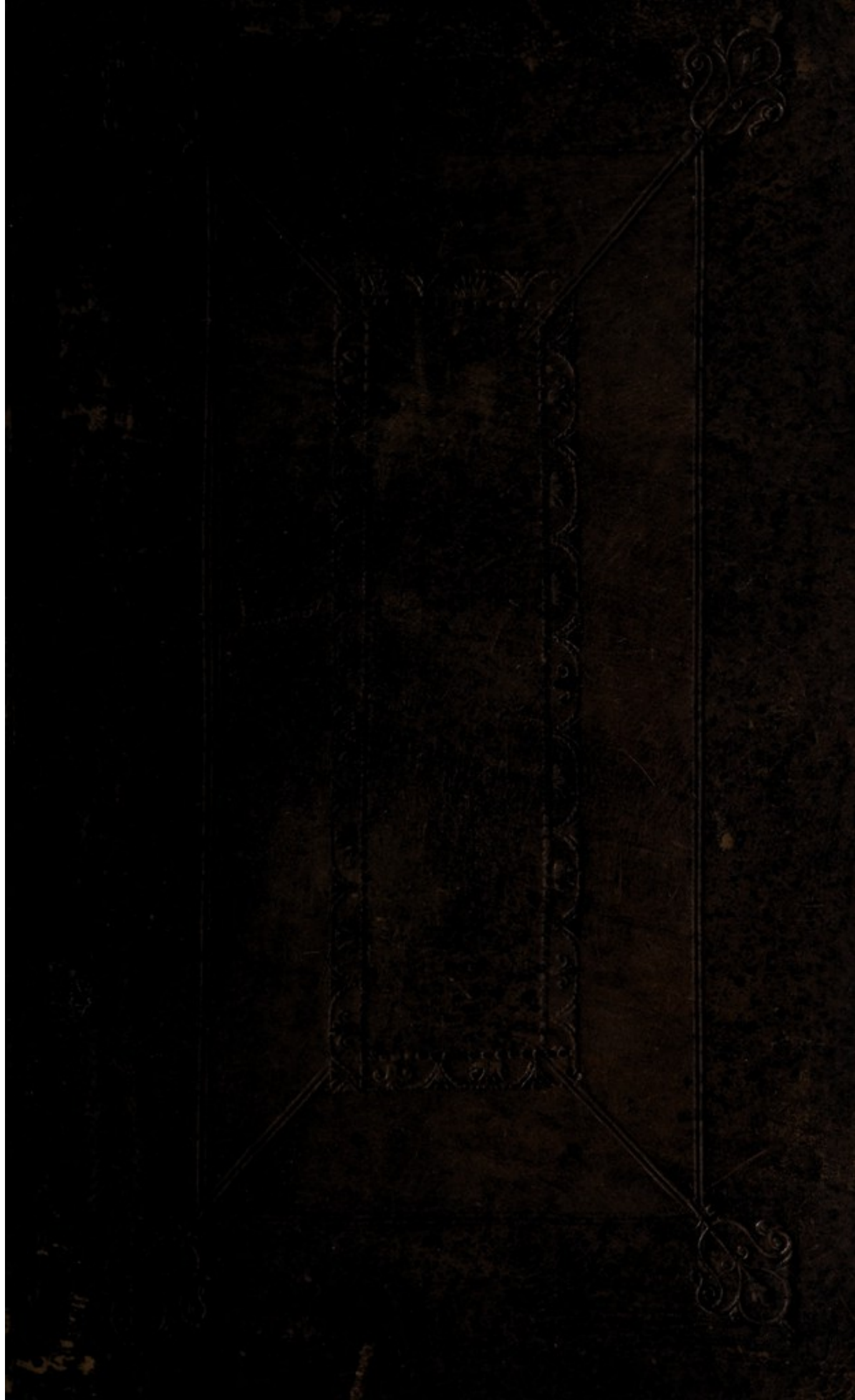
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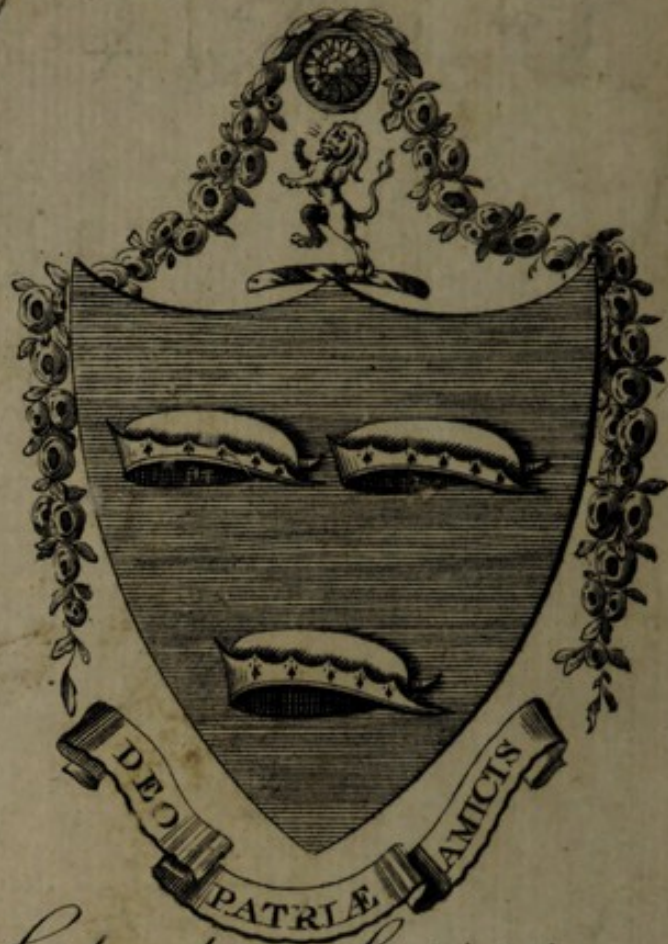
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Charles Lutwidge,
Holm Rook.

Bookplate of Charles Lutwidge
underneath. (cf. Venn)

Hon^{de} ..

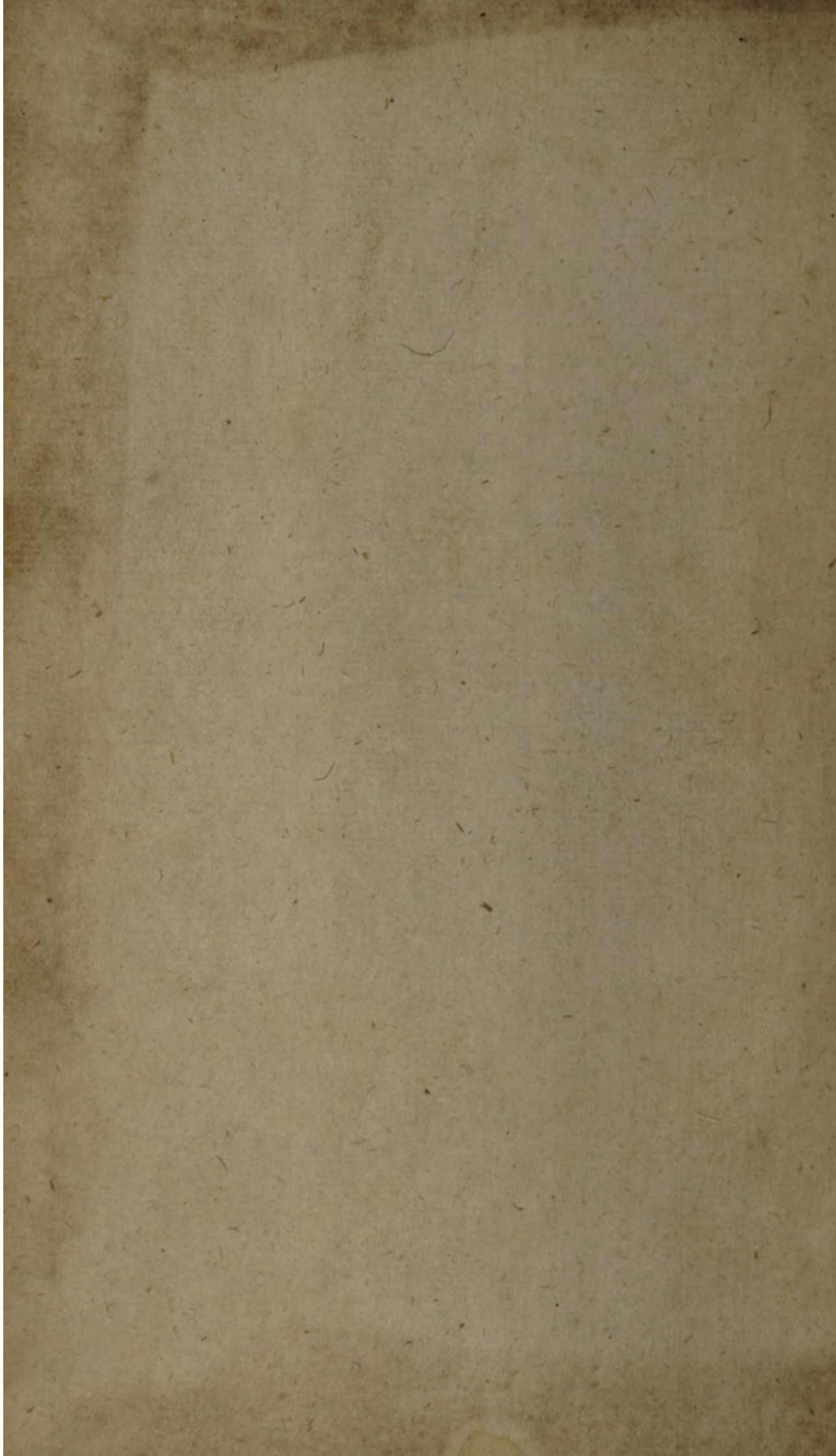


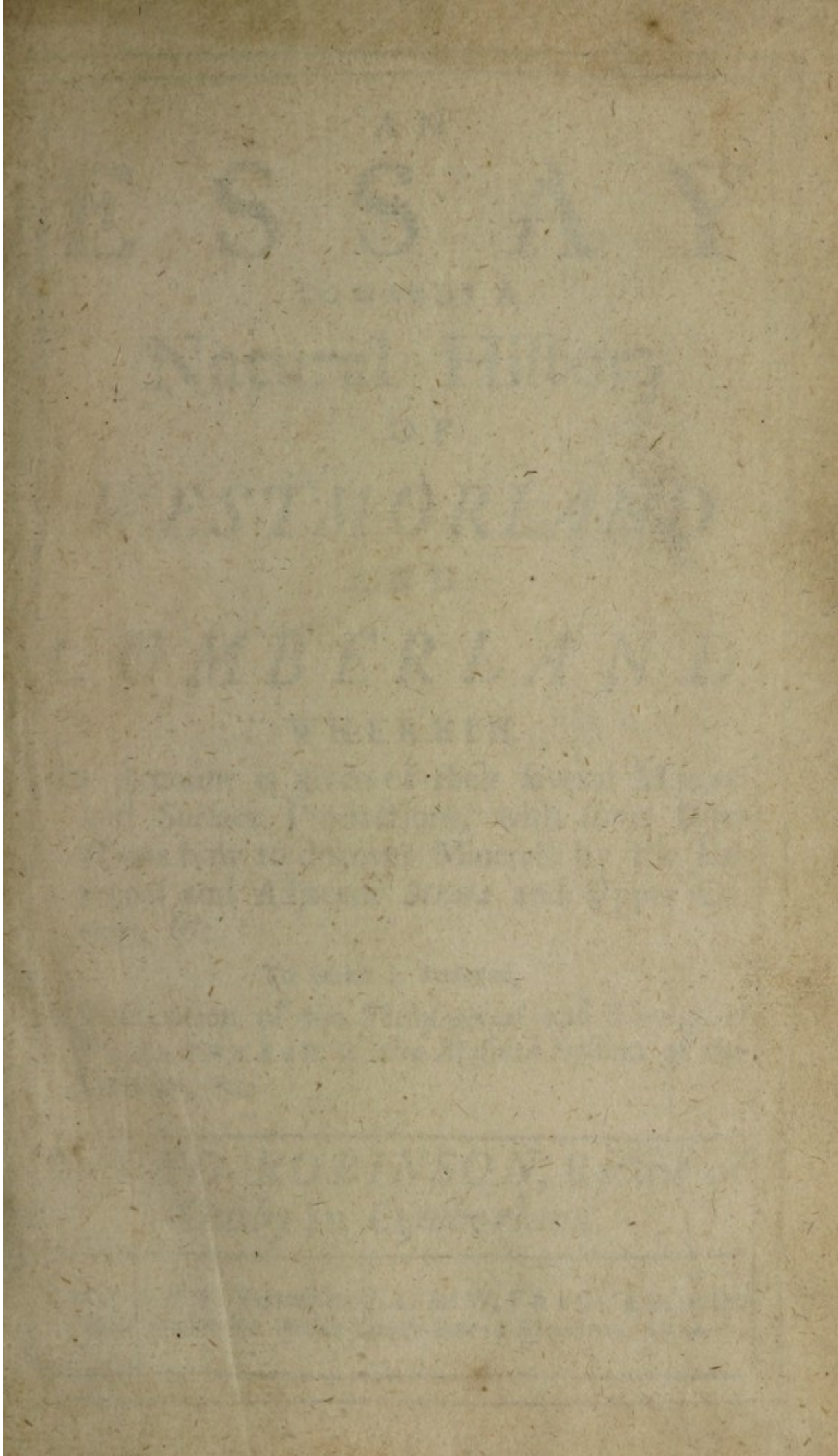
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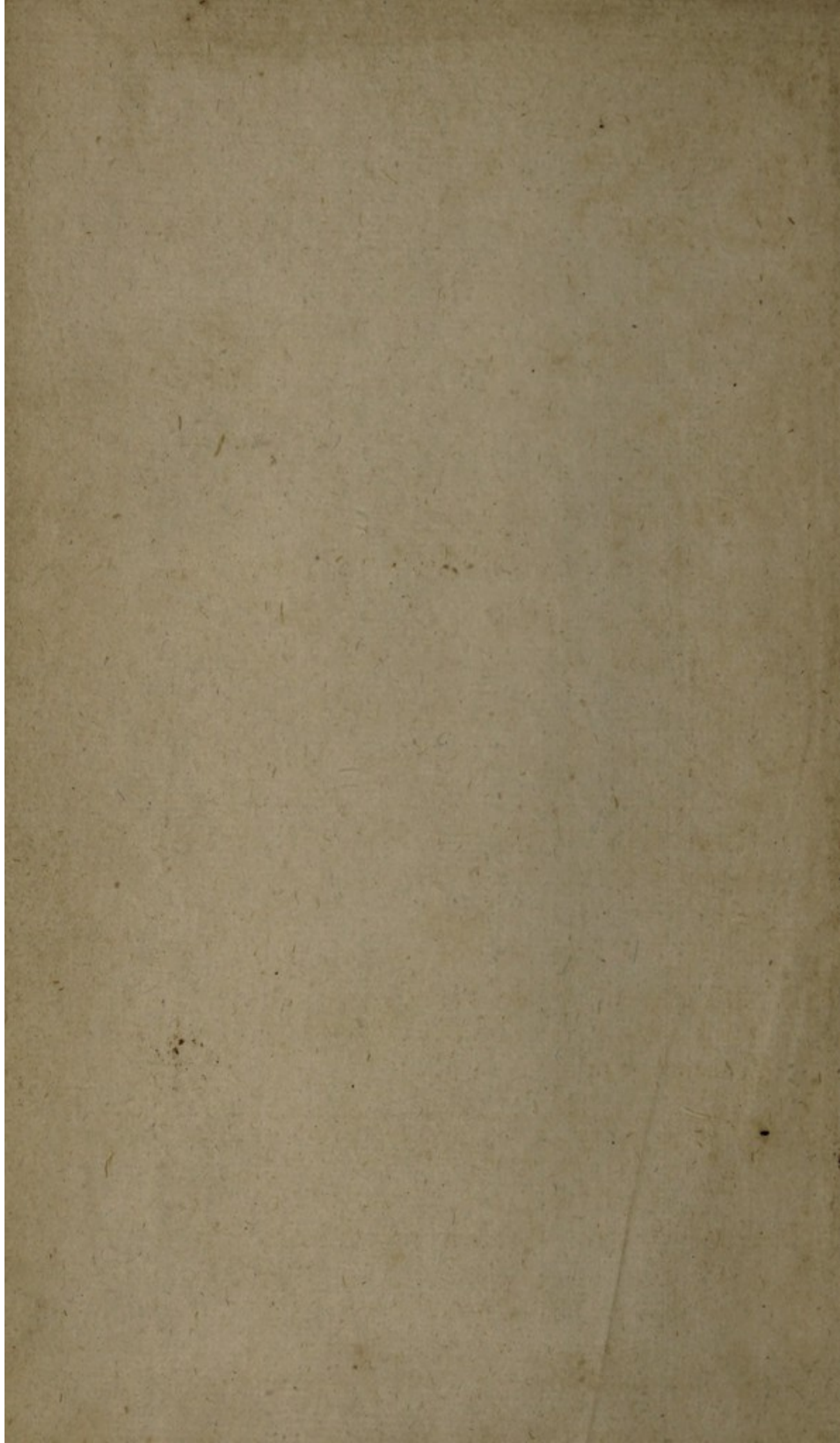
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A N
E S S A Y
 TOWARDS A
Natural History
 O F
WESTMORLAND
 A N D
CUMBERLAND.

W H E R E I N

An Account is given of their several Mineral and Surface Productions, with some Directions how to discover Minerals by the External and Adjacent *Strata* and Upper Covers, &c.

To which is Annexed,

A Vindication of the *Philosophical* and *Theological* PARAPHRASE of the *Mosaick* System of the *Creation*, &c.

By *THO. ROBINSON*, Rector of *Ousby* in *Cumberland*.

L O N D O N: Printed by *J. L.* for *W. FREEMAN*, at the *Bible* against the *Middle-Temple-Gate* in *Fleetstreet*, 1709.

ESSAYS

ON THE HISTORY

OF WESTMORLAND

AND CUMBERLAND



By JOHN HENRY COLEMAN, Esq. F.R.S.

LONDON: Printed by J. B. ROBINSON, in Pall-mall.

1784.

TO THE
RIGHT HONOURABLE
RICHARD,

Lord Viscount *Lonsdale*,
Baron *Lowther* of *Lowther*.

MY LORD,

THE many Favours I receiv'd
from my late good Lord,
Your Lordship's Father, have
given me Encouragement to Ad-
dress this small Treatise to Your
Honour, wherein Your Lordship
will have an Account of such Ob-
serva-

DEDICATION.

servations as I have made of the Mineral Productions of the two Northern Counties of *Cumberland* and *Westmorland*, with some Natural and Philosophical Reflections upon them, Grounded upon a general, yet very probable, if not Evident *Hypothesis*: (*Viz.*) *That when the Almighty by the first Division of the Waters made the dry Land to appear, all the Lax and floating Particles of Matter, in that vast and confused Mass, which were of the same Nature and Affinity, by an agreeable Juxta-position of Parts, and a secret Magnetism, drew together and did fix and settle into particular Classes, every Class producing some Mine, Metallick Ore, or Mineral, which is the more Pneumatick Part and Perfection of that Class: I have therefore upon this Topick divided these two Counties into several*

DEDICATION.

veral Classes, and given an Account of such Mineral Productions as are peculiar to every Class of a Mineral Nature: And have likewise given some Directions how to discover the several kinds of Minerals by the external and adjacent *Strata* or Upper Covers; as we discover Nuts or other Fruits by their Husks, Shells, or outward Coats.

My Lord, My only Design in this Treatise is, to give Caution to such Gentlemen as have a Mineral Spirit, that they may not be imposed on by such Ignorant Pretenders as go about taking Advantage of the Credulity of Gentlemen, Cheating them out of their Money.

My Lord, I will forbear in this Address to make the World acquainted with those vast Improvements Your Lordship has made

DEDICATION.

in all those Noble and Liberal Sciences, Divine and Humane, which Exalt and Sublime our Nature, and in a great Measure recover that Divine Image after which we were at first made, in Conformity to which all sound Religion and true Nobility consist.

My Lord, That which sets off Your Honour's Improvements with more Advantage, is, That they are made so Early in your blooming Years, whilst Your Lordship is yet under, the Tuition of the Right Honourable Your Lady Mother, and such Learned and Ingenious Tutors, as her Pious and Prudent Care hath made choice of for the Improvement of your growing Years.

But, *My Lord,* 'Tis not only Your Honour's acquired Accomplishments, but those Natural Endow-

DEDICATION.

dowments, that Charming Sweetness of Temper, those Agreeable Condescensions (not at all derogatory to Your Lordship's high Birth and Quality) which are the distinguishing Graces the Author of Nature hath particularly Blessed you with, and by which Your Lordship hath made a Conquest over the Hearts of all that have had the Honour and Happiness of your sweeter Conversation, which have Encouraged my Presumption to present to Your Honour this short *Essay*, in which, if there be any thing that may Inform your Judgment in these Subterranean Matters; or upon Occasion of your Surveying those many and large Mannors Your Lordship is the happy Proprietor of, may be serviceable to Your Lordship, I shall value my self thereupon.

DEDICATION.

Oratory was never my Talent, and therefore I am not qualified to give the World a just Encomium of Your Lordship's present Merits and promising Years, which offer us so near a Prospect of that great Blessing, which not only these two Counties, but the whole Kingdom will Enjoy in Your Lordship's Riper and more mature Age; but my want of proper Expressions shall be supply'd with the Sincerity of my hearty Prayers for the Increase of Your Lordship's Honour and Happiness in this Life, and Glory Eternal in the Life to come. *I am,*

MY LORD,

Your Lordship's most Faithful

and Obedient Servant,

THO. ROBINSON.

T H E

P R E F A C E.

IT was never my *Ambition* to be in *Print*, but having been *Reflected* upon by some, who value themselves upon the *Glittering Title* of *Virtuosi*, and have undertaken to entertain the *World* with new *Schemes* and *Theories* of this *Earth*, without ever being *Ten Foot* under *Ground*, I must take leave to tell these learned *Gentlemen*, That it's *Morally* impossible for them to come to any certain *Knowledge* of the *Natural Consistencies* of this *Earth*, the *Position* of the several *Strata*, and *Sediments* on
which

The P R E F A C E.

which its Fabrick is Built; the Nature of Veins, Mines, and Minerals, the Circulation of Subterranean Waters, from whence all Springs and Rivers have their Rise; unless from the uncertain Reports of Miners, who sometimes go about the Country like Mountebanks, pretending to what they know no more of than Children in the Horn-Book know of Metaphysicks, or Mathematicks.

I easily foresee, that this Freedom will give Offence to some Men, who expect to be treated with a more agreeable Ceremony; but unless they can support and fortify their New Theories with Arguments more agreeable to the Scripture, Reason, and the Experience of such judicious Miners, as have made it their Business to Observe the several Natures of these Subterranean Compositions,

The P R E F A C E.

I could wish, that by all means they would smother their Resentments.

But it's not my Design, to Reflect upon the particular Character of any Ingenious Pretender, but to Support and Vindicate my own Character, as a Clergy-Man, as well as my Judgment in Minerals, having been now Thirty Years concerned in the Inspection of Under-ground Projects of several Kinds and Natures.

And if such Ocular Observations as I have made, prove of Benefit and Use to Mankind, but more especially to my Country-Men, I shall Value my self thereupon.

For having received not only Common Respect and Civilities from most of the Gentry in these two Counties, but from several many singular Favours, for which

The P R E F A C E.

I thought that a bare Acknowledgment would be too thin and airy a Return; I therefore present them with this small Treatise, as a more solid and substantial Testimony of my Gratitude and Thankfulness.

T H E

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AN
ESSAY

TOWARDS A

Natural History

OF

Westmorland and Cumberland.

The INTRODUCTION.

THESE two Counties are situated in the Northern part of *England*, and in the Center or middle of the Island of *Great Britain*. Their Surface is elevated above the rest of the Island; which expofeth the Inhabitants to a colder, yet a more healthful Air than the level Counties:

B

They

I N T R O D U C T I O N .

They consist of Mountains, Hills, Dales, and Vallies; and these Elevations, and Depressions of their Surface, occasion great difference in the Soil, producing great variety of *Herbs, Plants, and Vegetables*; which afford not only wholesome Food and Nourishment, for vast Stocks of Sheep feeding upon the Mountains, but for numerous Herds of Beasts and Cattle in the Dales and Vallies, which are not only checker'd with natural *Groves* of Wood, composed of several sorts of Trees, as the *Oak, Ash, Birch, &c.* fit for Timber, and other Uses; but also interlaced with rapid Rivulets flowing from the Mountains.

In these two Counties we also have several *Parks and Forests*, well stocked with Deer, both *Red* and *Fallow*, which, in their Season, are as fat and well grown, as any perhaps in the whole Island.

The Interior *Strata* of these Mountains and Hills are no less productive of several kinds of metallick *Ores, Mines, Minerals,* and *Semi-minerals*, which may enrich the ingenious and industrious Miner; of all which, the following Chapters will give a more particular Account. But,

Seeing

Seeing all *Countries*, and particular *Situations*, are esteemed more or less pleasant, according to the different degrees of Heat and Cold, the Fertility and Sterility of the natural Soil, the conveniencies of *Stones, Water,* and *Fuel*; That this *Natural History* may be more useful, compleat, and satisfactory to the Reader, we shall first Treat of *Mountains, Earths, Waters,* and the *Operations of Heat and Cold*, in general, as necessary Preliminaries, before we make our particular Observations upon those several Classes and Divisions, into which, for Method and Distinction sake, we have divided these two Countries.

C H A P. I.

Of Mountains in general, with their Natural Uses, in reference to the whole Earth.

SOME of our late *Theorists*, who have undertaken to give us some new Schemes and Descriptions of this Terraqueous Globe, and to entertain us with Theories of it, seem to be of Opinion, that the *Antidiluvian* Earth was mathematically round, without Mountains, Hills, or Vallies, as if these ex-

The Natural History of

berances of its Surface, like Warts and Wens, were the Deformities of it. But this *Hypothesis*, or rather Conceit, seems to be the effect of their Ignorance in Divinity, as well as Natural Philosophy. For if these new *Theorists* had considered that God hath made nothing in the whole Creation in vain, but to wise Ends, and the best of Purposes, tho' the narrowness of our dark Intellect is not able fully to comprehend them, they would have been convinced of their Mistake, and retracted their ill grounded *Hypothesis*. For as God was pleased to make, not only the Earth it self, but all the several Ranks and Species of Creatures which live upon it, and are subordinate to our Nature, for our Use, Pleasure, and Diversion; so these high and lofty Mountains, do not only contribute to the Entertainment of our visive Faculty, with most curious and delightful Landships, but present us with a Set of Vegetables peculiar to their cold and elevated Soil, and most proper and agreeable with the hot Natures of Sheep and other Creatures bred upon them, which are most refreshed with the coldness and frigidity of the Mountain-Air. But as the whole Frame and Fabrick of the World is supported and preserved in order by the Agreement, Conspiracy, and Subserviency of one Part to another; so one Part of the Earth is serviceable to another, and the

Mountains

Mountains to the Whole: For I cannot yet understand how this Earth could have been an habitable World, without a distribution of Rain, Wind, Air, and Dews; for all which those *warm* and *spacious Plains* and *Vallies* are in a great measure indebted to the high and lofty Tops of Mountains, that seem with Pride and Contempt so much to overlook them.

This dark *Phænomenon* in *Nature* will be made more apparent, and obvious, if we make an Inquiry into the Original of *Wind*, *Rain*, and *Storms*, and how these are distributed over the Surface of the *Earth*.

Some Philosophers have been in busy quest to find out the Original of Wind and Rain; and after much sweat, seem to discover Wind to rise out of the *Hollows* and *Cavities* of Rocks and Mountains; and that the *Rain* that waters the Surface of the Earth, ariseth from Rivers, Lakes, Ponds, and waterish Earth.

I confess, that *Wind* blows from the Mountains, and that some Rain ariseth from Rivers, Lakes, Ponds, and waterish Earth: But this Wind and Rain are only at second hand, and are not sufficient so to moisten and water the Earth's Surface, as to make it prolifick and fertile.

We must therefore endeavour to find out the Original Cause of both, and then we

shall presently find by what means their distribution is made over the Earth; and since neither the Rivers, Ponds, Lakes, nor waterish Earth can implete the Atmosphere with such a constant Supply of Wind, Air, and Rain, as is sufficient to answer the ends of Nature, we must take it for granted, that the Sea, or Main Ocean, is the grand *Storehouse* which supplies the Atmosphere with Wind to brush and cleanse the Air; without which, it would presently stagnate and corrupt; and likewise with Rains to moisten the dry and over-heated Air, and fertilize the Earth. We are indeed told by our *Lord* that the *Wind* blows where it listeth, and that no Man knows from whence it cometh, or whether it goeth; and therefore to enquire from whence it derives its Original, seems to be a Boldness unbecoming a Disciple of Christ. But as God Almighty hath made us reasonable Creatures, he has given us also Power and Authority to exercise those rational Faculties he hath given us. And we cannot make a better Improvement of this our essential, and distinguishing Talent, than by searching into the Book of *Nature*, wherein we may read the lively and most glorious Characters of the Divine Essence, and those Essential Attributes of his Almighty Power and Infinite Wisdom: And when we behold and consider this wonderful Fabrick, this magnificent

magnificent Palace, wherein we live, the Symmetry and Proportion, the Agreeableness and Conspiracy of its Parts, and how one Thing serves another, we cannot but adore the Almighty and Wise Architect, and the great Rector of the Universe. *He that is wise, and well considereth these things, saith the Psalmist, he shall praise the Lord for his goodness, and declare the wonders that he hath done for the Children of Men.*

But to return to the Subject in hand; because Wind is the usual fore-runner of Rain, and the distributor of it over the Earth, we shall make it our first endeavour to find out its original, as well as its natural Uses; and notwithstanding the difficulty of the Discovery, we may venture to assert, That in the greatest probability, it proceeds from vast swarms of *nitrous* Particles, arising from the bottom of the *Sea*; which being put into Motion, either by the central *Fire*, or by that *Heat* and Fermentation which abound in this great Body of the Earth: And therefore this first Commotion, excited by the said Fermentation, we call a *Bottom Wind*, which is presently discovered by *Porpices*, and other Sea-Fish, which delight to sport and play upon the Waves of the Sea; who, by their playing, give the *Mariners* the first Notice of an approaching Storm: When these *nitrous* swarms are risen toward

the Surface of the Sea, in a dark Night, they cause such a shining Light upon the Waves, as if the Sea were on fire; and being delivered from the brackish Water, and received into the open Air, those fiery and shining Meteors which fix upon the Masts and sides of Ships, and are only *nitrous* Particles condensed by the circumambient Cold, and like that which the Chymists call *Phosphorus*, or *Gloe-Worm*, shine and cast a Light, but have no *Heat*: This gives to *Mariners* the second Notice, that the Storm is rising; for upon the first breaking out of the Wind, the Sea begins to be rough, the Waves swell and rise, when at the same time the Air is calm and clear.

This boiling Fermentation of the Sea causeth the Vapours to arise, which by the Intensity of the circumambient Cold, is condensed into thick Clouds, and falls down in Storms of Wind and Rain, first upon the Sea from whence they rose, and then the attractive Power of the Mountain-Cold, by a secret Magnetism, between Vapour and Cold, attracts the waterish Vapours, intermix'd with *nitrous* Particles, to the high Tops of Mountains and Hills, where they hang hovering in thick Fogs and waterish Mists, until the *Atmospherical Heat* rarifies the *nitrous* part of the Fog, which is always uppermost, and appears white and *translucent*,
into

into brisk Gales of Wind, and the Intenseness of *Atmospherical Cold*, having attracted the Vapours into the colder Regions of the *Air*, where, being condensed into Clouds, the Wind breaks, dissipates, and drives them before it until they fall down in Rain, and water the Surface of the Earth; and this seems to be the reason why, in *Egypt*, and those level Countries where they have no Mountains, they have little Wind, and less Rain.

Again, God hath so ordered it, that all the great Rivers upon the Earth should have their Rise, and break out from the tops and sides of the highest Mountains; whose declivities give them both Weight and Motion, which pressing into the Sea, causeth that constant Flux and Reflux, which is so necessary for Navigation. For that Reciprocation of Motion, is occasioned by a continual strife between the fresh and salt Water; when the weight of the salt Water forceth back the fresh *River* Water, it causeth a *Flux*; and when, on the other side, the *River* Water forceth back the salt Water, it causeth a *Reflux*; and the reason why in some parts of the *Mediterranean* Sea, there is neither Flux nor Reflux, is, that the River *Nilus* and * *Niger*, by their long Courses through those level Countries of *Egypt*, &c. have lost both their Weight and Rapidity; yet, I am of Opinion,

* *The Pacific Sea,*
&c.

nion, that these slow running Rivers do gradually swell up the Sea into such a gibbosity, as contributes to that annual Flux, or overflowing of *Nilus*, &c.

There are several other Advantages which the level Countries, especially the Dales and Vallies, receive from the Mountains, which I shall give Account of when I come to treat of the Mountains we have in these two Counties.

C H A P. II.

Of Heat and Cold; their natural Uses and different Operations, but especially of their attractive Powers.

IT was an excellent Observation made by the Lord *Bacon*, that great Master of Natural Philosophy, That *Heat* and *Cold* were the two Hands of *Nature*, which does not only, by Turns and Interchanges, govern the Atmospheric Regions: But all those Mineral Productions, in the dark Kingdom of the Earth, are effected by the Operations of *Heat*, imbodyed in *Sulphur*; and *Cold*, imbodyed in *Quicksilver*; and these Two are reputed the Male and Female Parents of all Mineral Productions: And it's very probable

ble that all spiritual *Entities*, whether animate or inanimate, do act in material Vehicles suitable and agreeable with their Natures.

We generally speak well of *Heat*, because of the Benefits we receive from its warm and enlivening Influence upon us; but as slightly and indifferently of *Cold*; as if it were an Enemy to *Mankind*, and not useful in Nature. And therefore some of our young Philosophers have excluded it out of all the *Categories*, making it only a Privation of Heat, and a *Non Ens* in Nature. But if these young Philosophers would take a Journey to *Greenland*, *Freezland*, or some of those cold and freezing Countries, they would there meet with the Effects of *Cold*, when it crops their Ears, mortifies their Fingers, and perhaps deprives them of the Badge of their Sex.

Besides, we do observe that *Cold* does as readily pervade the strait Pores of any Vessel of Wood, Stone, Glass, &c. as its opposite *Heat*; and we yet further observe, that what *Heat* dissolves, as Wax, Metals, &c. that *Cold* hardens; and on the contrary, what *Cold* hardens, that *Heat* dissolves. By which it's apparent, that *Cold* is not only something in Nature, but as useful as its opposite, *Heat*.

And

And therefore the generality of *Natural* Philosophers have been very inquisitive to find out the *Primum Frigidum* in *Nature*. Some contend for the *Earth*; others for the *Water*; a third for the *Air*; a fourth for *nitrous Steams*; a fifth for the *Wind*: These different Hypotheses are in my Opinion not deserving of a particular Refutation. For as God hath made the *Sun* a Central Heat, and the *Primum Calidum*, so it's very probable and agreeable with reason, that the *Moon*, our next Neighbouring Globe, was made by the Divine Wisdom, the *Primum Frigidum*; and without these two great *Luminaries*, this dull *Earth*, whereon we live, would not have been an habitable World; for if we had had a *Sun* without a *Moon*, its violent heat would have dried up the *Seas*, and burnt the *Earth* up to a *Crust*; and if we had a *Moon* without a *Sun*, the *Sea* and *Earth* would have been frozen to the induration of an *Icy Marble*; but by the commixture of these two different *Atmospheres*, (*viz.*) of *Heat* and *Cold*, the *Earth* is made Prolifick and Fertile, and the *Aerial Atmosphere* fit for the *Respiration* of such compounded *Animals* as now live upon it.

When these two powerful Antagonists, like neighbouring Princes, do Reign in League and Amity, giving place one to the other, not invading one anothers Territories,

we have then seasonable Weather; but when they invigorate their Powers, and act their Antipathies upon each other, then we have violent Storms, or dreadful Thunders, as in the Ninth Chapter of *Exodus*, ver. 23. *The Lord sent Thunder and Hail, and the Fire ran along the Ground; so there was Hail, and Fire mingled with the Hail, very grievous.*

If I should give a particular Relation of all the Uses and Operations of Heat and Cold, it would enlarge this Chapter beyond the Limits of my designed Brevity: I shall therefore only give Account of their attractive Powers, and shew their natural Uses, and how by them they serve the ends of Nature.

That *Heat*, by its warm Influence upon the Earth and Waters, sucks up and attracts both Vapours from the Waters, and Exhalations from dry and bituminous Earth, is by all taken for granted; and these Vapours and Exhalations, it presently dissipates and rarifies into thin *Air*, thereby supplying the defects in the *Aerial Atmosphere*; for without daily Recruits of fresh *Air*, all living Creatures would be necessitated, either to breath Fire, or Corruption, which would presently destroy the whole Race of Creatures that live by *Respiration*. And as *Heat*, by its attractive and rarefying Faculty supplies the defects in the *Aerial Atmosphere*,

sphere, so *Cold*, by its attractive and condensing Power, only sucks up Vapours, and when they are condensed into Clouds, it sends them down again in showers of Rain, thereby cooling the over-heated Air, and moistening the dry and thirsty Earth, preparing it for the Production of the several Species, and sorts of Vegetables which God Almighty, by his universal Providence, hath laid up in Nature's Store-house; not only for Food and Nourishment, for the inferior Ranks and Orders of all those living Creatures, subordinate to Human Nature; but even for *Man* himself, being his *Vicegerent* upon this Earth: This attractive Power of *Cold* being a new *Hypothesis*, which, to some, may either seem precarious, or an imposition upon the Credulity of easy Readers; I shall endeavour to make it more clear and evident by these following Instances, which being grounded upon common Experience, cannot, without giving an Affront to *Natural Reason*, be deny'd.

1. First, Experience tells us, that if a great Inundation be followed with an intense and *freezing Cold* in the Morning, it will attract and suck up into the Air more Water than a Week of Summer's Sun; which occasions that vulgar Observation, *When a great Flood falls soon, it soon riseth*; again, *And when the Fogs and Mists*

go up by the Hill, they come down by the Mill.

2. Again, we observe that when the morning Cold is freezing, after a Flood, in Puddles and standing Pools, the Ice is hollow, the Water being suck'd up from them.

3. We further observe, that in continued Frosts, every morning and evening, which are the times of the freezing Cold, it sucks up out of waterish Ground (even through thick Boards of Ice) such quantities of Water, as in some cold Countries, increase the Ice to an incredible thickness: This we call *Float-Ice*, from the overflowing of new Supplies of Water every Morning and Evening.

4. We further observe, that in lodging Rooms, where there is much Breath and Vapour, the external Cold, when intense and freezing, will attract to the glass Windows those Vapours, and condense them into a waterish *hoar Frost*.

5. And notwithstanding that the Flux and Reflux of the Sea is occasioned by the Rivers; yet it's very probable, that the cold Influence of the Moon does by its attractive Influence regulate the Spring-Tides.

That the *rising* and *falling* of the *Atmosphere* is occasioned by the rising and falling of these subtle *Ætherial Spirits* of *Heat* and *Cold*, is apparent, by the rising and falling
of

of *Quicksilver* in the common *Barometer*, and the Spirit of Wine in the *Thermometer*; for as it is against the Nature of Gravity to ascend, so it seems a palpable Contradiction to the Laws of Gravity, that Vapour, which is a heavy Body, should ascend without the force of some attractive Power: It's also against the Nature of *Levity*, that a dry Exhalation, or a sublimated Spirit, should, *proprio motu*, descend without a Pressure.

And it cannot be imagin'd that the external Vapours in the open Atmosphere, which are too gross to pervade the Glass of the Tube, should be the cause of the *Quicksilver's* rising; or to hang *pendulous*, as it does in Mr. *Patrick's* open pendulous *Barometer*, there must be then some other secret and invisible Cause; and it seems most probable that the magnetick Attraction of this *Ætherial Spirit of Cold*, which governs the humid and vaporous *Atmosphere*, is the true and only Cause, both of its rising and falling; and in like manner, the rising and falling of the Spirit of Wine in the *Thermometer*, is occasioned by the rising and falling of the *Ætherial Spirit of Heat*, which governs those warm Steams and Exhalations which heat and qualify the cold and moist Air, and fit it for Respiration.

When

When the *Quicksilver* riseth in the Tube, the Vapours and the Clouds rise, dilate, and rarify into Wind, and we have dry *Weather*; and on the other side, when the *Quicksilver* falls, the Vapours condense, the Clouds fall, and Rain and Storms follow.

And on the contrary, when the Spirit of *Wine* ascends in the Pipe, we have Rain, and when it falls we have fair *Weather*: *Heat* and *Cold* giving always place one to the other; especially when they govern the Atmospheric Regions in Amity and Friendship, according to the Laws of Nature. Thus, as the *Heavens declare the Glory of God*, so the *Firmament shews forth his handy Work*.

C H A P. III.

Of the Earth in general, with the different Natures of Soils, and Virgin Earth, with their Natural Productions.

TH E several Compositions of this Earth's Globe, are reducible to these four, (*viz.*) *Earth, Juices, Stones, and Metallick Ores*; and these are so intermingled one with another, that without understanding the Nature of every one in particular, the most ingenious *Artist* cannot make a Separation; I shall therefore first Treat

C of

of *Earth*, being most obvious and nearest to our Senses. By the *Earth*, I do not mean that pure and simple *Element*, whereof Philosophers tell us that all mix'd Bodies are compounded; for I am of Opinion, that if we should dig never so deep into the Bowels of the *Earth*, we should never find any such pure Elementary *Earth*, but what is mix'd with several *Juices*, (*viz*) *Vitriol*, *Sulphur*, *Salt*, and *Mercury*; and it's the intermixture of these *Juices*, which makes the *Earth* productive of the several kinds of *Vegetables* upon its *Surface*, some giving to them *Colour*, *Taste*, and *Smell*, others *Growth* and *Increase*. But by *Earth*, I understand such an earthy Substance, as neither melts in the *Fire*, nor dissolves in the *Water*, as *Metals* and *Juices* do, nor is so compact or hard, as are *Stones*.

This earthy Substance I shall divide into *Soil* and *Virgin Earth*; by *Soil*, I mean the outer Coat, or *Surface*, which lies open to the *Sun* and *Air*; from the warm Influence of the *Sun*, it receives its degrees of *Concoction* and *Digestion*; and from the *Aerial Salt* and *Acid*, it hath its degrees of *Fermentation*, and from both it's made productive of *Herbs*, *Plants*, and other *Vegetables*; so that all difference in *Soil*, is either from the different degrees of *Heat* and *Cold*, and the circumambient *Air*, or from the several
kinds

kinds of *Strata* they cover, which impregnate them with mineral Steams and Exhalations, according to their different Natures.

The *Cold Mountains* having but the Advantage of a *single* Reflection of the Sun's Beams upon them; yet their *Strata* being of a hot and sulphurous Nature, are productive of such sorts of Vegetables as are agreeable with those *Stones* and *Strata* they cover, and are best able to endure the Winter *Frosts* and *Cold*, and are of a combustible quality.

The *Soil* which is the cover of *Limestone*, *Chalk*, *Marble*, and others of a calcinable Nature, being impregnated with a fertile *Salt*, are productive of great variety of fine sweet *Herbs*, *Plants*, and *Flowers*, which afford rich Feeding and Nourishment for such Cattle as feed upon them, but being of a tender Nature, will not endure the Winter *Cold*.

The *Soil* which is the cover of the several kinds of *Freestone*, and is of a liquifiable quality, does not produce naturally such variety of sweet *Grass*, *Herbs*, and *Flowers*, as those *Strata* of a calcining quality; but these being the *Strata* of the Dales and Vallies, and having the Advantage of a multiplied Reflection of the *Sun*, a deeper *Soil*, and a warmer *Air*, than the former, makes them the most prolifick and fertile.

Virgin-Earth, is not only that which lies under the *Surface-Soil*, which hath never been

Note.

been broken up, either by *Spade* or *Plough*, or has had the benefit of the *Sun* and *Air*; for in our sinking into the Bowels of the Earth we find Beds and Kells of tough *Clay*, *Marles*, *Fuller's Earth*, and a soapy or greasy white *Earth*, which is commonly the upper cover of a rich *Coal*; these being taken out of the Earth, and exposed to the *Sun* and *Air*, will, within a short time, be so modified and digested, as to become productive, not only of common *Grass*, but of other *Herbs* and *Vegetables*.

Peat Earth.

And Experience tells us, that even bituminous *Peat Earth*, upon the *Cold Mountains*, when burnt, limed, and manured, and the sulphurous and sterile Spirits are exhaled, will produce a new Set of sweet *Grass*, as *Clover*, both white and red, and other *Flowers*, which is sufficient to convince any one, that the seminal Forms of all *Vegetables* were at the Creation disseminated in the Earth; which when new modified, brings forth equivocally, and by a spontaneous Generation, a Production of new *Vegetables*, their latent Seeds being exerted by a new Modification of the Soil.

Note, That

The Natures and Qualities of Earths may be discovered, either by their *Colours*, *Taste*, or *Smell*.

Colour of the Earth.

1. Our first Discovery of the Nature of the Earth, is by the *Colour*; it's reported, that

that *Aristotle* was of Opinion, that the pure elementary Earth is void of *Colour*; and *Strato* affirms it to be *white*, because *Ashes* are *white*.

The former of these Philosophers is mistaken in his Logicks, for *Colour* is an essential and an inseparable Quality of Matter; and the other is mistaken in his Observations, for the *Ashes* of Peat and Turf is of a redish *Colour*; but I presume, that the Philosopher has rather warm'd his Fingers at a Wood-Fire than one of Peat and Turf.

It's most certain, that all Earth is colour'd, and the variety of *Colours* we observe is either from Mineral Exhalations, which generally carry a glistering and shining along with 'em; the *discolouring* from the *Sun's* over Concoction only, is obscure of an *Iron* colour, or black; so that considerable Conjectures may be made for the Discovery of *Mines* and *Minerals*, from what hath been said of the Colour of the Earth.

2. Our next Discovery, of the *Nature* of the Earth, is from the divers *Smells* of it. The Smells of the Earth.

The Works of *Nature* in producing variety of *Smells* of the Earth, deserve our next Consideration.

Commonly the Earth smells well upon the fall of the first Rain, after the *Heat* of *Summer* is past, the dry Time having suck'd up and drained that Humidity in the Earth,

which is the only Cause from whence all good Smells do proceed.

The occasion of good and bad Smells.

All *white Metals*, as *Silver*, *Lead*, and *Tin*, having more of *Quicksilver*, in their Composition, than of *Sulphur*, have a sweet Smell.

All other Metals, which have much of *Sulphur* in their Composition, as *Copper*, *Iron*, and other *Bastard Metals* or *Semi-minerals*, have an ill Smell, by reason of their being generally mix'd with *Brimstone*, *Coperas*, or the like malignant Juices; and that *Virgin Earth*, which is the upper cover of these Metals, is tinctured with the same Smell or Flavour.

We read of some *Earth* that is so abominably stinking, that the Steams and Exhalations which do arise from these malignant Juices, do sometimes not only kill the *Miners* that dig in the *Veins*, but the very Birds that fly over them.

3. *Our third Enquiry*, will be to know the Condition of the Earth by the *Taste*.

The Taste of Earth.

The curious *Miner* will leave no Experiment untry'd that may be considerable for his Information, and therefore useth *Taste*; *pure Earth* hath no manner of *Taste*, and the *Earth*, which is mix'd with Minerals, hath commonly a *bad Taste*; for there is scarce any *Mineral* but what is *adust*, and they be all dry, whereas the very first principle

principle of Sweetness is *Humidity*. The Taste of *Mineral Earth* may be known by infusing of it in pure and clear *Water*, especially if you set it on the *Fire*, and let it boil once or twice, and then cool again; the mixture of Juice it contains, may be discovered by tasting the Skum which riseth, and swims upon the *Water*.

C H A P. IV.

Of Water in general, shewing the Original of Springs, Rivers, Lakes, Ponds, Mineral Waters, &c.

WHEN the *Almighty Power* was pleased, by the Division of the Waters, to cause the dry Land to appear, and gradually to become an Habitation for several Ranks and Orders of Creatures, compounded of Matter and Life;

This *Division* was made into *Waters subterrene, superterrene, and nubiferous*: Those Waters above the *Firmament*, i. e. without the power of this *Earth's Attraction*, were attracted to the *Moon's Center*, which by *Moses* are called the Waters above the *Firmament*. *The Division of the Waters.*

The *subterrene Waters*, are those sweet Mineral Feeders, which do implete the Body of the *Earth*, and perform the same

Office, that Blood does in the Bodies of *Animals*.

This Sweet Water hath a constant and regular Circulation through those greater *Fissures* and *Divisions* of the several *Classes* of Matter; and these *Fissures*, by the *Miners*, are called *Dykes*, *Rakes*, *Riders*, or *Veins*, according to the Nature of those *Classes* of Matter they pervade, and they are analogous to the *Veins* in the Bodies of *Animals*: Besides these greater *Fissures* we meet with in the Body of the Earth, we meet also with many small *Ramifications*, or lesser *Veins*, which feed, and keep in Life, not only the several *Mines* and *Minerals*, but even the very *Stones*, and different *Strata* or *Layers*, and *Sediments* of it.

The Division of Fissures or Veins of the Earth.

And as all the great *Veins* in the Bodies of *Animals* do meet in the Neck, and from thence are divided into lesser *Veins*, and some as small as Hairs, which we call *Hair-Veins*; so the greater *Nerves*, which are called the *Septipares*, have their Original from the Head; and being divided into lesser and smaller *Nerves*, are the *Conduit-Pipes* thro' which *Life*, *Motion*, and *Activity* is conveyed to all the *Members* of the Body.

In like manner, all the great *Rivers* upon this Earth have their Rise from the *Tops* and *Sides* of the highest *Mountains*, following the *Windings* and the *Turnings* of these
greater

greater *Veins* and *Divisions* of the Earth; and in their long Courses, taking in those Waters flowing from the *lesser Veins*, until they increase to *Navigable Rivers*, and empty themselves into the next *Sea*.

Now to avoid all needless Disputes about the *Original* of perpetual Springs and Fountains, we shall be positive in our Assertion, That they neither have their *Original* from the *Sea*, leaving behind them the *saline Quality*, as they pervade the strait Strainers of those Earths they pass through; nor do they proceed from *Air* condensed in the Cavities or Hollows of the Earth; or are the *Product* of those *Rains* which water the Earth's Surface, but that they have their *Original*, First, From the natural breaking out of the *Strata*; or, Secondly, By an accidental breaking of some of those subterrene *Veins*; or, Thirdly, When by our digging into the Body of the *Earth* we cut them; which is the same with opening a Vein, or letting of any *Animal Blood*.

The Original of Springs.

As for the Causes of *Lakes*, *Ponds*, *Mineral Waters*, their Natural and *Medicinal Uses*, we shall give a particular Account of them when we come to Treat of such as we have in these two Counties.

C H A P. V.

Of Stones in general, their different Natures, Forms, and casual Impressions, &c.

TH E S E two Counties of *Westmorland* and *Cumberland*, being the most mountainous and stony of any Counties within this *Island of Great Britain*, it will be necessary that we first Treat of *Stones in general*, their *Natures* and *Figures*, before we proceed to give a particular Description of the several *Mountains*, *Stones*, and *Strata of Matter*, with the *Mineral Productions* of these Counties.

And, First, of the *Generation of Stones*.

The Generation of Stones.

It is most certain, that there is a very *active Principle*, or *Virtue*, that operates in the *Generation of Stones*, as well as upon the rest of the *Matter of the Universe*, that is subject to *Generation* and *Corruption*; but the difficulty lies in knowing what that *Principle* is, because it operates in no determinate place; but sometimes *Stones* are made in the *Air*, in the *Clouds*, in the *Water*, and in the *Bodies of Animals*; and it's taken for granted, that in all *Generations* there are concern'd two essential *Principles*, (*viz.*) an *active* and a *passive Principle*.

Note.

In

In the Generation of Stones, the passive Principle is either *Sand* or *Slime*; those generated of *Sand* are of a *liquifiable Nature*, those of *Slime* are of a *calcinable Quality*.

The Principles of Generation.

And to these two kinds are all Stones reducible. As for *Flints*, they make up no particular *Stratum* of this Earth, but are a sort of *Mundick*, lying in Beds of *Chalk*, either in Layers, or Confusion, like *Cat-heads* in Coal-Metal, or *Limestone-Chivers*; the former *liquifies* into Glass as Transparent as *Chrystal*, the other is of the Nature of *Iron*.

The active Principle in the Generation of Stones is a *petresying Juice*, or Water. In the History of *Peru*, we read of a Water, wherein, if the Neighbours do but immerse either Earth or Clay, made up in Moulds, as we make up *Brick* or *Tile*, it presently turns into a hard and solid Stone; and the People thereabouts build their Houses with it; all the Cattle that drink of it die. The Colour of this petresying Liquor is whitish, inclining to yellow.

The Active Principle.

But we need not *Travel* into the other *Hemisphere* to find Water of this kind, having several Springs of this *petresying Nature* both in *England* and *Ireland*.

Stones have their substantial Forms, which make them differ *specifically*; yet, because we cannot come to the Knowledge of them, in our *Definitions*, we are fain, by way of *Periphrasis*,

The Forms of Stones.

Periphrasis, to make use of *Accidents* and *Properties*.

Every several *Form* of Stones, is accompanied with particular *Virtues*, as remarkable as those of *Plants* and *Animals*, and proportion'd to the length of time Nature takes in its *Generation*.

The Division of Stones.

All sorts of Stones may be divided into *Common* or *Precious*.

The more *Common*, are *Rocks*, *Quarries*, and the *Common Strata* of the Earth, or they are *Pebbles*.

Precious Stones are either the external *Gums* and *Exudations* of *Metallick Stones*, or they are the *internal Kernels* of such.

They are either *Transparent* as the *Diamond*, or *Obtuse* as the *Onyx*, or between both, as the *Jasper*.

The Cause of Transparency and Opacity.

It's *Water* that is the principal *Cause* of *Transparency*, and the *Earth* of *Opacity*.

White Stones are made of a *Humour* almost like *Water*, and therefore are the most *Clear* and *Transparent*; such is the *Chrystal*, and *Iris*, so called, because being held opposite to the *Sun*, it much resembles the *Rainbow*.

The *Diamond* is engendered of a less clear *Humour* than the *Chrystal*, or the *Iris*, and so is more *obscure* than either of them.

The same variety may be observed in all *Precious Stones*, whether they be compos'd of Juices or Humours, that be Green, as the *Emerald*, or Blue, as the *Saphire*, or Red, as the *Ruby*, &c. There are some of mingled Note. Colours, and some also that are not Transparent, which are engendered of black and thick Humours; an Instance whereof we see in Water, which, tho' it be naturally white and clear, yet mingled with Ink, it loseth its Transparency, tho' not the Lusture of its Superficies.

But besides Shining and Transparency, Of the Accidents of Stones. there are other Accidents and Properties that accompany Stones, both *Precious* and *Common*; and to discover the Natural Causes of such, some of our late *Virtuosi* have made it their Business and Study, but with what Success I shall not here determine.

We read of Stones, that have in their Clouds and Spots, represented Towers, Sheep, and other Animals, perfect and imperfect.

The Story of the *Agats* of King *Pyrrhus* is famous, that represented to the Life *Apollo* and the Nine *Muses*, so lively as any Painter could draw them.

And it's said, that in the House of Wisdom L. Soph. at *Constantinople*, there is a Marble-Stone, that by the very natural Veins of it, hath the Picture of *John* the Baptist, with his Cloathing of Camel's Hair, expressed to the Life,

Life, excepting one of his Feet, which is imperfect.

But we need not go so far as *Constantinople* for Instances of this kind, having the like *Mirabilia Naturæ* at Home in our own Country.

Benwell
Colliery.

Observe.

In a *Colliery* at *Benwell*, near *New-Castle* upon *Tyne* in *Northumberland*, where the Miners sink above the Salt-water Level, they find the *Sulphur* so crude, and hard, being mix'd with its Native Earth, that a Pick-Axe will scarce break it: But sinking the same *Pit* down some Fathoms below the Salt-water Level, the *Sulphur* is so exalted and sublimated that it will fire at a *Candle*, and sometimes with the stroke of a Pick-Axe; and if the Miners should not open their Air-Pits, and keep their Thurling-Ways clear, and frequently brush and sweep the *Coal-Wall* before they fall a working, there would be such Collections of these *sulphurous* and *bituminous* Spirits, as would either set the *Colliery* on fire, or by kindling of a *Fire-damp*, blow it up.

It is likewise observable, that if the Water in any place of that *Colliery* stagnate, it will fire with a *Candle*, and burn like *Brandy* or *Wine*; and if the Water be fed and supply'd with a constant and perpetual Feeder of that *bituminous* Water, it would burn for Ages; and this seems to be the true Cause of *Hot Baths*.

But

But this is not the only thing remarkable in this *Colliery*; for we further observe, *observe.* that where the Roof of the *Colliery* will not stand without supporting; if the Miners cut down Branches from Oak, Birch, Ash, or any other living Tree, to make Props of, to secure the Work; these Trees, Body and Branches, with their Leaves and Lineaments, will in a short time be so *imprinted* and painted upon the smooth Sill of that *Colliery*, that nothing but the *Author* of *Nature* it self could produce such excellent Workmanship.

I had this Relation from Mr. *Enoch Hudson*, the *Owner* and *Manager* of that *Colliery*.

These *Relations* may convince any, that there is a *plastick Spirit* in *Nature*, which where-ever it meets with these Chymical principles of *sublimated Salt*, *Sulphur*, and *Quicksilver*, it will, like a *Looking-Glass*, take the lively Images of any thing, *animate* or *inanimate*; and by *Virtue* and *Power* of this *plastick Spirit* is *Matter* modified into the *Form* and *Shape* of the *Bodies* of *Flies*, *Insects*, and other compounded *Creatures*.

I have seen the *Impression* of *Fern*, *Heath*, and other *Vegetables* in an excellent *Collection* of such *Rarities* of *Nature*, made by our present *Lord Bishop* of *Carlisle*.

As for those *Stones* which go under the *Name* of *Formed Stones*, they are not only *formed* *Stones.*
found

found upon the tops and sides of high *Mountains*, and sometimes inclosed in hard Rocks in Foreign Countries, but we have great variety of them here at Home, as well upon the Mountains as in the Vallies. There is a Parish in *Lincolnshire*, where the *Minister* of it told me, they were as common and plentiful as Pebbles: He sent me a Bag full of them, wherein there was great variety; there was one sort I never saw in any other place, or among those Collections made by those who place a great Value upon such Rarities of Nature: They call these by the Name of *Miller Thumbs*. The same Mr. *Hornsby*, the Minister, told me, that upon the *Commons* are daily found abundance of *Firr-Trees* lying cross one another, and very confusedly bury'd in the Earth; some above ten Foot deep, which the Neighbours dig up for *Timber*, as well as Fuel, for *Fire*, of which there is great scarcity and want in that County; and that which makes it more remarkable, there is neither any such kind of *shell Fish* found in our Seas, nor was there ever known any *Firr Trees* to grow naturally in that Country.

*Petrefied
Shells.*

Some Years ago being at the Duke of *Somerset's* House in *Suffex*, there were *Masons* there cutting and polishing of Marble, which was made up of nothing but *Cockles* of all sorts, great, middle sized, and small ones, some

some of them lying *upwards* and some *downwards*, with the smallest Lineaments of their Shells drawn in great Perfection; and these *Masons* told me, that these Stones were got in the middle of the Country, at a distance from the Sea.

It seems most probable, that those *Firre Trees*, bury'd under Ground in *Lincolnshire*, were brought thither by the Devastations made by *Noah's Flood*: But it cannot be imagin'd, that those *shell-Fish* should be lodged and petrefied to Stone, upon the Tops of high Mountains, and inclosed in the middle of hard Rocks by that *general Flood*; but it seems more likely, that when God by the *Division* of the Waters, made the dry Land to appear, these *shell-Fish*, which were not *Loco-motive*, were left behind, and by the general Petrefaction, with the rest of the now *solid Strata*, were petrefied into Stone: But because I would not willingly over-burthen the Credulity of the *Reader*, I will proceed to the next Chapter.

C H A P. VI.

Of the different Classes of Matter of the Earth, with their Natural Productions; but more especially of the different Classes of these two Counties, &c.

The Original of Classes.

WHEN the several *Sediments* of Matter, of which this Earth is compounded, did settle into the Form and Figure it is now in, all the *Sediments* of the same Nature, and Affinity, by an agreeable *Juxtaposition* of Parts, drew together and were *petresied* into these *solid Stones*, or *Strata*, we now find them in; and every particular *Class* of Matter is productive of some *Mine* or *Mineral* peculiar to that Class, and is the Perfection of it.

The Division of Classes.

The several Classes are *divided* by the *greater Rivers*, which always follow the *Windings* and *Turnings* of the *greater Fissures*, which divide the Earth; which will be more apparent when we shall give a particular Description of the different Classes, into which we have divided these two Counties: And, First, of the *East Class*, or *Division*.

C H A P.

C H A P. VII.

Of the East Class, with its Mineral Productions, &c.

BEFORE I proceed to give a particular Description of this *Class*, I think it necessary to give a short Description of the Mountainous Heath of *Stainmore*, which divides the two Counties of *Westmorland* and *Yorkshire*.

This spacious and stony Heath, from whence it hath its Name of *Stainmore*, or *Stonemore*, is in or about the middle of this Island. It's in length Sixteen Miles, and in breadth about Ten. It hath a gradual Ascent from *Brough-Town* to the *Grained-Tree*, which is a Boundary-Mark in that part, dividing *Westmorland* from *Yorkshire*. The Rise of the Ground for four Miles together, will answer one Yard in twenty; so that by a moderate Computation, the perpendicular Ascent to the Summit of it, would be three hundred Yards, which occasions the frigidity of the Air always upon it: From the *Grained-Tree* to *Bowes-Town*, it lies much upon a Level; and thence, it hath a gradual Descent to *Greta-Bridge*. This high Mountain-Heath divides the Southern and Northern Climates, giving to the Southern Counties a

more early Spring-Season by twenty or thirty Days, than to the Northern part of the Island. But this Want of so early a Spring, is repaired by the Continuance of the *Sun*, and the *Autumn-Season*, as many days longer; so that our *Winter* seldom begins before *Christmasts*. From this *Heath*, which seems to be the *Ridge* of the *Island*, all those *Eastern* and *Western Mountains* in *Cumberland* and *Westmorland*, take their Rise; which, by Expanding their Arms, inclose a great part of these two Counties. From the Northern Skirts of this *Heath*, riseth the Head of the River *Eden*.

*The East
Clafs:*

This *East Clafs* is divided by the River *Tyne* on the *East*, and the River *Eden* on the *West*.

Tyne hath its Rise from the East-side of *Cross-Fell*, following the *Fissure* down the Precipice of the *Mountain* to *Garragil*, and thence through *Aldstone-moor-Dale* to *Knars-Dale*, where it enters into *Northumberland*, following the greater *Fissures*; and in its long Course, receiving into its Stream the lesser Rivulets, flowing from the lesser Veins, 'till the Tide meets it at *Newburn*, within four Miles of *Newcastle*, where it becomes Navigable; and about eight Miles below that great *Town*, it empties it self into the *Sea*.

Newburn:

This

This *Class* consists of a *Ridge* of *Mountains*, extending from *Stainmore* on the *South-East*, to *Gilfland* on the *North West*, in length about twenty Miles. The Summit of this long *Ridge* of *Mountains* is *Cross-Fell*.

1. The first Elevation of this Ridge to the *East*, is called *Hilton-Fell*. The word *Fell*, according to our Country Dialect, signifying a lesser Mountain.

The present Possession of the Mannor and Royalty, is in the Family of the *Hilton's*, and the Lord *Lonsdale*, a late Purchaser.

The *Mineral* Productions are *Lead* and *Coal*, which being of a disagreeable Nature, the one makes the other of little Value.

The Prospect of *Lead* upon this *Fell*, is only from the appearance of several Veins of *Spar*, *Soil*, and *Vein-Stone* breaking out upon the Surface; and these being oftentimes either unripe or dead Veins, cheat the *Miners* with vain Hopes.

2. The second Elevation of this *Ridge*, is called *Dufston-Fell*; the Mannor and Royalty is in the Possession of Mr. *Winder*, Son and Heir to the late Ingenious Lawyer *Winder*, his Father.

The *Mineral* Productions of this *Fell*, are chiefly *Lead*, of which there is such Plenty got, as keeps a *Lead-Mill* for the most part smelting down the *Ore*.

That which is here most remarkable is, that all the *Ore* got upon this *Mountain*, is not found in *Natural Veins*, which run down perpendicularly, or sloping, which is most usual, but in *Seams* like *Coal*, which run parallel, being inclosed within the *Strata* of a hard and solid *Lime-stone Sill*, without any considerable *Depression* from the *Horizon*.

*Flat, or
Float-Ore.*

This we generally call *Flat-Ore*, or rather *Float-Ore*, being the over-flowing of a *rich Vein*; and doubtless, if the *Miners* would be at the charge of cross cutting the *Rise* of this *Lime-stone Sill*, they would discover the *Vein*, from whence this *Ore* does flow.

*A petrefying
Spring.*

Upon this *Mountain* there is a *petrefying Spring*, which turns *Moss*, or any other porous *Matter*, that either falls into the *Water*, and sucks it up, or comes within the *Stems* and *Vapours* that arise from it, into hard *Stone*; insomuch, that upon the *Mouth* of the *Well*, there is rais'd a considerable *Hill* of such *Petrefactions*.

The *Manager* and *Steward* of these *Veins*, is the *Judicious Mr. Barrow*.

*Silver-
band, of
the Name
of it.*

3. The third *Elevation* of this *Ridge* of *Mountains* is called by the Name of *Silver-band*; which Name it has either by the large *Substance* of *Silver* got by the *Product* of the *Ore*, or from the *Nature* of the *Ore*; which, when refin'd by *Art*, yields a valuable

able Product of *Silver*. The Mannor and Royalty is in the Possession of the Earl of *Thanet*; the Lessee and Manager, is the Ingenious and Famous Mr. *Bacon*, who, by his great Judgment and Adventures in *Minerals*, hath advanced to himself a great Estate in *Northumberland*.

4. The fourth Elevation is called *Blencarn-Fell*: The *Mineral* Productions, by the *Veins* of *Spar*, and *Soil*, which appear at day, seem to be *Lead*, there being as yet no Tryals made. The Lord of the Mannor is Mr. *Thomas Lough*. Blencarn-Fell.

5. The fifth Elevation is called *Kirkland-Fell*, which, as well as the other *Mountains* upon the same *Class*, hath its *Veins* of *Spar*; but as yet there have been no Tryals made. The Lord of the Mannor is Sir *William Fleming*, Baronet. Kirkland-Fell.

6. The sixth and highest Elevation is *Cross-Fell*, which is the Summit of this *Ridge* of *Mountains*; it was formerly called *Fiends-Fell*, from evil Spirits which are said in former Times to have haunted the Top of this *Mountain*; and continued their Haunts and Nocturnal Vagaries upon it, until St. *Austin*, as is said, erected a Cross, and built an Altar upon it, whereon he offered the *Holy Eucharist*, by which he countercharm'd those *bellish Fiends*, and broke their Haunts. Cross-Fell.

*The Name
of it.*

Since that time it has had the Name of *Cross-Fell*, and to this day, there is a heap of Stones, which goes by the Name of the *Altar upon Cross-Fell*. This is an old Tradition that goes current among the Neighbourhood, but the Reader may chuse whether he will give it Credit or not.

*The Rise
of Rivers.*

From the upper *Strata*, as well as from the Sides and Skirts of this high *Mountain*, breaks not only out several rapid Rivulets, as *Blackburn*, *Keshburn*, and others, but these three famous Rivers, (*viz.*) *Tyne*, *Wear*, and *Tees*, which, before they fall into the Sea, are all Navigable.

Tyne, as we have said, hath its Course through *Northumberland* to *Newcastle*, thence to the *Shields*, and at *Tinmouth-Bar* it falls into the Sea.

Wear runs through *Wardale* to *Durham*, and thence to the Sea.

Tees makes its way through *Teesdale* to *Bernard-Castle*, and so to *Tarham*.

As this *Ridge of Mountains*, did by gradual Ascents and Elevations arise from *Stainmore* to the Summit of *Cross-Fell*, so by gradual Descents and Depressions it sinks down 'till the Mountains dilate, and spread into the level Country we call *Gilfland*, in the Borders of *Scotland*.

Osby-Fell.

1. The first Depression is *Green-Fell*, which adjoins to *Cross-Fell*, and are both within the
Mannor

Mannor and Lordship of *Ousby* and *Bank*, and is in the Possession of *Motterom Crackenthorp*, Esquire, who is the sole Lord of the Royalty.

The *Mineral* Productions of this large Mannor, are *Lead*, *Copper*, *Coal*, and *Oker*. The only *Vein* now wrought, is called *Keshburn-Vein*, in which formerly great Quantities of *Ore* have been got, which turned to a good Account, and is yet an Encouraging Prospect, the *Sills* all rising with the *Mountain*.

There are in this Mannor very fair and hopeful Appearances of *Veins*, which, if thoroughly try'd by a Man of Purse and Judgment, might turn to the great Advantage of the *Lessor*, as well as *Lessee*. The *Copper* is very rich, but so intermix'd with the *Lead Ore* in the same *Vein*, that it requires some labour to separate them.

In this Mannor there is a mighty *Vein* of *Copperish Sulphur*, two Yards wide, which the Rivulet called *Blackburn*, that divides the Mannors of *Ousby* and *Aldstone-moor*, discovers. I doubt not, but if this *Vein* was sunk down 'till it got its natural Feeder, it would turn to a rich *Vein* of *Copper*; for it is very usual in the Rich Kingdom of *Peru*, which so abounds with *Minerals*, that it supplies a great part of *Europe* with Bullion, that the richest *Veins* are *Sulphur* at the Top, and
as

*The great
Sulphur
Vein.*

as they get more Moisture, turn to *Copper*, and when sunk deeper into the *Veins*, turn to *Silver*.

The *Coal* lieth upon the inside of the *Mountains*, and is so broken by the general Flood, that it turns to no Account, either to the *Lord* or *Farmer*.

Before I leave the Description of the Mannor and Royalty of *Ousby*, I cannot forbear taking notice of the Discoveries made in that Mannor by *Edward Baynard*, Esquire, Doctor of Physick, who having Marry'd the Virtuous Lady Madam *Ann Crackenthorp*, Relict of *Christopher Crackenthorp*, Esquire, who having for her Jointure and Settlement, the whole Mannor and Royalty of *Ousby* and *Bank*, gave him a Property to those Mannors during his Wife's Natural Life. This worthy Gentleman having a rich *Lead* Work upon the *Mountains*, took pleasure, not only in viewing the Management of that Work, but having a *Mineral* Spirit, and being Curious in making Natural Observations, took occasion frequently to survey our *Mountains*, where he discovered a *Chalybate* Water breaking out from the upper *Strata* of *Croß-Fell*, so rich of the *Mineral*, that the very Vapours arising from it, tinged not only the adjacent Stones, but discoloured the Grass and Herbs about it. The Skum of the Water where it stagnates,
is

is near as thick as Cream upon Milk; the *Medicinal Uses* of it I leave to the Judicious Discoverer: Besides, he discovered a rich *Vein* of *Oker*, which, if it were near the Sea, would be of good Value.

He discovered also several *Veins* of *Lead*, which, if a good Understanding could have been had between him and *Richard Crackenthorp*, Esquire, his Son-in-Law, might have been of great Advantage to them both.

2. The second Depression is *Melmerby-Fell*. Melmerby-Fell. The Lordship and Royalty of that Mannor is in the Possession of *Thomas Pattison*, Esquire; the *Mineral* Productions are *Lead*, of which some Quantities have been got; the *Veins* are very hopeful, but no thorough Tryals have as yet been made.

3. The third Depression is *Gamblesby-Fell*, Gamblesby-Fell. known by the Name of *Hartside-Fell*. The Mannor and Royalty was formerly in the Possession of the Crown, but now in the Possession of the Lord *Portland*.

The *Mineral* Productions are chiefly *Coal*. There is some appearance of *Veins* of *Glassy Spar* and *Float Copper*, but no Tryals of either have been made. Here the *Metallick Class* changeth into a *Class* of *Coal*; and we observe, that as the *Lead* does gradually go off, so the Seams of *Coal* do gradually come in and increase. The Seam of *Coal*, which is called *Hartside-Colliery*, is but half a Yard thick,

Observation:

thick, and for many Years hath supplied the neighbouring Towns with *Coal*.

Busk-Fell. 4. The fourth Depression is *Busk-Fell*. The Lord of the Mannor and Royalty is the Lord *Suffex*; the Mannor-House is *Kirkoswald-Castle*. In this Mannor there is no outward appearance, either of *Lead* or *Coal*.

Renwick-Fell. 5. The fifth Depression is *Renwick-Fell*; the Lordship whereof is in the Possession of *Queen's College* in *Oxford*. The *Mineral* Production of this *Fell*, is *Coal*, which is now increased from half a Yard to a three quarters Seam; this hath been an antient *Colliery*, but never effectually managed.

Croglain-Fell. 6. The sixth Depression is *Croglain-Fell*; the Lordship and Royalty belongs to the Lord *Wharton*. Here have no Tryals been made, either for *Coal*, or other *Minerals*, that I have account of.

Upon the inside of this *Fell*, breaks out a *Chalybate* Water, very strong of the *Mineral*. It is found by Experience to be an excellent *Antiscorbutick*; it cleanseth and sweetens the Blood, &c. and is much frequented by People under several Distempers.

Coal-Fell. 7. The last and lowest Depression of this *Ridge* of *Mountains*, is called *Coal-Fell*. It hath its Name from the *Colliery*. Here the *Coal Class* is in full Strength and Perfection, the Seams of *Coal* at their full height and growth. This *Colliery* is so antient, that

we

we cannot find out the Original of it: It supplies *Carlisle* and the Country near it. The Mannor and Royalty is in the Possession of the Earl of *Carlisle*; the present *Lessee* is the Ingenious Mr. *Mowberry*. Here also is the *Mountain Strata*, and the *Mineral Class* changed into a *Class* of Red *Free-stone*, which overspreads all *Gilfland*; in which, towards the Borders of *Northumberland*, is a *Sulphur-Spaw*, so strong of the *Mineral*, that the smell of the Water may be smelt at a great distance from it. It tingeth *Silver* with a *Goldish* or *Copperish* Colour: It seems by the *taste* and *smell* it hath of *Gun Powder*, to have something of *Nitre* in it. By *bathing* in it, it cures *Itches*, *Scabs*, and *Ulcers* in the *Flesh* and *Skin*; as for the inward Operations of it, I leave 'em to the Professors of *Physick* to discover.

Of the Sulphur-Spaw.

Gilfland.

The *Surface-Soil* of this *Class* is light and sandy, and is more proper for the Production of *Rye*, than any other sort of *Grain*.

Upon the *East* side of this *Ridge* of *Mountains*, lies *Aldstone-moor-Dale*. It consists of the same *Strata* with the *Mountains*, and is productive of the same kinds of *Minerals*, especially of *Lead*, which hath contributed much to the enriching of the Inhabitants of the *Dale*, as well as of the *Lessees* and *Managers* of the *Veins*.

Aldstone-moor-Dale.

In that part of the *Dale* which lies near the River *Tyne*, for want of the warm Influence of the Sun, which is often skreen'd and clouded by the Fogs and Mists hovering upon the Mountains, grows little of any kind of *Corn*; yet, by the manuring of the *Soil*, it's made to bring forth great plenty of rich and fatning *Grass*; and produceth as great variety of *Herbs, Plants, Flowers*, and other *Vegetables*, as any Place I know of in the *Island*. The occasion of these rich Productions is not only to be attributed to the Manure, but to those warm *Mineral Sills* and *Stones*, which lie under the *Soil*, which feed and nourish 'em with those warm and moist *Stems* and *Vapours* which do arise from them, like as hot *Beds* in *Gardens* force a more timely *Spring* than in open *Countries*.

The West
side of the
Mountains.

The *West* side, or *Skirts* of these *Mountains*, from *Brough under Stainmore*, to the *City of Carlisle*, seems to be *Earth* superinduced upon the *Mountain-Strata* by the general *Flood*.

It generally consists of a light sandy *Soil*, being the *Cover* of a soft, redish, hungry *Free-stone*; which rather sucks to it the *Spirit* and *Moisture* of the *Soil*, than contributes toward the *Fertility* of it; and if it be not fed and nourished with constant *Supplies* of *Manure*, or frequently laid to *Fallow*,
that

that it may, by the Aerial Salt, and the Sun's Concoction, recover its wasted Strength, it would be reduced to that degree of Sterility, as not to answer the Husband-Man's Expectation.

These *Vallies*, indeed, by the side of the River *Eden*, being of a deeper *Soil*, and frequently overflowed by that River, makes them more fertile, than those declining Grounds lying upon the Skirts of the Mountains, whose *Soil*, by great Rains and Floods, washeth down into the *Vallies*.

Besides, those great Rivers that have their Rise from the Tops and Sides of the highest Mountains, there breaks out from the Skirts or lower *Strata* of this *Ridge*, more than thirty lesser *Rivers* and *Rivulets*, which supply the lower Grounds with plenty of Water; and these, from their very Fountain-heads, do flow with such Rapidity, that every particular *Rivulet* affords both Water and Force to serve a Corn-Mill: Every little *Fell-side Town* hath its *Rivulet* running through it, or by it; which the Inhabitants call *Becks* or *Burns*, as *Ousby-Beck*, *Kirkland-Beck*, &c.

Of Rivulets, their Rise.

All the solid *Strata* upon these Mountains have their *Horizontal* Depressions, which the Miners call *Dibbing* and *Rising*, and their Rise is most commonly to the Sun.

The Surface-Productions of this Class, are such as are peculiar to the *Mountains, Heaths, or Dales*; a Catalogue whereof will be annex'd to this Treatise.

C H A P. VIII.

Of the Second Class, bounded by Eden on the East, and Pettoral on the West, with its Mineral Productions.

*The River
Eden.*

TH E River *Eden* hath its Rise from the Mountains of *Stainmore*, its Course is by *Appleby, Templefourby, and Eden-Hall*, where it takes into its Stream the Rivers *Eamont* and *Lowther*, which make a considerable Increase to it; and as it glides by *Langwathby, Great Salkeld, and Kirkoswald*, it takes into it all the *Fell-side Rivulets*; and at *Carlisle*, it takes in both *Pettoral* and *Caldew*, and empties it self into the Sea at *Row-cliff*.

If the City of *Carlisle* would lay out that Money got for an Equivalent for their *Tolls*, it would go near to make the River *Eden* Navigable at *Carlisle*, which undoubtedly would be to the great Advantage of that City, the two Kingdoms now being united.

This

This River breeds great plenty of that Fish we call *Trouts*; and if it were not for these *Bays* and *Damms*, which stop the *Salmon* from coming up to spawn and breed in the Spring-heads of this River, we should have in our Markets greater plenty of this Fish, and at cheaper Prices.

The *South East* part of this Class or Division, in the County of *Westmorland*, consists much of the same *Strata* with *Stainmore*, and produceth valuable Veins of *Lead*.

The Strata of Westmorland.

At *Regal* and *Slegal*, we meet with some small Seams of *Coal*, the main Body of the *Coal* lying upon *Stainmore-Heath*; so that if the *Miners* should sink there for a lower *Coal*, and a thicker Seam, they would run a hazard of losing both Labour and Money.

For as in all *Classes* of *Coal* the Seams gradually increase in thickness 'till they come to their full height and growth, so they gradually decrease 'till they dwindle out into small Seams, and then the Covers change, and the *Coal* goes out.

Note.

The lower part of this *Class* is generally *Lime-stone*, which of all others is the most *prolifick*, and hath the greatest *Feeder* of Water upon it. It feedeth the upper *Soil* with a most fertile *Salt*, and moistens it with the Vapours arising from its Feeder.

Its *Soil* does not only produce the greatest variety of *Herbs*, *Plants*, and other kinds

of fatning *Grass*, but all sorts of *Trees*, especially such as bear Fruit, as *Apples*, *Pears*, and *Stone-Fruit*, delight to grow upon a *Lime-stone* Earth; for by spreading their Roots among the open Joints of the *Lime-stone*, they suck in the *Mineral Spirit*, with that *saline Juice*, which is more agreeable with their Natures than the *Spirits* and *Juices* of any other Earth or *Soil*, unless forced by *Cultivation* and *Manure*.

And hence it is that this County produceth more Fruits of all kinds than *Cumberland*, though of a lower Situation.

For these and the like Advantages of Nature, I cannot but take notice of *Lowther-Hall*, the Seat of the Right Honourable the Lord *Lonsdale*, in the bottom of *Westmorland*, as they call it, as having all the Advantages of a Natural *Situation*.

The Situation of Lowther-Hall.

For it is not only by the *Elevation* of the Ground, freed from those Fogs and waterish Frosts, which in the Spring-Mornings, by the *attractive* Power of the *Water-Cold*, draw down to the Rivers; which either so corrupt the Air, as to breed Flies, and other noisome Insects; or by the Intensity of its *freezing*, kills the *Fruit* in the *Blossom*, but is also so much below, and at such a distance from the Mountains, that all those fierce and rapid *Blasts* of Wind, occasioned by their Declivities, are either spent, or
strike

strike a Level before they reach it. Yet this *Situation* hath so much Advantage from the *Mountain-Winds*, as to brush and fan the *Air*, and preserve it from *Stagnation* and *Corruption*.

It is not only fenced from violent *Winds* by all kinds of *Forest-Trees* of Nature's own Production, but adorned and beautified by such *Foreign Trees* and *Winter-Greens* as are raised by human Art.

It hath by Nature such a gradual Ascent to the House, as makes the *Avenue* to it most noble and magnificent.

Its *Situation* is upon a *Lime-stone* Rock, which does not only secure the Foundation, but so fertilizes the Earth and Soil, as to make it proper for *Gardens*, *Orchards*, *Terras-Walks*, and other most delightful Conveniences.

The *Demefn* and *Parks*, which surround the *Situation*, are of the same fertile *Soil*, producing rich and plentiful Crops of *Grass* and *Corn*.

The Elevation of its *Situation*, gives it a most curious *Landskip* of *Woods*, *Waters*, *Mountains*, *Rocks*, *Towns*, *Churches*, and *Castles*, which entertain the Eye with a delightful Prospect.

Those thick and pleasant *Copses* of *Wood* and *Trees* by the sides of the River *Lowther*, near two Miles in length, do so multiply,

refract, and reflect the *Sun-beams*, that it enjoys as warm, and a more fragrant Air, than the lower *Dales* and *Vallies*; and it hath the convenience of a plentiful *Market* within three Miles of it.

This *Lime-stone Class* dilates and spreads over a great part of *Westmorland*, and is not quite cut out 'till we come to *Eamont-Bridge*, within a Mile of *Penrith*; there the Rivers of *Eamont* and *Lowther* join their Streams, and meeting with a cross *Fissure*, running full East from the Bridge, they follow the windings and turnings of it until they fall into *Eden*, above *Eden-Hall Town*.

Eamont
and Low-
ther Ri-
vers join.

Penrith-
Fell.

And as this cross-running *Fissure* divides this part of *Westmorland* from *Cumberland*, so it divides and changeth the *Strata* into a *Class* of Red *Free-stone*, of a round *grit* and *nitrous* quality, which occasions the Sterility of the Surface.

This *Class*, or *Vein* of Red *Free-stone*, extends from the Division of the Counties in a straight Line, 'till it comes to *Carlisle*, passing through *Penrith Fell*, *Lazonby-Fell*, *Baron-Wood*, and so forward with little change or alteration, unless in hardness and softness.

These *Strata*, or *Beds* of *Stone* and *Quarries*, are so broken by the general *Flood*, that they have no certain *Dibb* and *Rise*, but generally lie in great Confusion.

In all these *Quarries*, wherein Men have digged the deepest for Stone, we cannot observe the least change or alteration, but a continued Rock.

The *Soil* of this *Class* is very *sterile* and *barren*, producing only *Fern*, *Heath*, *Bent*, and a lean hungry *Grass*, unless by the sides of the Rivers, or where the Nature of the *Soil* is changed by *Burning*, *Liming*, and *Manure*; and as this *Class* is *barren* and *sterile* in its Surface, so is it as *sterile* in its *Mineral* Productions, the Nature of the *Strata* being inconsistent and disagreeable with the Nature of *Lead*, *Copper*, *Coal*, or any other *Mineral*, unless *Iron*; and the *Miner* may dig to the *Center*, before he find it, for there is neither any outward or inward appearance of any Sign or Symptom of it, but the *Colour* and *Tinge* of the Stone.

Besides, these *Rocks* and *Quarries* are so broken, that they are drained of all their Natural Feeders: We find not one rapid Stream flowing either from the Tops or Sides of the Hills.

This *Class* is too barren to enlarge more upon it, I shall therefore in Post-haste ride over this sixteen Miles-Stage, and go to another *Class*, which I am in hopes may entertain us with greater Variety.

C H A P. IX.

Of the Third Class, with its Mineral Productions, &c.

THIS *Third Class* in *Westmorland*, hath the River *Lowther* on the *East*, and *Eamont* on the *West*. Its *Figure* is *Triangular*, the lowest *Angle* terminating at *Eamont-Bridge*. It's so *Rocky* and *Mountainous*, that it occasioned a young waggish Scholar in his *Iter Boreale*, to make this gingling Observation of it, *Nubila Westmoorland, Saxosa est misera poor Land*. Tho' this County be *Stony* and *Mountainous*, yet the *Strata* being generally *Lime-stone*, so fatten and enrich the Soil, that it produceth plentiful Crops of fatning Grass, and several kinds of Corn in good Perfection; it also breeds better and larger Cattle, both Sheep and Beasts, than *Cumberland*, its adjoining County; and the Inhabitants, generally speaking, are more Industrious.

*Hartley-
Fell.*

This County wants not its *Mineral Productions*. In the late Sir *Christopher Musgrave's* Time, at *Hartley*, were great quantities of *Lead* got, in a very rich *Pipe-Vein*; and if *Purse* and *Judgment*, *Industry*, and a *Mineral Spirit*, should meet together in one Man, much more might be got in the same *Vein*, and other *Veins* discovered. At

At *Wastall-Head*, where *Motterom Crackenthorp*, Esquire, hath the *Mannor* and *Royalty*, I observed a *Vein* of *Sulphurous Copper*, breaking out at day, which, upon a thorough *Tryal*, might turn to a good *Account*; in this *County* there be several *Veins* of *Lead*, which undoubtedly, if sufficiently wrought, would answer to a good *Account*.

But leaving *Westmorland* for a while, we will endeavour to make Discoveries of such *Mineral Productions* as *Cumberland* affords in this *Third Class*; which is divided and bounded by the *River Pettoral* on the *East*, and *Caldew* on the *West*: We have a *Vein* of *Lime-stone*, which, from the *Boundaries* of *Westmorland*, passeth in a straight *Line* thro' the *Villages* of *Stainton*, *Allenby*, and *Lammonby*, 'till it comes to *Sourby-Pasture*, where a *Class* of *Coal* begins gradually to come in.

The middle Class
in Cum-
berland.

At its first *Discovery*, it is but eight or nine *Inches* thick, but the *Roof* and *Covers* being strong, it is a workable *Coal*; and if a *Level*, which would not cost above *Two hundred Pounds*, were brought up to drain it, it might be a lasting *Colliery*, having a very large *Spread* of *Ground*, and be very convenient and beneficial for *Penrith*, which hath want of nothing but *Fuel*.

This small *Seam*, with its *Lime-stone* and gray *Free-stone* *Covers*, crosseth *Caldew* in a straight *Line*; and entring into *Mr. Denton's*

The growth
and in-
crease of
Coal.

Demefn, there come on new and stronger Covers, and the *Coal* is increased to the thickness of fourteen *Inches*, and is workable; from thence it continues its Spread into *Warnhall-Fell*, where it is increased to half a Yard, and is a very antient *Colliery*, which hath served the neighbouring *Towns* for some Ages, and may continue for several more, the *Coal* spreading over all that *Heath*: It hath a very strong *Roof* of *Black Plate*, part of which is taken down in working.

The *Royalty* of this *Colliery* was formerly in the Possession of the *Crown*; but now, with all the *Forest* of *Englewood*, is in the Possession of the *Lord Portland*.

This *Vein* of *Coal* keeps its Course into the *Mannor* of *Westward*, where the *Covers* of the *Coal* improve in pinguidity, and the *Seam* in thickness, being now a Yard thick; here likewise comes in a small *Seam* of *Ken- nel-Coal*. The *Lord* of this *Mannor* is the *Duke* of *Somerset*.

From *Westward* this *Vein* or *Class* of *Coal* spreads along in a straight *Road*, till it come into the *Mannor* of *Bolton*; where the *Coal* is increased to seven *Quarters*, or two *Yards*, in thickness, and the *Kennel-Seam* to a *Yard*, the *Craw-Coal* to three *Quarters*. Here the *Class* of *Coal* is come to its full *Growth* and *Perfection*; and continues its spread over a great part of that *Level* part of the *County*,

to the *Scotch* Sea. The Royalty of this Mannor is likewise in the Possession of his Grace the Duke of *Somerset*.

C H A P. X.

Of the Fourth Class, or the Western Mountains, their Mineral Productions, with an Account of the several Lakes and Ponds, and the River Darwent, with the kinds they breed, &c.

THE *Western* Mountains have their Rise also from *Stainmore*, and gradually ascend to *Skidday*, or *Skyday*, so call'd from the height of it. It is the highest Summit of all these *Mountains*, and of the same Degree of *Altitude* with its opposite Mountain, *Cross-Fell*, and *Scruffle*, in the Borders of *Scotland*; and this appears not only by our *Levelling-Instruments*, but by the falling of the *Atmosphere*, which occasions that common Observation, *When Sky-day has a Cap, (viz. of Snow) Scruffle wots full well of that.*

These *Western* Mountains differ from those on the *East*, both in *Nature* and *Position*. The *East* Mountains consist of several *Strata*, having an easy *Horizontal* Depression.

The

The more particular *Strata* on which these high Mountains are built, are the *Hazel Grit*, which is a *Mineral Free-stone*, *Iron-stone*, and a *blackish Stone*, which is peculiar to these Mountains. All these have their Covers of black *Plate* or *Chivers*.

The Position of these *Mountains*, as we have observed, is in an extended *Ridge*: The *Western Mountains* are of a quite different Nature, consisting of a *Blue Crag*, or continued *Rock*, without any *Horizontal* flat Beds. I have my self been in a *Copper Vein* twenty Fathom deep, and could not observe in the sides of the *Vein* one flat *Bed*, or Change; and I am of Opinion, that it would have continued the same from the Surface to the Center.

The Position of these *Mountains* are in confused and irregular Clusters, some meeting in Angles, others bellying out in the middle, and inclining to meet at both ends. This occasions those *Dales* we have among them, as *Patterdale*, *Matterdale*, *Langdale*, and *Borrowdale*, &c.

This causeth also those large and deep *Lakes* and *Ponds* of Water, we have among these Mountains, which having small *Rivulets* running through them, preserve the Water in those deep *Cisterns* from Corruption, and feed and nourish those several kinds of *Fish* bred in them.

The

The most remarkable of which is *Ulls-*^{*Ulls-water.*}
water, being about three Miles in length,
 the River *Eamont* in a small Stream running
 through it. This Lake is near a Mile in
 breadth. The *Fish* bred in it are *Trouts*,
 which are esteemed the best and largest in
England. The *Flesh* upon them is as Red
 and Crisp as that of *Salmon*. I have seen
 some of those they call over-grown *Trouts*,
 near two Foot in length.

The second remarkable *Lake* is called *Kes-*^{*Keswick-*}
wick-water, some Miles in length, and in^{*water.*}
 some places near half a Mile in breadth:
 In this large *Expansion* of Water, there are
 several little *Islands*; upon one of which,
 which is called the Lord's *Island*, there was a
 large and convenient *House*, with *Gardens*,
Orchards, and other Conveniencies: It was
 formerly (in the Times of the *Scots* Inva-
 sions) the Habitation of the *antient* Family
 of the *Ratcliffs*, now the Lords of *Darwent-*
water, who have in Possession the *Mannor*
 and *Lordship* of *Keswick*. The *Fish* bred in
 this Water are *Pikes*, which feeding upon
 the other kinds of *Fish*, destroy their In-
 crease. The River running through it is
Darwent.

The third remarkable *Lake* is called *Bas-*^{*Bassen-*}
senthwait-water, some Miles in length, and^{*thwait-wa-*}
 in some places near half a Mile in breadth.^{*ter.*}
 The *Fish* bred in this Water, are *Basts*, a
 bony

bony fort of *Fish*, yet when baked in Pots, the Bones all dissolve. The River running through it is *Darwent*.

There come every Year a Number of *Swans* to winter upon this Water, and in the *Spring*, they breed upon the little *Islands* in the Water, or in the *Sedge*, growing by the sides of it; and as soon as the young Brood gets wing, the old ones carry them into the *Southern Rivers*.

Buttermor-
water.

The fourth remarkable *Lake* is *Buttermorwater*, wherein is bred a sort of *Fish* called *Charrs*, much like the *Ulls water Trout*; the *Male* is grey, the *Female* yellow bellied; the *Flesh* upon them is *Red*, and *Crisp* to the Taste. They are more luscious and delicious than the *Trout*. They are in this Country baked in Pots, well seasoned with Spices, and sent up to *London* as a great *Rarity*. In some places this Water is so deep, that the Bottom cannot be found, either by *Diving* or *Plumming*. The Water running through it is so inconsiderable, that it hath neither got the Name of *River* nor *Rivulet*. These *Charrs* are a *Fish* bred in this Water, and are peculiar to it and *Windermere-water*.

These *Mountains* have their Names and Distinctions from the next adjacent Town, or from the Mannor and Lordship they belong to, as *Matterdale*, *Patterdale*, *Ridall*, *Cunningston*, *Langdale*, *Borrowdale*, *Newland*,
Keswick,

Keswick, and *Threlkeld Fells* or *Mountains*.

The *Mineral* Productions of all these *Mountains* are *Lead*, *Copper*, and *Iron*; there is no Prospect of *Coal*, either upon these *Mountains*, or their *Heaths*; for where there are no flat and pinguid *Strata*, there can be expected no *Coal*, as hereafter, in its proper place, will be more particularly observ'd. *Langdale* and *Cunningston* *Mountains* do abound most with *Iron Veins*; which supplies with *Ore*, and keeps constantly going, a *Furnace* at *Langdale*; where great plenty of good and malleable *Iron* is made, not much inferior to that of *Dantzick*.

In the beginning of *Queen Elizabeth's* *Reign*, there was erected a *Copper-Work* near the *Town* of *Keswick*, the most famous at that time in *England*, and perhaps in *Europe*. The *Operators*, *Managers*, and *Miners*, were most of them *Germans*. The chief *Steward* of the *Work*, was one *Hecksteter*, who, by his *Books* of *Accounts*, which are most regular and exact, and all in large *Imperial Paper*, as well as by other *Writings* I found under his *Hand*, appears to have been a *Man* of great *Learning*, as well as *Judgment* in *Metals* and *Minerals*.

The *Copper Ore* which kept these large *Furnaces* at constant work, was, for the most part, got in the *Veins* upon *Newland* *Mountains*,

Note.

The great
Copper-
Work at
Keswick.

Mountains, the Royalty whereof did then belong to the Earl of *Northumberland*, and is now in the Possession of his Grace the Duke of *Somerset*, who having married the most Vertuous and Noble Lady *Elizabeth*, Daughter and Heires to the Earl of *Northumberland*, intituled himself to the *Peircy's* Estate.

I find that some small quantities of *Ore* were got upon *Caldbeck* and *Cunningston* Mountains, and brought to the great Work at *Keswick*, being a place most convenient, both for *Water* and *Coal*, which they had from *Bolton Colliery*; the Royalty whereof belonged to the Earls of *Northumberland*, and is now in the Possession of the Duke of *Somerset*.

Newland
Veins.

In our Survey of the Mountains of *Newland*, we found eleven *Veins* opened and wrought by the *Germans*; all distinguished by Names given them, as *Gowd-Scalp*, now *Gold-Scalp*, *Long-Work*, *St. Thomas's Work*, &c. of all which *Veins*, the richest was that they called *Gowd-Scalp*. We found the *Vein* wrought three Yards wide, and twenty Fathom deep above the grand *Level*, which is driven in a hard *Rock* a hundred Fathom, and only with *Pick-Axe*, *Hammer*, and *Wedge*, the Art of *Blasting* with *Gun-Powder* being not then discovered. For securing of this *Rich Vein*, no Cost of the best *Oak-wood*

Gold-
Scalp Vein.

was

was spared; and for the recovering of the *soles* under *Level*, was placed a *Water-Gin*, and Water was brought to it in Troughs of Wood upon the tops and sides of high Mountains, near half a Mile from the *Vein*.

The *Ore* at the top of the *Vein*, which appeared by day-light, was *sulphurous*; but in sinking deeper, the *Vein* got more Moisture, and the *Ore* improved in Goodness.

The *Ore* got by the *Gin* under *Level* was so rich in *Silver*, that Queen *Elizabeth* sued for it, and recovered it from the Earl *Peircy* for a Royal *Vein*.

Most, of the most Judicious *Miners* and *Chymists* in *England*, were concerned in the Tryal, either as of the *Jury*, or *Evidence*. The Verdict was given for the Queen; and as the *German-Books* give Account, a hundred Tun of *Ore* was entered upon by the Queen's Agents. This rich *Vein*, and several more in the Mountains of *Newlands*, are now laid open and recovered by his Grace the Duke of *Somerset*; and likewise *Smelt-Houses*, *Furnaces*, and all other Conveniences are made ready by his Grace for setting forward a great Work.

It may be presumed that the discouragement his Grace met with, which at present hath put a stop to so noble a Project, was his meeting with an Ignorant *Operator*, who under-

understanding not the Nature of the *Ore*, burnt and destroy'd fifty Tun of the best *Gold-Scalp Ore*, without the Production of one Pound of fine *Copper*.

C H A P. XI.

Of the Art of Calcining and Refining such sulphurous Copper Ores, as are got in the Mountains about Keswick and Newlands; so that the Sulphur does not burn and destroy the Metal.

ALL Copper *Ore* that is shining is *sulphurous*; it's the *Sulphur* that gives the shining *Complexion*.

Tho' the *Ore* that's *Blue, Green, or Brown*, yields much *Copper*, and requires less *Art* and *Labour* in the *Operation*; yet, the *Yellow* shining *Ore* produceth a finer and more silvery *Copper*; which will appear in the *Produce*, if, in its *Operations*, it be artificially managed to the best *Advantage*; for by giving of *sulphurous Ore* too quick a *Fire*, either in *calcining*, or in *melting* of it down into a *Regulus*, the *Metal* presently exhales and flies out with the *Sulphur*, and nothing is left but a burnt *Slag*.

The Method we use then in our Operations of shining *Ore*, is first *calcining* of it, when broken by the *Stampers*, into small pieces of the bigness of *Cockles*. The *calcining* Fire must be low, and the *Ore* must continue in it 'till the blue Flame be quite spent and gone off. When the *Ore* is taken out of the *Furnace* and cooled in cold Water, we put it the second time under the *Stampers*, and break it as small as *Hazel Nuts*; and then put it into the great *Furnace*, where we let it lie sweating in a soft and slow Fire the space of twenty four hours, until the taste and smell of *Sulphur* be quite gone off: Then we raise the Fire, and as soon as the *Ore* is throughly flow'd, we presently Tap the *Furnace*, and give the *sulphurous Slag* no time to feed upon the *Metal*, or mix with it in the *Furnace*. As soon as the *Metal* and the *Slag* are *coagulated* and *hardened* in the *Sand* we Tap it into, we cool it again in cold Water, and the *Regulus* is easily separated from the *Slag*. This is the second Operation.

After this, we put the *Regulus* under the *Stampers*, and beat it as small as Meal, and put it again into the great *Furnace*; and when it's well flow'd, we cool the Fire a little, and skum the *Regulus*; and if it appear in the *Furnace* of a *greenish* Colour, this we call course *Copper*, which is not

as yet *Malleable*. This is the third *Operation*.

After this we put the course *Copper* into the refining *Furnace*, and when it is well melted down, we let it continue *Purging* and *Refining* it self from the *Dross*, until, upon *Tryal*, we find that it has got its natural *Colour*; then we *Tap* it, and if it be not *Malleable* we put it into cold *Water*; for as cold *Water* hardens hot *Iron*, so cold *Water* softens hard *Copper*. This is the fourth, and commonly the last *Operation* that is required for bringing *sulphurous Ore* into fine *Copper*.

Note.

Note.

Note, That this kind of shining *Ore* requires no *Flux* to make it flow; and to *Flux* it with powdered *Pit-Coal*, (as I have seen done by *Ignorant Operators*) is to add *Sulphur* to *Sulphur*, which quickly burns up and destroys the *Metal*. This Method was practis'd by that *Eminent Operator* in *Copper*, *Mr. Middleton Shaw*, in his *Tryals* made of his *Grace the Duke of Somerset's Ores* got in *Gold-Scalp Vein*, the *Long-Work Vein*, and other *Veins* in *Newlands Mountains*.

C H A P.

C H A P. XII.

Of the Generation, Growth, and Transmutation of Metals, &c.

TH E R E is no *Phænomenon* in Nature that hath more exercised the Heads of the Learned, and about which their Opinions are more different, than the *Generation, Growth, and Transmutation of Metals*, and this affords us no great Matter of Wonder; since the *Author of Nature* seems to have created them in that *Obscurity and Depth*, and to have immured them in hard *Rocks*, on purpose to hide their Causes, and to give a *Check* to the Ambition of Man.

The Philosophers, who pretend to search into the Causes of Things, besides the first *Matter*, which is the first *Principle*, (not only of *Metals*, but of all other Bodies in the World) have assigned another *Matter*, but remote also; and this is a certain moist, unctuous *Exhalation*, together with a Proportion of thick and tough *Earth*, from which (being mingled together) results a *Matter*, whereof not only *Metals*, but also *Stones*, are made; for if the *Dryness* prevails, *Stones* are made; but if the unctuous Humidity be predominant, then *Metals* are ge-

nerated. Of this Opinion was *Plato*, *Aristotle*, and their Followers.

From the abundance of this pure and shining Moisture made Solid, proceeds the lustre of *Metals*; in whom, of all the *Elements*, Water is known to be most predominant; and for this Reason it is that they flow, and are dissolved by *Fire*.

From the various Temperament and Purity of the aforesaid *Matter*, come the divers kinds of *Metal*, the most pure and perfect of all which is *GOLD*, being, as it were, *Nature's* principal Intention.

Many, to avoid difficult Disputes of this Nature, are of that vulgar Opinion, that at the *Creation* of the *World*, God Almighty made all the *Veins* of *Metal* in the same Condition as we now find them. This *Hypothesis* seems to give an affront to *Nature*, in denying her a productive Virtue in this, which is allowed her in all *sublunary* Things. Besides, Experience hath manifested the contrary, for a clear and evident Example of which we have in *Ilva*, an Island adjoining to *Tuscany*, a place full of Iron *Mines*; in which, when the *Miners* have digged as deep as they well can, they suffer the *circumjacent Earth* to fall in, and fill up the Works, and in the space of fifteen or twenty Years, this *metallick Earth* will, by the virtue of the
mine-

mineral Spirit, be transmuted into *Iron*, and the *Miners* will work it over again.

Yet notwithstanding that this Objection from Experience seems to destroy this vulgar *Hypothesis*, it's more probable and agreeable with Reason than that new *Hypothesis* so stiffly maintained by some of our learned *Virtuosi*, who assert, that in the *Antidiluvian Earth* there were no *metallick Veins* of *Ore*, but what were in small *Corpuscles*, intermix'd with the *solid Strata*; which, as it is inconsistent with the Account which *Moses* gives of *Tubal Cain*, who was the first, we read of, who wrought both in *Brass* and *Iron*, and that long before *Noah's Flood*; so it cannot be imagined that the Flood should change the whole Frame and Figure of the Earth; as if God, not liking the first moulding of this Earth, would mould it over again.

The *Chymists*, who make it their Business to *Anatomize* the Mixtures of compounded Bodies, and to reduce them to their first Principles, do affirm, That all *Metals* are generated of *Sulphur* and *Quicksilver*, and that from the different Proportion of their Mixtures, and greater or lesser Purification, results the difference that is found in *Metals*.

I am the more confirmed in this Opinion, because in all the *metallick Veins* we open,

we find more or less of *Sulphur*; and tho' *Quicksilver* be not discernable in the *Ore*, yet the Effects of it are found by those that labour in the *Veins*, and especially in the *Fumes* where the *Ore* is melted; besides, there is no Metal, but more or less of *Quicksilver* may be extracted out of it.

There are some also who pretend to understand so much of the Nature, and Operations of the *Planets*, that they can Calculate Nativities, Prognosticate the Events of *War*, and guess at the Cabinet Councils of Princes; would have the *Sun*, *Moon*, and the rest of the *Planets*, by their Cœlestial Heat and Moisture, to join in the Generation of Metals; whereas, common Experience tells us that the warm Influence of the *Sun*, which is the *Primum Calidum* among the *Planets*, never penetrates farther than ten Foot into the Earth, and that the greatest Rains seldom moisten the Earth deeper than the Surface-Soil.

Again, Experience further assures us, that the deeper we sink down into the Bowels of the Earth, the *subterraneous* Heat and Moisture increaseth; and we find all *Minerals* and *metallick Ores* in higher degrees of Perfection.

But it's generally agreed upon by all *Philosophers*, *Chymists*, and *Astrologers*, that in all Generations, there must be two Principles,

ples, (*viz.*) one of Activity, which we call the formal and efficient Cause; the other of Passivity, which is the material Cause.

The efficient Principle must then be a mineral Virtue or Spirit, which pervades the whole Body of the Earth; and where-ever this mineral Spirit meets with Matter modified and prepared for its Reception, it unites and mingles with it, and falls a working: It serves its self with *Heat* and *Cold*, as its Instruments, which are not *Elementary* Quantities, as *Philosophers* conceit, but real *Entities*, and the two Hands of Nature, by which all its Operations, as well in the Bowels of the Earth, as in the *Atmospherical* Regions, are effected, as we have observed in our Preliminary Chapter of *Heat* and *Cold*. The Office which the *subterraneous Heat* performs in all Generations, as well as Metals, is to mingle uniformly the earthy and humid Parts together; and then to boil, digest, and thicken that Matter; and the Cold coagulates and hardens it so, that it puts on the form of this or that *metallick Ore*; and is more or less perfect, according to the present Modification of that Matter, when the *mineral Spirit* began to actuate and inform it. Hereupon is grounded the Opinion of several *Philosophers*, who affirm, that there is only one kind of perfect Metal, which is **GOLD**, and that all the others

we call so, are only Principles and Gradations to it; and therefore they conceive it possible by Art, to reduce them to Perfection: And this *Hypothesis* hath occasioned so much Labour and Study to find out the *Philosopher's Stone*, which will *transmute* all the *imperfect Metals* into the Perfection of GOLD.

They who oppose the possibility of such Transmutations, place the force of their Arguments in proving, That the several Species of Metals, as *Copper*, *Lead*, and *Iron*, are perfect in themselves, and distinct one from another.

But their Reason convinceth not; and if it were granted, the Inference would not follow, for we see like *Transmutations*, and far more difficult, performed both by Art and Nature.

By Art, *Wasps* and *Beetles* are made of the Dung of Animals, and several kinds of *Insects*; and it is notoriously known, that in *Scotland*, of pieces of Ships, and Fruit that falls into the Sea, are generated *Living Ducks*; besides, there are petrefying Waters that will *transmute* Moss or any porous Matter that will suck in the Water, into solid and perfect Stone, as we have already observed.

And in Metals, it's evident that by the *Spirit of Vitriol*, (as we have said) *Lead* and *Iron* may be turned into fine *Copper*; and in the

Nourish

Nourishment of all living Creatures, there is a continual *Transmutation*. And notwithstanding that the same Definition agrees not with *Copper*, *Lead*, and *Iron*, as well as with *Gold*, we cannot thence conclude, that they differ specifically, because some may be perfect as *Gold*, and the other imperfect, as all the other within the same Species of *Metal*; so a Man and Child hath the same essential Definition, but a Child is not a Man 'till grown up to the Age and Perfection of a Man. Besides, we meet with in the Veins of the Earth, several *Semi-minerals*, which, like *Abortions*, are sometimes, by the Covetousness of Mankind, torn from the Bowels of the Earth before they come to their full Time of Maturity.

Sometimes also we meet with *Semi-minerals* in rich *Veins*, wherein the *Ore* seems to be at its full Growth and Perfection; and to me they appear as if they were the *excrementitious Superfluities* of Generation.

Having now given you the Opinions of others concerning the *Generation*, *Growth*, and *Transmutation* of *Metals*, I shall proceed to the next Chapter, which will entertain you with the Nature of *Mundicks*.

C H A P. XIII.

Of Mundick Metals, but more especially of Black-Lead, or Wadd; its Nature and Uses, &c.

IN the Mountains of *Newlands*, we meet with several *Veins* of *Mundick Metal*, which consists of *Tin* and *Copper*, so mix'd and incorporated, that their different Species cannot be discerned in the *Ore*, which is of a grey and shining Complexion.

This *Ore* having much *Sulphur* in its Composition, flows easily, and yields near half *Regulus* white, and promising; but the different *Metals* can neither be separated, nor reduced to a malleable Temper.

This seems to be a natural *Bell-Metal*, which is a mixture of *Tin* and *Copper*; and if this *Mundick Metal* were artificially *Refin'd* and *Temper'd*, it might in all probability be made as useful, and of equal Value with the artificial Mixture.

In these *Mountains* we have several other *Mundick Veins* of *Copper* and *Iron*, of *Lead* and *Antimony*, mingled in the same *Ore*, but can neither be (by any Art we have) either separated or made malleable.

Wadd
and Black-
Lead.

The most remarkable *Mundick Vein* upon these *Mountains*, is that we call *Wadd*, or *Black-Lead*. This

This *Vein* was found upon *Borrowdale* Mountains, near *Keswick*, and there is not any other of the same kind in *England*, nor perhaps in *Europe*, at least that I ever heard of.

Its Composition is a black, pinguid, and shining Earth, impregnated with *Lead* and *Antimony*. This *Ore* is of more Value than either *Copper*, *Lead*, or *Iron*.

Its natural Uses are both *Medicinal* and *Its Uses.* *Mechanical*. It's a present *Remedy* for the *Cholick*; it easeth the Pain of *Gravel*, *Stone*, and *Strangury*; and for these and the like Uses, it's much bought up by *Apothecaries* and *Physicians*, who understand more of its *medicinal* Uses, than I am able to give Account of.

The manner of the Country Peoples using it, is thus; First, they beat it small into *Meal*, and then take as much of it in white Wine, or Ale, as will lie upon a *Sixpence*, or more, if the *Distemper* require it.

It operates by *Urine*, *Sweat*, and *Vomiting*. This Account I had from those who had frequently used it in these *Distempers* with good Success; besides, those Uses that are *Medicinal*, it hath many other Uses, which increase the Value of it.

At the first discovering of it, the Neighbourhood made no other use of it, but for marking their *Sheep*; but it's now made use of

of to glazen and harden *Crucibles*, and other Vessels made of *Earth* or *Clay*, that are to endure the hottest *Fire*; and to that end it's wonderfully effectual, which much inhaun- ceth the Price of such Vessels.

By rubbing it upon *Iron-Arms*, as *Guns*, *Pistols*, and the like, and tinging of them with its Colour, it preserves them from rust- ing.

It's made use of by Dyers of *Cloath*, making their *Blues* to stand unalterable; for these and other Uses, it's bought up at great Prices by the *Hollanders*, and others.

The *Lords* of this *Vein*, are the Lord *Banks*, and one Mr. *Hudson*. This *Vein* is but open- ed once in seven Years, but then such quan- tities of it are got, that are sufficient to serve the Country.

This *Mundick Ore* having little of *Sulphur* in its Composition, will not flow without a violent Heat. It produceth a white *Regulus*, shining like *Silver*. It cannot be made *malle- able*.

C H A P.

C H A P. XIV.

How to discover Mines of Coal, Veins of Copper, Lead, Iron, &c. by their upper Covers and adjoining Strata, as we discover Nuts, and other Fruits by their Husks, Shells, Leaves, and outer Coats.

AL L Mines of Coal, Lead, Iron, Copper, &c. have their natural Position in the *Earth*, either upon Flats, or in *Veins*.

Coal always lies in flat Seams, having an *Horizontal* Depression, which the *Miners* term *Dib* and *Rise*.

And thus Providence hath been pleased to order it, that all the *Mines*, and those solid *Strata*, which are their natural *Covers*, should (for the Ease and Benefit of Man) have a natural *Rise* to the *Surface* of the *Earth*, that, by their breaking out upon the Precipices of *Mountains* and *Hills*, or by the sides of *Rivers*, the *Miners* might be encouraged to make their Tryals with great Advantage; whereas, if the *Mines* and *Strata* of the *Earth* had laid upon a flat *Level*, there would have been no breaking out, or outward Discoveries, either of *Coal*, *Mine*, or *Mineral*, but the *Miners* would have been forced to make their Tryals by *Guess*, or at *Hazard*.

All

All Seams of *Coal* have their proper and peculiar *Classes* of *Strata* or *Covers*, belonging to them; and if any unskilful *Miner* should make *Tryals* for *Coal*, without the Limits and Bounds of this *Class*, he would undoubtedly lose both his Labour and Money.

Seams of *Coal* lie seldom upon the Tops of high *Mountains*, but upon the *Mountain* Heaths, where the *Declivities* and *Inequalities* of the Surface give advantage to drive *Levels* for draining their *Feeders*: Thus Nature hath ordered all Things for the Benefit of Man, and to encourage his Industry.

The usual *Covers* of *Coal*, lying upon the *Skirts* of *Mountains*, are *Beds* or *Layers* of black *Chivers*, yellowish *Free-stones*, *Lime-stones*; and next to the *Coal*, there commonly lies a grey *Free-stone*, spangled with *Sulphur*, which changeth into a *bituminous Plate*, which is the Roof and Support of the *Collieries*.

Seams of *Coal* commonly lie upon the *Seaside* of the *Mountains*, as in *Northumberland*, and the adjacent Counties; the *God* of *Nature* having not only provided *Fuel* sufficient for those and the *Inland* Counties, but convenience for the Exporting the *Overplus* to supply the Wants of other Countries.

And it is worth our *Observation*, that in the coldest *Climates*, *God* hath provided for
the

the *People* inhabiting there, the greatest plenty of *Fuel*, either of *Wood*, *Peat*, or *Coal*.

Thus every *Country* hath something in Perfection, which other *Countries* want; and this the *Divine* Wisdom hath ordered for the Encouragement of *Trade*, and that there might be a Communication of one *Nation* with another, round the whole *Globe* of the *Earth*.

In some of the *Inland* parts of the *Country*, the *Coal-Covers* differ from those on the *Mountain* Heaths, being of a whitish soapy kind of *Earth*, which the *Miners* call *Coal-Metal*; and where-ever we meet with this in our *Sinking*, we never miss of *Coal*; under this white *Metal*, comes in a *beddy Free-stone*, which is always of a grey Colour, and changeth to a *black bituminous Slate*, which is the *Cover* of the *Coal*. These are the *Coal Covers* upon *Bolton-Pasture* in *Cumberland*; for *Lead*, *Copper*, *Iron*, &c. have their Generation in the *Veins* of the *Earth*, which run through the great Bodies of *Mountains*, and are the principal Receptacles of its *Heat* and *Humidity*.

These larger *Fissures* of the *Earth*, and especially of the *Mountains*, run down either perpendicularly or sloping (which is more usual) from the *Horizon*.

Those *Veins*, or *Fissures*, which run parallel between the *flat Sills*, without any considerable

considerable *Depression*, we call *Flats*, and the *Ore* contained in them *Float-Ore*.

When the *Vein* opens wide in some place, and again closeth, or as the *Miners* speak, *Twitcheth at both Ends*, this is called a *Belly of Ore*, or *Pipe-Ore*, and is no natural *Vein*.

The *Miners* are very curious to know which way the *Vein* runs upon a *Vertical Plain*, as being certain Signs of the greater or lesser Riches.

Those *Veins* that run *East* and *West*, are by all esteemed the richest; and I am the rather confirmed in this Opinion, by observing that all those rich *Veins* of *Lead*, especially in the *Northern* part of *England*, run *East* and *West*, or incline to those Points.

Some, who pretend to understand the *Natures* and *Differences* of *Metal*, would have *Lead* and *Iron* to be of the same Nature with *Copper*, and that they only differ in the degrees of *Siccity* and *Humidity* in their Composition: And by this Affinity of Nature, it is, by the *Spirit*, or *Oil* of *Vitriol*, that both *Lead* and *Iron* may be transmuted into fine *Copper*; and to confirm this *Hypothesis*, we observe that the adjoining *Sills*, or *Strata* of *Copper*, *Lead*, and *Iron*, are much of the same kind of *Grit*.

Having given Account of the several kinds of *Veins*, their natural and accidental Positions

tions in the Earth, I proceed to shew the *manner* how these *Veins* may be discovered.

And that is either by Art or Fortune; 1.
sometimes violent Currents of Water wash off the *outer Coat* of the Earth, and leave the *Vein* naked, and open to the Eye.

Sometimes *Veins* are discovered by great 2.
pieces of Rocks or Cliffs falling down from the Tops and Sides of high *Mountains*, having something of *Metal* in them.

Sometimes rich *Mines* of *Coal*, and other 3.
Minerals, have been discovered by the Plough.

Lucretius was of Opinion, That those *Vul-* 4.
cano's, or burning Mountains of *Ætna*, *Ve-*
svivius, and the like, did first discover to the World, the Nature of *Metals*, by melting them, and making them run out of the *Rocks* and *Veins* wherein they lay conceal'd, into the Form they are now known in: But much less Discoveries than these, have been sufficient, when Fortune has had a mind to distribute Riches to her Favorites.

Besides, those *Veins* that are discovered by Chance, or good Fortune; there are other Discoveries made by Human Art and Industry.

The *colour* of the *superficial Earth* is no 1.
small Indication, whether or no there be *Me-*
tals in the Bowels of it, as hath been said in the third Chapter.

2. Sometimes when *metallick* Stones are found at the bottom of the *Mountains*, the Industrious *Miner* traceth them up to the place from whence they were broken off, and there begins to dig, or cross-cut for the *Vein*.
3. The breaking out of Springs of Water, is a good sign that the *Vein* is near, especially when the Water discoloureth the *Earth* and *Stones* with a *yellowish* or *cankered* Colour.
4. When *Trees*, *Shrubs*, or *Plants* grow in rows, as if they had been set by a *Line*, oftentimes it proves that a *Vein* of *Metal* runs underneath them.

The Plants that grow over the *Veins* of *Metal*, are neither of so large a Growth, nor of so lively a Colour, as others of the same kind, because the Exhalations arising from the *Veins* blast them, and hinder their Perfection.

This I have frequently observed upon *Newland* Mountains; and for this Reason it is, that neither *Dews* nor *Snow* will lie long upon a *metallick* Class of Earth; by these *Symptoms* and *Indications*, the Ingenious *Miner* hath Encouragement to make his Tryals.

Having now shewn the natural Position of *Veins*, which are the *warm* and *humid* *Matrixes*, wherein all *metallick* Ores have their Generation and Growth, I shall proceed to make an Inquiry, whether, in these two Counties of *Cumberland* and *Westmorland*, any
precious

precious, or *Stones* of an *extraordinary* Value may be found, which the following Chapter will give Account of.

C H A P. XV.

Whether there be Precious Stones, or Stones of a considerable Value, to be found in these two Counties.

I Have already laid it down as a probable *Hypothesis*, That all *precious Stones* are either the *External Gums* and *Exudations* of *Stones* of a *metallick* Nature, or the *Internal Kernels* of such; as the *Magnet* in *Iron Veins*, or the common *Cat-heads* in *Coal*, or *Lime-stone Metals*, or *Chivers*.

And therefore the most *precious* and *valuable Stones*, are found in *Veins* of *Gold*, *Silver*, or *Lead*; and these *Stones* bear a Value proportionable to the Value of those *metallick Veins*, wherein they are found: And tho' we cannot flatter our selves with the Hopes of finding, or making any Discoveries of *Veins*, either of *Gold* or *Silver*, in these two Counties; yet we have rich *Veins* of *Silvery Lead*, in which we frequently meet with *Stones* richly Imbossed with Clusters of *Diamonds*, as bright and sparkling as any we have from *Bristol*; and if we had the

Art of using them, would be of the same Value.

We have also in our rich *Lead Veins*, great Variety of *Spar*; some white, and as transparent as fine *Chrystal*.

I had some by me, through which I could have read the smallest Characters, tho' an Inch thick.

We have others, *Green, Blue, Red*, and of a *Violet Colour*, which if they could be so softened and mollified, as to be cut into Figures, might be of Use and Value.

We have likewise in the Rivers *Irt* and *End*, within the Mannor of *Egremont*, *Pearls* got in those large *shell-Fish* we call *Horse-Mussels*, which gaping and eagerly sucking in their dewy Streams, conceive and bring forth great Plenty of them, which the Neighbourhood gather up at low Water, and sell at small *Prices*.

These Rivers were Rented by a Neighbouring *Gentleman*, of his Grace the Duke of *Somerset*, who is now the Lord and *Proprietor* of that antient and large Mannor; but the *Gentleman* dying, his Project sunk.

The Mineral Productions of this Mannor are *Iron*, with some small Seams of *Coal*, which seem to be of an agreeable Nature; for in our sinking for *Coal*, we frequently meet with *Strata* of *Iron* in its upper Covers.

In a place call'd *Langhorn*, within that Mannor, is a *Belly*, or *Pipe* of *Iron Ore*, eight Yards deep, in breadth eighty Yards, and in length a hundred; out of which, several thousand Tun were yearly got for many Years last past; the *Ore* was very rich, consisting of *Button-Ore*, and a *pinguid shining Ore*. It answered to his Grace the Duke of *Somerset*, a yearly Rent of several hundred Pounds: The present *Lessees* are the Judicious *Thomas Addison*, Esquire, and Madam *Ann Hebar*.

Being at *Egremont*, his Grace the Duke of *Somerset* having, of his Goodness, given my Son the Rectory of that Church, I had the Curiosity to go to see that rich *Vein*, and the Stock of *Ore* upon the Bank, which was like a little Mountain. In that great variety of *Ore*, I did not only meet with *Spar*, as Transparent as the clearest *Chrystal*, but *Stones* Imboss'd with *Bastard Diamonds*, near as sparkling as the *Real*.

I also found several of the *Hæmatites*, or *Blood-Stones*, some of which I carried up to *London*, and were well approved of, as not inferior to the best.

And undoubtedly in that rich *Mine* there were several *Magnets* ingendered; but these *Stones* (which, for their extraordinary Virtues and Usefulness to Man) may deservedly be reckoned amongst the *precious Stones*,

but being *Opake*, and without *Luster* or *Shining*, cannot be easily discovered or distinguished by the Injudicious Miners.

These *Magnets* (with Submission to better Judgment) are only the *Pneumatick Kernels*, or *Spirituos Glands* of a rich *Vein* of *Iron*, like those *Cat-heads* we meet with in *Coal-Covers*, or *Lime-stone Chivers*, or *Flints* in *Beds* of *Chalk*, to which the *Spirits* of the *Mine* concenter; and these *Magnets* being removed from their *Native Beds*, emit their *Spirituos Effluvia's*, and attract and draw to their *Center*, such light *Bodies* of *Iron*, as come within the *Sphere* of their *Activity*, *Iron* being their most natural and agreeable *Pabulum*.

And this *Magnetick* attractive Power, is not peculiar to the *Magnet*, but the *Root* of every *Tree* and *Vegetable*, by its *plastick Spirit*, attracts such *Juices*, as are most agreeable to their *Natures*; and by concocting and digesting of them into their own *Substance*, they grow up and encrease 'till they come to their full *Growth* and *Perfection*.

As for the *Position* of the *Magnetick Needle*, which always points to the *Northern* and *Southern* polar *Stars*, we shall endeavour to give light into that dark *Phænomenon*, in that *Chapter* which will *Treat* of the *Power* of *Magnetisms* and *Natural Instincts*.

But before I conclude this part of the *Mineral* History, I cannot omit, that in our surveying of those high, steep, and stony Mountains, which are called the *Skrees*, within the said Mannor, we discovered near the Top of one of the highest Mountains, a *Vein* of *Iron*, which, in the Opinion of the Judicious Mr. *Shaw*, who was the Discoverer, was as rich a Prospect as was in *England*, being within four Miles of *Ravenglass*, a Harbour for Ships.

At the Foot of one of the Mountains we found lumps of *green Copper Ore*, which we presumed were broken off from some rich *Vein* of *Copper* upon the Top of the Mountain.

The Mountain whereon we discovered the *Iron-Vein*, being so very steep, I durst not climb up to it, but sent my Son to see it, who gave me the same Account with Mr. *Shaw*. They brought me down out of the *Vein*, the several kinds of *Ore* it contained, as *Button-Ore*, *Stony Ore*, and a soft *greasy Ore*. These I carry'd up to *London*, where they were try'd, and well approv'd of.

These Discoveries may be of great Advantage to the Duke of *Somerset*, the Lord of the Royalty; and therefore I would not have them over-look'd by those who (perhaps) hereafter may make themselves the Authors of these Discoveries.

As the *Interior Strata* of these Counties are rich in *Metals*, the Rivers rich in *Fish*, so the *External Surface* is productive of as great Variety of *Plants* and *Vegetables*, a Catalogue of which we have hereunto annexed.

A

A

L I S T

O F

Several rare PLANTS, (not observed by Mr. Ray,) found in the Mountainous Parts of the Counties of WESTMORLAND and CUMBERLAND, by the late Eminent Botanist Mr. *Thomas Lawson*; and by him noted on the Margin of the said Mr. Ray's Catalogue of *English Plants*, now in the Possession of (his Daughter) Mrs. *Thompson* of *Farmanby*.

ALSINE *Becaburgæ folio*, Morisoni. Chickweed, with the Leaves of common Brook-lime; as described by Dr. *Morrison* of Oxford, very frequent.

Anonis Spinosa, flore Albo. The prickly Rest-harrow (usually Purple) with a white Flower. On sandy Hillocks near the Seashore.

Armeria

A List of some Plants in

Armeria (five Caryophyllus) pratensis, flore Albo. White flower'd *Meadow-Pink*. This was observ'd near *Orton* in *Westmorland*; and growing in the like marshy Grounds, with the Common, cannot be suppos'd to be only a Variety, and not a distinct *Species*. The same perhaps may be said of the forementioned *Anonis*.

Bifolium Palustre, tribus foliis. Three-leav'd *Tway-blade*. This was first found in the *Low-Hag*, over against the Mill at *Great Strickland*. But he afterwards met with it in sundry other places of the Neighbourhood, as likewise elsewhere in the County of *Westmorland*.

Cannabis Spuria, flore albo magno & elegante. *Wild Hemp*, with a large and beautiful white Flower. This was first observ'd, as an extraordinary Rarity, by *Dr. Merret*, in the Forest of *Sherwood*, and other parts of *Nottinghamshire*: It grows plentifully on the Skirts of *Cross-Fell*, and other places within both these Counties.

Cardamine flore pleno. Double flower'd *Lady's Smock*. This grows commonly enough on the Pasture Grounds near *Little Strickland*; and 'twas elsewhere found with no less than eight Rows of *Petali*.

Caryophyllata,

Caryophyllata, flore amplo purpureo pleno. Double flower'd *Herb-Bennet*, with a large and purple Flower. This comely Plant was sent by the Discoverer (Mr. *Lawson*) to Mr. *Ray*; who acknowledged it to be hitherto undescrib'd, and therefore bestow'd upon it the following Description, *Caryophyllata purpurea prolifera, quadruplici aut Quintuplici serie petalorum; è medio floris emergit caulis, florem in summitate gerens octodecim petalorum.*

Cotula non fœtida, flore pleno. Double flower'd *Dog's Camomile*. This Rarity, with four or five Ranks of Flowers, was met with in the Discoverer's own Grounds at *Great Strickland*.

Equisetum Nudum variegatum minus J. B. the naked and party colour'd *Horse-Tail* of *John Baubinus*. This was first shew'd to Mr. *Lawson* at *Great Salkeld*, but grows in so great plenty there, and every where on the Banks of the River *Eden*, that he could not but wonder that this was the first time of its being observ'd in *England*; 'tis an early, and quickly fading *Vernal Plant*, which might probably be the occasion of its not being hitherto taken notice of by those Curious Gentlemen, who commonly began their Circuits

culits too late in the Year for such a Discovery.

Geranium Batrachoïdes flore eleganter variegato.
Crowfoot, Cranes-bill, with a beautiful party colour'd Flower. A dry'd Sample of this, found in Mr. Howard's Park at *Thorntbwait*, was sent to Mr. Ray, who (in his Supplemental *Fasciculus* soon after publish'd) took notice of it as a special Rarity.

Geranium Columbinum folio malvæ rotundo, flore albo. Dovesfoot, Cranes-bill, with a white Flower. This being observ'd several Years together in good fruitful Ground, under a Wall near the *Round-Table* at *Eamont-Bridge*, the Discoverer thought he had reason to reckon as a new *Species*; tho' he doubted whether he might boldly say the same of that which follows.

Geranium Hæmatodes album, venis rubentibus striatum. Bloody Cranes-bill, striped with redish Veins. The Mixtures in the Common kind (tho' even that is peculiar to those and the like *Alpine* Countries) are quite contrary. This *Variety*, for he suppos'd it to be no more, was found on several sandy Grounds near *Millum* in *Cumberland*, but most plentifully in the Isle of *Walney*.

Narcissus

Narcissus Flore albo & albido. The Common wild *Daffodil*, with a white and pale colour'd Flower. The latter of these is frequently observ'd to grow intermix'd with the Ordinary yellow; but the former was first gathered near his own House at *Strickland*, and afterwards near *Ulverston* in *Lancashire*.

Orchis Militaris purpurea odorata. *Parkinson's* sweet purple flower'd *Soldier's Cullions*. This was look'd upon as a choice Rarity, when he first met with it, (about the *Fairy Holes*) on *Lancemoor* near *Newby* in *Westmorland*: But 'twas afterwards found abundantly in the Meadows upon both the Banks of *Eden*, throughout several Parishes.

Pedicularis Palustris elatior alba. The larger Meadow *Lowse-wort*, or *Rattle*, with a white Flower. This grows pretty plentifully near the Foot of *Long Sleddal*, by the side of the common Road, leading towards *Kendale*.

Ptarmica Flore pleno. Double flower'd *Sneeze-wort*. In one of the little Islands, call'd *Small Holme*, in the great *Lake* of *Wingender-Meer*.

Scabiosa montana maxima Lobetii. The great Mountain Scabious. This Plant is well known to be a Native of the *Italian* and *Helvetick* Alps; and Mr. *Lawson* reasonably enough concluded from thence, that it might also have a spontaneous Growth in this Country, when he found it near the Lord *Lonsdale's* Seat at *Lowther*; but he was afterwards rather inclined to believe (as he confesses) that the place where he gathered it, had probably been heretofore a Garden.

Iblaspi Veronicæ folio Parkinsoni. This is the same sort of *Penny-Cress*, which *John Bauhinus* calls by the Name of *Bursa pastoris loculo sublongo affinis pulchra planta.* It grows on the moist sides of many of our Northern Mountains. Its seminal Leaves (which lie next the Ground) are rough, hairy, almost round, indented, of a deep green Colour, each on a short foot Stalk, somewhat resembling the Leaves of *Speedwell*; and its Stalk is also hairy, half a Foot high, branching usually from the bottom, though sometime without Branches. At the Top are many small white Flowers, which are succeeded by small long Pods, one above

above another, Spike-fashion. In each of these there is a slender brownish Seed. The Root is very white and long.

The End of the First Part.

A
VINDICATION
OF THE
Philosophical and Theological
EXPOSITION
OF THE
Mosaick System
OF THE
CREATION.

WITH
Moral Inferences *and* Conclusions.

By THO. ROBINSON.

Non est mortale quod opto.

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I

A
VINDICATION
OF THE
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Mosaick System, &c.

The Introduction.

AN Ingenious young Divine having lately published a Treatise in Vindication of the Vulgar *Exposition* of the *Mosaick History* of the *Creation*, wherein he seems to insinuate, That all other *Expositions*, not agreeable with the *Vulgar* and *Lite-*

The Introduction.

ral Sense, make the Scripture a *Nose of Wax*; and give Encouragement, not only to *Socinianism* and *Deism*, but to downright *Atheism*.

I must for these following Reasons, beg leave of this Ingenious Author to dissent from his Opinion.

1. And first, because most of the Learned Interpreters, as well Ancient as Modern, have compared the Holy Scriptures to *Waters*; wherein the *Lamb* may Wade, and the *Elephant* may Swim, *i. e.* some Passages in the Sacred Scriptures (especially such as concern the necessary Rules of Life) lie level with the meanest Capacities; whereas, there are other Passages too deep for the Profoundest Judgments: Among which, we must count this of the Creation.
2. Again, much of the Majesty of the Scripture-Style, which distinguishes it from all Humane Authority, consists in the *Metaphor* and *Figure*; which does not more set off the Beauty, than stir Men up to a diligent Search after those Divine *Truths*, veiled under dark and mysterious *Expressions*.
3. Besides, whilst we continue in this embodied State, our *Soul* takes her Prospects of Things

Things without, through *Material Opticks*; hence it is, that we can form no *Ideas* of Abstract or Spiritual *Entities*, but under Corporeal *Shapes* and *Figures*: And therefore it hath pleased the Divine Goodness, out of Compassion to our Infirmities, to represent to us his own Spiritual *Essence*, under such Corporeal *Forms*, as are most agreeable to our External *Senses*, and present State, (*viz.*) as having *Head, Eyes, Face, Hands, Arms*, and other Corporeal Parts, like to our *Bodies*; and likewise, as having the Passions of *Anger, Grief, Repentance, Love and Hatred*, like to the Passions of our *Souls*.

Now to understand all these Passages throughout the Scriptures, in a Vulgar and Literal *Sense*, would dissecrate the Divine *Essence*, which the whole Humane Race, as well *Heathens*, as *Jews* and *Christians*, have in all Ages believed to be an Eternal Spiritual *Being, Omnipotent* and *Omnipresent*; otherwise it would be Folly for Men to send up Prayers to a God that is not present to hear them, and wants Power to help them in their Necessities.

To entertain such mean and vulgar *Ideas* of God and his Divine Perfections, would certainly unhinge the Foundation of all Religion, as well *Natural* as *Revealed*; and not only introduce *Socinianism* and *Deism*, but

Atheism and *Prophaneness*, and turn the Sacred Scriptures of God into *Romance* and *Ridicule*: So that to *Vulgarize* and to *Allegorize* the Scripture, are equally of evil Consequence to Religion; the former making them a common History, and the other a mystical and unintelligible Riddle.

But it is not the Intention of this Treatise to Reflect upon any Ingenious Expositor; yet foreseeing that my Opinion concerning such petrify'd *Shells*, as *Cockles*, *Mussels*, and other *Marine* Insects, which we meet with inclosed in hard Rocks, upon the Tops of high Mountains, as well as in Beds of *Sand*, *Gravel*, and *Chalk*, in the Valleys, will be objected against by a *Spiteful Virtuoso*, as being (in his Opinion) inconsistent with the Vulgar and Literal Sense of *Moses*; I shall therefore (to gratify his *Scrupulosity*) endeavour to establish this *Hypothesis*, upon such Philosophical Principles and Expositions, as Interpreters of great Learning and good Authority have thought agreeable to the more deep and refined Sense of that great Master; who having the greatest Advantages of making Improvements in all Sciences, as well *Divine* as *Humane*, we must needs have a greater Esteem and Veneration for his short, but most comprehensive System, than for the larger Volumes of those
com-

common *Historians* and *Philosophers* of later date, whose Writings are only the Product of their Natural Reason, although set off with the greatest Artifice of Words and Advantages of Humane Learning.

The *Birth* and *Life* of this *Great Man*, was all *Miracle* and *Wonder*; and when he dy'd, God interr'd him, and gave him this Encomium, *Moses my Servant is dead*.

To insist upon these in particular, would make a Volume; but my design at present shall be only to give a short Account how *Moses* came to be qualify'd for so great an Undertaking, as to write a *Description* of the *World's Creation*, to be God's Messenger to *Pharaoh*, and Captain-General of that mighty Host of the *Hebrews*, which God design'd to deliver from the *Egyptian* Yoke.

The first *Improvement* which this *Great Philosopher* made in *Humane Sciences* and *Philosophical Mythology*, was in *Pharaoh's* Court, under the Tuition of his own Daughter, who, having no Child of her own, design'd to Adopt him her Son, and make him Heir-Apparent to that Crown; and without doubt, she made choice of some of the learned *Hierophantæ* to be his Tutors, who were most Eminent for their Knowledge in *Philosophical Mythology*; which is no other, than a more agreeable Vehicle, found

out for the conveying to us the Truth and Reason of Things through the *Medium* of Images and Shadows.

And hence it is, that the Scripture tells us, *That Moses was learned in all the Wisdom of the Egyptians*: Who at that time, and in some after Ages, were the most Eminent, for obscuring their profound Notions under *Hieroglyphick Resemblances*.

And it was most certain, that even the wise *Men of Greece*, distinctively so called, as well as *Thales, Pythagoras, Socrates, Plato*, and others, borrowed Notions from the *Mosaick Writings*.

Upon this Account it was, that *St. Clement of Alexandria* tells us, That the manner and style in which the *Greek Philosophers* handled their Philosophy, was like that of the *Hebrews*, Dark and *Ænigmatical*.

As for the Writings of the *Old Testament*, with all good Men, we adore the *Divine Wisdom*, which directed the Pen-Men of Holy Writ; and must readily acknowledge the Plainness and Perspicuity thereof in the necessary Rules of Life, without which it would not have answered the Ends of the *Divine Wisdom* in the Inditing of it. We must also grant, that wheresoever it is Dark and Abstruse, it's far from *Phantastry* and affected *Obscurity*. Hence it is that *Solomon*
makes

makes the *Words of the Wise*, and their dark *Sayings*, expressive of the same thing; and in another place he tells us, that their Discourses were *like Apples of Gold in Pictures of Silver*; that is, besides the Beauty and Truth in the Out-side and Case, they had a more rich and precious Meaning within.

Hence it seems evident, that the People of the *Jews* had always been trained up in an *Allegorical* way; and they had it in such Esteem, that they thought no Man fit to Teach that could not handsomly shade his Sense, *Si quis noverit perplexe loqui, loquatur; sin minus taceat.* And therefore our *Blessed Saviour*, in compliance with their mode and way of Teaching, taught the People in *Parables*; and the Evangelist saith, *That without a Parable spoke he not unto them*: And undoubtedly this way of wrapping up their Notions under Veils and Figures, they had from *Moses*, and *Moses* from the *Egyptians*.

After our *Great Philosopher* had made these Improvements in the *Philosophick Schools* of *Egypt*, God, by his special *Providence*, translated him into the Family of his Kinsman *Jethro*, who being as well Prince as Priest of *Midian*, did not only discipline him in the Art of Policy, Conduct, and Government; by which he was fitted and prepared for being *Captain-General* of that mighty
Host

Host of the *Hebrews*, which God designed to deliver from the *Egyptian* Slavery: But it's most probable that he instructed him in the Religion of his Ancestors, (*viz.*) the *Patriarchal* Traditions, concerning the Creation of the *World*, the beginning of Things, and the *Genealogies* of Men; which being best known to *Adam*, who coming immediately out of God's Hand, did undoubtedly deliver them to his Son *Seth*, *Seth* to *Enos*; and so from Father to Son, to *Abraham*, from whom *Jethro* descended by a second Marriage: And it is the Opinion of learned Men, that during his Residence in *Midian*, which was Forty Years, he writ his Book called *Genesis*, by the Assistance of *Jethro* his Father-in-Law.

After these Gradations and Improvements, *God* took him into his own Service, and by a sort of *Personal* Conference, communicated to him, as well the manner how all Things came to-Exist, as how the Manners of Mankind were to be exercised; so that we may reasonably suppose that the *Mosaick* Writings were grounded upon *Divine Revelation*, as well as upon *Philosophical Principles*.

From what I have advanced upon this Argument, it seems Conclusive, That this Short and Comprehensive History of the
Creation,

Creation, is *Philosophical* and *Mystical*, as well as *Historical* and *Ad Hominem*; for it cannot be imagined, but that so great a *Philosopher* would write after the Mode of the *Schools* from whence he had his Education.

I have now done with the *Preface*, or *Introduction*, and shall subjoin a *Philosophical*, *Mythological Paraphrase* upon the First Chapter of *Genesis*, with reference to a late *Vindication* of the *Vulgar Exposition* of it. And because I would not willingly be thought more definitively *Wise* than others can bear or approve of, I shall submit such *Philosophical Conclusions* as I have drawn from the *Literal Sense*, to the Judgment of Men of greater Learning and deeper Thought.

And first of all, it must be allowed by all Good Men, that the *Literal* and *Historical* part of this *Concise System*, is carry'd on so evenly, and consistently one part with another, every thing being represented so accommodately to the Capacity of the *Vulgar*, especially of the *Jews*, being then bred up in Slavery and profound Ignorance; so that according to the *Literal Sense*, *Moses* discovers himself to be a Man of the highest *Political Accomplishments*, as well as *True* and *Warrantable Prudence*.

It must also be acknowledged, that the *Philosophical Sense* contains the noblest *Theories*, as well *Theological* as *Natural*, that the Mind of Man, in this dark embodied State, can be entertain'd with; by which *Moses* appears to be *Master* of the most *sublime* and *generous* Speculations that are, or can be contained in the best *System* of *Natural Philosophy*.

A

Philosophical, Mythological,

P A R A P H R A S E

U P O N T H E

First Chapter of Genesis.

I*N the Beginning.]* i. e. when Time first commenced; for before the Creation of the World, there was *Duration*, which the School-men call *Stabilis Æternitas*; but Time being an equal Mensuration of Motion, it and Motion commenced together.

Verse 1. *In the beginning God created the Heavens and the Earth.*

God.] the Supream *Being*, uncreated and independent, Almighty in Power, and Infinite in Wisdom, and all Perfection, was the Efficient Cause.

Created.]

Aristotle's Hypothesis.

Created.] de novo, out of Nothing; for the Conceit of Aristotle, That this World, with all its Furniture, as it now stands, was Eternal, is to advance the World into an Equality with God; for whatever is Co-eternal with God, is God.

Plato's Hypothesis.

The Platonick Hypothesis, That the Matter, out of which God made the World, did pre-exist, is to make God an Impotent Cause, not able to make this World without Matter and Stuff to work on.

Democritus's Hypothesis.

To fancy with Democritus, That the Matter was not only pre-existent and eternal, but that the World had no Efficient Cause, but from the casual Motion of material Atoms, or little Corpuscles, is the same as if we could conceive that all the Materials of a Noble Palace could of themselves meet together, and be their own Architect.

By Heaven, what is meant.

The Heaven.] i. e. the super-celestial Regions, or upper Stories of the Universe, wherein are the many Mansions, where those bright Intellectual Beings, those
Morning

Morning Stars, which *Job* tells us met together and sung for Joy, do inhabit, and keep their Residence; for tho' neither the World, as it stands, nor the Matter of which it consists, was Eternal, yet it may be presumed to be an immediate Consequent of Eternity, and the natural Emanation of the Divine Essence and Attributes, according to that Model and Idea pre-conceived in the Divine Understanding.

For it cannot be imagin'd, that the Divine Essence would for some time sit still, and wrap up it self in Sloath and Idleness, but did always display it self in a vigorous Activity; for the natural Tendency of Infinite Power is Action; of Infinite Wisdom, is Counsel and Contrivance; of Infinite Goodness, Beneficence; we may then reasonably conclude, that God would, from all Eternity, follow the Inclinations of his own Divine Essence.

And the Earth.] i. e. this Ter-
raqueous Globe, whereon we
live;

(*Viz.*) Power, Wis-
dom, and Goodness.

The Earth.

The Angels were fallen from their original State, before the Creation of this Earth.

live; which was created perhaps some Thousand Years after the Creation of the *Cælum Imperium*; for notwithstanding that Omnipotent Power might have created the whole World at one stroke, by an Imperious *Fiat*; yet it would not have been agreeable with Infinite Wisdom, which consists in Deliberation and Counsel.

And it is the Opinion of some learned Men, that the Angels having fallen from their first Estate, God created this *World*, and the *Humane Race*, to inhabit upon it, with an Intention that Human Nature should fill up the Number of fallen Angels.

Ver. 2. *And the Earth was without form, and void, and Darkneß was upon the Face of the Deep; and the Spirit of God moved upon the Face of the Waters.*

The State of the Chaos.

The Division of the Chaos.

This Earth, when it was in its *Chaotick* Condition, was only a confus'd *Maß* of Matter, consisting of *Solids*, *Fluids*, and *Volatiles*, all jumbled together like that *Egyptian* Fog that was to be felt, and continued in that state until God impressed Motion upon the *Chaos*, and then the *Solids* subsided, the *Fluids*, being lighter, covered the

the *Solids*, and surrounded the *Globe*.

Whilst the *Chaos* was in this State, *Darkness* was upon the Face of the *Deep*, until the bright *Lucid Æthereal Volatiles* disintangled themselves, and formed a Sphere of Light.

The *Hebrew* would have it expressed thus, The *Spirit of God* sat on brood upon the Rude *Mafs*, and by Vital Heats in Incubations, did so digest and modify the Passive Matter, as to make it fit for receiving Life.

Bishop *Patrick*, in his Excellent Comment upon the First Chapter of *Genesis*, is of Opinion, that the *Seminal Principles* of Animals and Vegetables began to be formed then when the *Spirit of God* moved upon the *Waters*; which, if we take for granted, we may reasonably conclude, that the *Waters* were first productive of *Animals*; and in the greatest probability, such Marine Insects, as *Cockles*, *Mussels*, *Oysters*, and innumerable different *Species* of other *Shell-Fish*, which we meet with

Light in *Mafs*.

Archbishop *Sancroft*.

And the Spirit of God moved upon the Face of the Waters.

Bishop *Patrick*'s Opinion.

My Hypothesis not inconsistent with *Moses*.

The reasonableness of it.

generated in Sand and Gravel, being not *Loco-motive*, and the first Products of the Waters, might be left behind upon the first Division of the Waters, and the draining of this Earth; and so with the other *solid Strata* and *Sediments*, be petrefy'd into a *stony Substance*.

And this *Hypothesis* seems to be as Rational as, *That they were left behind at the Universal Deluge*; and that when the Beds of Iron, Rocks of Marble, Lime-stone Flints, and all Solids were dissolved into a liquid Substance, or Hotch-Potch, these petrefy'd Shells should keep their Forms, and escape that Universal Dissolution.

Ver. 3. *And God said, Let there be Light; and there was Light.*

The first remarkable *Phænomènon*, which follow'd this ordinary Division of the *Chaos*, was *Light*; which, in a Vulgar Sense, signifies no more than a bright shining *Illumination*, flowing from the *Æthereal Volatiles*, collected into a Sphere, surrounding the *Terraqueous Globe*: But with the *Egyptians*, in their sacred Characters, *Light* was the *Hiero-*

Hieroglyphick of Life; and Dr. H. M. would have Light to be the Platonick *Anima Mundi*, wherein are contained the *Seminal Principles* and *Specifick Forms* of all *Vegetables* and *Animals*; and this seems agreeable with the *Mosaick Hypothesis*, Gen. 2. v. 5. *And God made every Plant in the Field before it was in the Earth, and every Herb in the Field before it grew; they being pre-existing in a Vehicle of Light, before they were united to their Material Vehicles; and thus Light was the Active and Vivifick Principle of Generation; and it's very probable that Plato borrow'd his Notion of the Anima Mundi from the Mosaick Writings.*

i. e. That it answered the end for which it was created. And that all the *Seminal Forms* were agreeable to those *Shapes, Figures, and Ideas* pre-conceived in his own *Divine Understanding*.

As *Light* was an Emblem of Life, and the *Active Principle* in *Generation*; so by *Darkness*

The Platonick *Anima Mundi*.

The *Mosaick Hypothesis*.

Ver 4. *And God saw the Light that it was good:*

And God divided the Light from the Darkness.

Matter and Life,
Contemporaries.

Life diffused through
the whole Mass of
Matter.

here is not to be understood a bare Privation of *Light*, but that dark Fog of confused Matter which God made the Passive Principle of Generation: So that the dividing of the *Light* from the *Darkness*, may be meant of the dividing the Vivifick Principle of Life, from the Passive and Plastick Principle of Matter; for it may be very reasonably supposed, that Matter and Life were Contemporaries, and that Life was diffus'd thro' the whole Mass of Matter, which was then so Luxuriant and Teeming, that if God had not divided these two Principles of *Light* and *Darkness*, the Surface of the Earth would not have afforded Nourishment for so numerous a Brood of Animals as would have been produced.

Hence it is, that we see nothing so contemptible and vile in this World we live in, but hath its living Creatures, that dwell upon it; the Earth, the Water, the Superior and Inferior Air, the Bodies of Animals, the Flesh, Skin, the Entrails, the

the Leaves, the Roots of Vegetables, the Sand upon the Seashore, all these have their Inhabitants.

The Seminal Forms being by a vital Union conjoined to their Material Vehicles or Bodies, which the Philosopher Mystically represents by the figurative Emblems of *Day* and *Night*; the *Evening* and the *Morning* made the first Production; for if this were to be understood in a Literal Sense, the *Evening* and *Morning* would have made the first *Night*.

The several kinds of Solids, and other Consistencies of the Earth, being now subsided, those of the same Nature and Affinity, by an agreeable Juxta-position of Parts, and a Secret Magnetism, drew together, and settled into particular *Classes*, every *Class* being productive of some Mine or Mineral, which is the more *Pneumatick* and Spirituous Part, and the Perfection of that *Class*; and were consolidated, and received their different degrees of Induration and

Ver. 5. *And God called the light Day, and the darkness he called Night: and the Evening and the Morning were the first Day.*

Ver. 6. *And God said, Let there be a Firmament in the midst of the Waters, and let it divide the Waters from the Waters.*

Of the dividing of Solids into *Classes*.

Digestion by the Active Powers of the Subterrene Heat and Cold, together with those petrefying Juices which did then pervade the whole Body of the Earth.

Of the Division of the Waters into *Subterrene*, *Saline*, and *Aerial*, by equal Proportions.

And these Classes being divided by large *Fissures*, and smaller *Ramifications*, which dilate and pervade the several Classes, and by Miners are called the greater and lesser Veins of the Earth; they greedily suck'd into the thirsty Matter, the thin and sweet Water, which then might bear Proportion to a third part of the fluid Mass.

Another third part being taken up into the higher Regions, by the Attractive Powers of the Ambient Heat and Cold, impleted the Atmosphere with Air, and a considerable part was condensed into *Clouds*.

The Original of the Sea, &c.

The *Salt-water* being the Sediment of the whole Mass of Fluids, and too thick to pass through the strait Pores and Strainers of the Earth, began gradually to draw down to its Channels.

All the Veins and Pores of the Earth being now *saturated* and fill'd with the tenuous and sweet Water, the *Subterrene Lymphæducts*, or underground Water-works, began to bubble up and play from the Tops and Sides of the Mountains.

From whence the Rivers took their first *Rise*, and began to form their Courses to the *Sea*, and by their Rapidity and Weight, continually pressing upon her from all sides, swell'd her up into a *Gibbosity*, and forced her into a constant *Flux* and *Reflux*; which Reciprocation of Motion, causing in her a boiling Fermentation, the sweet Water does disintangle it self from the Salt; and being lighter, rise up in Fumes and Vapours, 'till they be condensed into Clouds, and then fall down in showers of Rain, which is the *Succus Nutritius*, that fertilizes the Earth's Surface.

The Waters being now divided, there was made a free and open *Expansion*, which *Moses*

The Original of Rivers.

The *Flux* and *Reflux* of the *Sea*.

The Cause of Vapours and Clouds.

How the Firmament was made.

calls the *Firmament of Heaven*; thus the Waters came into a settled Circulation, and an Atmosphere round the Earth was made.

The Waters above the Firmament.

As for the Waters above the *Firmament*, and were without the Sphere of this Earth's Central Attraction, they were attracted to the Moon's Center. See more of this hereafter.

Ver. 8. *And the Evening and the Morning were the second day.*

i. e. They made the second Revolution towards making this Earth an Habitable Globe.

Ver. 9. *And God said, Let the Waters under the Heaven be gathered together, and let the dry Land appear.*

The *Waters* being now divided, and the Saline Waters drawn down to their Channels, the *dry Land* began gradually to appear; first, the *Mountain tops*, then their *Heaths*, then the *Plains and Valleys*.

The second Causes and the Course of Nature established.

But before I proceed, it seems necessary that I give account of such second Causes as the *Almighty Power*, was pleased to make use of as instrumental in all those *Mundane Productions*; and these are either *Essential* or *Accidental*.

The

The *Essential Causes* were the two Principles of *Activity* and *Passivity*, or the *Vivifick* and *Plastick Powers*.

The *External Causes*, were the Active Powers of *Heat* and *Cold*.

The *Accidental Causes*, were *Time*, *Motion*, and *Space*.

This being premised, we will proceed to the Productions in the Vegetable Kingdom, which was the Work of the third Day.

And here we cannot but observe by what gradual Methods of Proceeding, the Almighty Power was pleased to bring all his Works under every *Genus* to Perfection.

In the Mineral Kingdom, we have first *Semi-minerals*, then courser Metals; as Iron, Lead, Copper, Silver; and Gold, which is the Perfection of that *Genus*.

The Mineral Kingdom being brought to its full Perfection, and the Seminal Principles of all the *Genera* of Vegetables being disseminated in the warm

Funds

Ver. 10. *And God called the dry-land Earth; and the gathering together of the Waters, he called Sea.*

Ver. 11, 12. *And God said, Let the Earth bring forth Grass, the Herb yielding Seed, and the Fruit-tree yielding Fruit after his kind, whose Seed is in it self, upon the Earth; and it was so.*

Funds and Promptuaries of the Earth; and being, by the Incubation of the Spirit of God, formed, they were ready to obey that imperious word, *Let the Earth bring forth, and it brought forth* the several Species of Vegetables, not all at once, upon one day, but according to their different degrees of Perfection; as, first, Grass, then Herbs, then Plants, then Shrubs, then Trees; among which, the *Oak* and the *Cedar* is the Perfection of that *Genus*.

The Vulgar Exposition not agreeable with the Analogy of Nature.

Hence it is, that we have our monthly Productions, one succeeding another, and one Set dying, when the other commenceth.

Ver. 13. *And the Evening and the Morning were the third Day.*

Now it seems to me very disagreeable to the Analogy of Nature, which never worketh in haste, by precipitous Jumps, from one thing to another, but by a gradual Proceeding, that all the different degrees of Heat, in the Spring, Summer, Autumn, and Winter Seasons, should all take their Turns on one day, according to the Vulgar

gar

gar Exposition, and produce their peculiar Vegetables in the short time of twenty four Hours, which make a Natural Day.

The Earth being now covered with the several Species of Vegetables; Provision of Food and Nourishment was made by Divine Providence for a higher degree of Life.

But the Passive Matter being yet too cold and waterish to draw down out of the second degree of Life, any of the Sensitive and *Loco-motive* Forms to Actuate and Inform it; the Almighty Power did therefore contract and collect this dilated Sphere of the *Æthereal Flame* of *Light* into one Body, which *Moses* calls the *Sun*; that those Vital Heats and Enlivening Incubations which stream from it, might be more strong and vigorous, and penetrate into the Cold and Passive Matter.

And God placed this Celestial Fire at such a convenient distance from this Earth, that it might be neither too much scorched by being too near it,
nor

God's Providence is visible in providing Food and Nourishment for his Creatures before he created them.

Ver. 14. *And God said, Let there be Lights in the Firmament of Heaven, to divide the Day from the Night, and let them be for Signs and for Seasons, and for Days and for Years.*

Ver. 16. *God made two great Lights, &c.*

Ver. 17, 18, 19. *And God set them in the Firmament of the Heaven, to give Light upon the Earth, And*

And to rule over the Day and over the Night, and to divide the Light from the Darkness; and God saw that it was good. And the Evening and the Morning were the fourth Day.

The Diurnal Rotation of the Earth, the reasonableness of it.

nor frozen by being at too great a distance from it; but that it should receive such a temperate Heat from it, as to excite its Seminal Virtues, draw up its Juices, and thereby ripen its Natural Fruits.

He placed it also in the middle of the *Planetary Sphres*, that it might illuminate all those dark and opaque Bodies, and make them luminous Stars, and to be Lights in the *Firmament of Heaven*, to give Light upon the Earth, and to distinguish the Seasons, and to divide the Time into Days, Months and Years.

God gave to the *Earth* also a Diurnal Rotation upon its own *Axis*, that it might have the benefit of Day and Night every twenty four Hours; so that no part of the Earth might be too much heated by the Sun's presence upon it, nor too long benighted by his absence from it.

And as it is more agreeable with Reason, that the *Spit* should turn about to the *Fire*, than that the *Fire* should turn about the *Spit*; so certainly it's more agree-

agreeable with Nature's way of working, which never does any thing *per plura*, which might be done *per pauciora*; that the Cold and Passive Earth should turn about its cold sides to receive the warm Influence of the Sun, than that the Sun, which by several Diameters is bigger than this *Earth*, should move round it once in every twenty four Hours.

After the making of the Sun, God collected all those waterish Fogs and Mists which rang'd about in the Planetary Spheres into one Body, which *Moses* calls the Moon; and he made it a vicarious Light to the Sun, to supply its absence in this lower World.

Moses, by calling it a great Light, speaks *ad Hominem*, it appearing so to our Senses; for the Moon hath no essential Light in its self, but what is mutuatitious, and received from the Sun.

As God made the Sun a central Heat, and the *Primum Calidum*; so he made the Moon a central

The making of the Moon, and its Natural Uses.

Why *Moses* calls it a great Light.

The *Primum Calidum*, and the *Primum Frigidum*.

central Cold, and the *Primum Frigidum*; that by its intermixing its Cold and Humid *Atmosphere*, with the Hot and Dry *Atmosphere* of the Sun, our *Atmospherical Air* might be fit for Respiration.

The Clearing of the Upper Firmament.

Thus, by collecting of the waterish Fogs to the Moon's System, the Upper Firmament, or the Planetary Spheres were cleared, and the Planets, with the rest of the Stars, created in the Morning of the World, began to appear, and to send down their celestial and invisible Influences upon this Earth.

The celestial second Cause.

Thus God made the Sun and Moon, and the clearing of the Planetary Spheres, necessary second Causes towards the Production of the Animal Life; and the Union of Matter and Life made the fourth Production. He made the Stars also, but whether they commenced with the Formation of this Earth is not clearly express'd.

Ver. 20. *And God said, Let the Waters bring forth abundantly*

As the Seminal Forms of Vegetables were disseminated in the Earth, so were the Specifick Forms

Forms of all the *Aquatick Animals* disseminated in the Waters; and undoubtedly, these took Life upon the *Spirit* of God's moving upon the Waters; and therefore *Moses* makes them the first Product of the Animal Life.

ly the moving Creatures that have Life, and Fowl that may fly above the Earth in the open Firmament of Heaven.

And it cannot be reasonably suppos'd, that all the subordinate Species of this Numerous Brood took all Life on the fifth Day, (as Dr. *W.* peremptorily affirms, and only to keep undamify'd his espoused and beloved Hypothesis) but rather by a methodical and gradual way of proceeding, from the less perfect, which the Naturalists call *Litorales*, as the *Marine* Insects, such as Cockles, and the several kinds of shell-Fish, then the several kinds of the *Pelagii*; and last of all, *Moses* tells us, that God created great Whales, which is the Perfection of this *Aquatick* Genus.

Ver. 21. And God created great Whales, &c.

Moses, our great Philosopher, makes Fish and Fowl Congenial.

1. And first, from the Parity of their Natures, being both *Oviparous* Animals.

The Affinity that is between Fish and Fowl.

2. From

2. From the Parity of their *Elements*, the Air and Water being the same Element differing only in degrees of Fluidity.

3. From the Affinity of their Operations, the Fish with Fins and Scales, swim in the Waters; and the Fowl with Wings and Feathers, swim in the Air.

4. From their manner of feeding, being both *Swallowers hole*.

By God's Blessing of them, is meant his Approbation of their several Species, and by impressing upon their Natures a strong and an irresistible Appetite to Propagate their kinds by Univocal Generation; and this we call the Law of Natural Instinct, or the Establish'd Course of Nature.

Ver. 22. *And God blessed them, and said, be fruitful, &c.*

Ver. 23. *And the Evening and the Morning made the fifth day.*

Ver. 24. *And God said, Let the Earth bring forth the living Creature after his kind, &c.*

i. e. The Sympathetical Union of the *Aquatick* and the Aerial Forms with material Bodies, made the fifth Production.

The Waters and the Air being replenished with their proper and peculiar Animals, agreeable with the Nature of their Elements, he proceeded to the
Creation

Creation of the several Species of *Terrene* Animals; and these, according to their different degrees of Life and Perfection; as,

First, Insects, then imperfect Sensitives, then the more perfect Sensitives, as the several Species of Quadrupeds.

The Insects are all *Oviparous*, and they are, 1. *Crawlers*, 2. *Creepers*, 3. *Leapers*, 4. *Flyers*.

The imperfect Sensitives are either *Spawners*, as the *Frog* and *Toad*; or *Oviparous*, as the several kinds of *Serpents*.

The perfect Sensitives are all *Quadrupeds* and *Viviparous* Animals, of all which the *Lyon* and the *Elephant* are the Perfection of that Genus.

God having now brought the Earth to its full Perfection; the *Interior Strata* and Consistencies of it, being enriched with several kinds of *Minerals* and *metallick Ores*; the *Exterior Surface* being over-spread with a green *Mantle* of Grass, beset with *Flowers*, and beautified with all the kinds of *Trees*, from

The *Terrene* Animals are, 1. Insects, 2. Imperfect Sensitives, and 3. Perfect Sensitives.

The Imperfect are *Oviparous*.

The Perfect are *Viviparous*.

Ver. 26. *And God said, Let us make Man in our own Image; after our likeness, and let him have Dominion over the Fish of the Sea, the Fowl of the Air, and over the Cattle, and over all the Earth, &c.*

K the

the meanest Shrub to the stately Cedar ;

Having replenished the Waters with innumerable Species of Fishes, from the smallest Marine *Insect*, to the prodigious and frightful *Whale* ;

The Gradations of Life.

Having furnished the Air with flying Fowls, from the smallest *Fly* to the lofty *Eagle* ;

Having also stocked the Earth with all the degrees of *Terrestrial* Animals, from the crawling *Worm* to the majestick *Lion*, and stoutest *Elephant* ; he then went about to make a more noble Creature, that might be the Lord of the New World, and all its Furniture ; and therefore (*More Humano*) calls a solemn Council, *Let us make Man* ; as if *Omnipotency* had been *Impotent*, and *Infinite Wisdom* had stood in need of Counsel : And the Result of the Council was, That he should be made after their own Image and Likeness, *i. e.* that he should have a Spiritual and Immortal Soul inspired into a Material Body ; so that he might have rela-

relation to the inferior Ranks and Orders of Creatures *subordinate to his Nature*; and over which he had given him a Title of *Dominion*; and that he should have also a relation to the *Intellectual Beings*, being an Order of Creatures above his *Nature*; and by having a Communion both with the Visible and Invisible World, he might be *Copula utriusque Mundi*, that Link that unites Heaven and Earth together: Thus Life is a Chain, by which we may ascend from the meanest *Insect*, Link by Link, 'till we ascend to the *Supream Being*, the Fountain of Life and Perfection.

Life a Chain.

God having created them *Male and Female*, pronounced the same Blessing upon them as upon all other Animals; that they might propagate their Species by *Univocal Generation*.

Ver. 27, 28, 29.
Male and Female created he them, &c.

And God ordered Man for Food, the Fruits of the Earth; to the Beasts he gave also to eat of the same, from the meanest *Insect* to the largest *Quadruped*; and to the Fowl

Ver. 31. *And God saw every Creature that he had made, and behold it was very good.*

This is *More Humano*, he approved of his Creatures, being all agreeable to those Shapes, Figures, and Ideas preconceived in his own Divine Understanding, and observing the Laws impressed upon their Natures.

too, and to every Thing wherein there is the Breath of Life.

Now the Author of the *Vulgar Exposition*, cannot possibly understand this in a Literal Sense, being that a full third part both of Beasts and Fowl, are Carnivorous, and feed altogether upon Flesh, unless he will take advantage of the Metaphor, *That all Flesh is Grass*.

I shall conclude with the words of the holy Psalmist, *Psal. 8. 4, 8.* who having considered the wonderful *Frame* and *Fabrick* of the *World*, the *Heavens*, the *Sun*, *Moon*, and *Stars*, breaks forth into a Transport of Admiration at the Divine Philanthropy, *What is Man that thou art mindful of him? And the Son of Man that thou visitest him? Thou madest him lower than the Angels, to Crown him with Glory and Worship. Thou madest him to have Dominion over the Works of thy Hands, and thou hast put all Things in subjection under his Feet; all Sheep and Oxen, yea, and the Beasts of the Field, and the Fowls of the Air, and the Fishes of the Sea, &c.*

Moral

Moral Conclusions.

HAVING in this short and concise *Paraphrase* given you the more *Philosophical*, and *Refined Sense* of this *Comprehensive System*, I shall deduce from it (by way of *Recapitulation*) such *Natural Inferences* and *Theological Conclusions*, as may convince any whose *Intellectuals* are not wholly *Infatuated* by the *Charms* of *Sensuality*, and are resolved to deny the *Being of their God*, rather than the *Gratification* of their *Brutish Lusts*, that this *Magnificent Structure* of the *World* with its *Furniture*, was not the *Result* of *Casual Motion* or *Blind Chance*; but the *Effect* of an *Omnipotent Power*, and *Infinite Wisdom*, *Counsel* and *Contrivance*.

My *Arguments of Probation* shall be reduced to several *Classes*, according to the *Method Moses* has proceeded upon in his *Literal and Historical Description* of the *Creation*.

And first of all it's observable, that *Moses* does not go about to prove the *Being* of a *God* expressly by way of *Argument*; but implicitly, by describing the *subordinate Degrees*

and *Concatenations* of Life and Perfection; making Life a *Chain* by which we may gradually ascend from the meanest *Insect*, Link by Link, 'till we come to the *Supreme Being*, the Original and Fountain of Life and Perfection.

And any other way of *Probation* would, at that time when *Moses* wrote the History of the *Creation*, have been superfluous and unnecessary; for notwithstanding that *Polytheism* and *Idolatry* had then overspread the World, yet *Atheism* was not heard of 'till After-Ages.

David tells us that in his time, the *Fool* had said in his heart that there was no God; but *David's Fool* was modest in Comparison of those of our Age, who assume to themselves the Impudence of speaking and disputing *Fools*; but my Intention in this short Treatise is not to spend Time and Labour in answering *Fools* in their *Folly*, but shall rather think it convenient to lay down such Arguments, as are most proper to Convince and Confirm the more sensible Part of Mankind, that there is a *God*, that by his Omnipotent Power made the *World*, by his Infinite Wisdom Contrived it, and by his Providence preserves it in *Being*.

CLASS I.

My First Class of Arguments shall be from the Consideration,

1. Of the *Frame* and *Fabrick* of this *Terraqueous Globe* whereon we Live.

2. From the Circulation of the *Subterranean Waters*, and the Communion they have with the *Atmospherical* and *Nubiferous*.

3. From the Communion between the *Lunar Waters* and the *Marine*.

4. From the *Flux* and *Reflux* of the *Sea*.

5. From the Consistence of the Saline Water, and the usefulness of it in *Nature*.

6. From the more peculiar Advantages Man hath from the great convenience and pleasure of Navigation.

7. From the provision God hath made to Encourage the Wit and Industry of Man in so concerning an Adventure.

I shall Treat of these in Order.

AND First, if our Modern *Atheist*, who values himself so much upon his Witty Reasoning against the Universal Belief of Mankind, would but imploy his Rational Faculties, in the study of Natural Philosophy, he would meet with in that System sufficient Arguments to convince him that there

is a supream independent *Being*, by whose *Power* all things were made, and upon which all *Beings* have their dependance.

Let me then in the first place desire him to Climb up with me to the Tops of those Rudely scattered Mountains, that to some seem but to be so many Wens, and unnatural *Protuberances* upon the face of the *Earth*; yet if he will but wisely consider how one part of the Earth is subservient to another, and the Mountains to the whole, he will easily be convinced, that they are not only Ornamental but useful. And that the Infinitely Wise God hath so contrived all the Parts of it, that no part can be wanting without prejudice to the whole.

The Mountains being built up of the most solid *Strata* and *sediments* of a *Hot Nature*, are not only made the Strong Columns and *Pillars* that support the whole *Fabrick*; but in there Interior Consistences are contained those Warm and Moist Matrixs wherein those Rich Veins of *Gold*, *Silver*, *Copper*, *Tin*, and other valuable *Minerals* are Ingendred, and receive their different degrees of Maturity and Perfection; which gives encouragement to Men to set their Wits on Work, to dig into those dark Regions, to find out those *hidden Treasures*, which the God of Nature hath Immured in Chests of hard and solid Stone.

To

To which I shall only add that the frigidity of their lofty Tops, attracts the Atmospherical Vapours to them, the Nitrous part of which being Rarefyed into Wind, it drives before it the Rain and Showers, which Water and Moistn the whole surface of the Plains and Vallies. I might enumerate more of the Natural uses of Mountains, but I refer to the Chapter that treats more particular of them.

But Secondly, if the *Atheist* will venture himself into the *Interior Viscera* or Bowels of the Earth, there he may observe those wonderful *Water-Works*, that *Aquavite*, which circulates through the Veins of that *Great Body*; and to gratify his Curiosity, he may not only see a *Vein* cut and a perpetual *River* flowing from a dry *Hill*, but besides the Water that circulates in the Veins the strait Pores of the most dense and solid Matter is saturated with it; which being Analogous to the Blood in Animals, and sap in vegetables, keeps in Life and Perfection not only the more valuable Minerals, but all the other common *Strata* and consistences of it.

And if the *Atheist* durst Climb up and take a view of the Inward *Contextures* of those High Mountains, he might with pleasure, and to the great satisfaction of his Curiosity, observe the meeting together of those large *Subterrene Veins*; and how those perennial

nial *Lymphæducts* play and bubble out from their upper *Strata, Sides* and *Skirts*, from whence all *Springs* and *Rivers* have their first Rise and Original; and if he would please to follow the various windings and turnings of their long Courses to the *Sea*, he may observe the Wonderful Providence of *God* in *Interlacing* the whole Surface of the Earth, with Rapid Streams of sweet Water, for the convenience both of *Man* and *Beast*.

The *Atheist* having now followed the Courses of the Rivers to the *Sea*, where they Empty themselves into that Grand *Cistern*, I would Advise him to make a stand, and there observe the Strife between the *fresh River-Water*, and those of a *Saline Nature*, which forceth back those fresh *Intruders*, making a *Flux* in the *Rivers* sometimes several Leagues upward; by which Repulse the strength of the *Salt-Water* being Spent, the Rivers return, and force their way into the *Sea*; which we call the *Reflux*: This causing a *boiling Fermentation* in the *Sea*, the fresh *River-Water*, being thinner than the Salt, riseth up in fogs and waterish Mists, impleting the *Atmosphere* with moist Air; and the Clouds with Water which the good Providence of *God* (like a *careful Gardiner*) sends down in Showers of Rain to Water the surface of the Earth for the Production of Vegetables.

Thus

Thus the Infinite Wise *God* of Nature hath settled a constant and regular *Communion* between the *Subterrene* and *Nubiferous Waters*; without which, this Earth would have neither been an Habitation for *Men* nor *Beasts*.

Having now demonstrated the *Communion* between the *Subterranean* and *Nubiferous Waters*; I might with the same facility shew that there is a *Communion* between the *Lunar* and the *Marine Waters* in our *Sea*, for the *Moon* being a Humid and Frigid Globe hath a mighty Influence not only on the Waters upon our Earth, but upon the *Plants*, *Trees*, *Fish*, and the *Moist Brains* of *Men*, which from the *Moon* are called *Lunaticks*.

Again the *Lunar Waters* being part of the same *Fluid Mass* which covered our Earth, there continues still a *Magnetick Sympathy* between them; hence it is that the *Moon* by its *Central Attractive Power* gradually swells up the *Sea* into a *Gibbosity*; till her *Magnetick Attraction* be over-powered by the *weight* of the *Water*; and then they sink down again, which causeth that regular overflowing at every *Change* and *Full* of the *Moon*, and this we call the *Spring-Tides*; when this overflowing is over, then the *Tides* come to their certain *Course*, only varying an Hour in twenty four; which is occasioned by the same *Gradual Attraction* of the *Moon*; thus the Waters below and above
the

the Firmament would again reunite as they did at *Noah's Flood*, if God's Providence did not fix their bounds, which without the Divine permission they cannot pass.

The Finger of God is so visible in causing this regular and constant Reciprocation of Tides so useful for *Navigation*, that the most profest *Atheist* (if he does not wilfully shut his Eyes) must be convinced that there is a *God* that orders all things for the good and benefit of *Man*; besides this constant fermentation in the Sea causeth the *Saline* and *Nitrous* particles to arise, and being impregnated with the *Atmospherical Air*, make it more fit for *Respiration*; and it's this *Aerial Acid* that fertilizeth the Earth.

But to keep the *Atheist* no longer making observations upon the Sea-Shoar, I will encourage him to take Ship and venture to ride upon the Backs of those frightful foaming *Waters*, when there are but four *Inches* between him and *Death*; for it's observed by an Ingenious person, that none fears *God* so much as he that denies that there is a *God*. *Hi sunt qui trepidant & ad Omnia fulgura pallent.* But let him take courage to himself, I will shew him how to foresee a Storm before it come, and tho' it be not in *humane power* to prevent it, yet he may prepare so as to escape the danger of Shipwrack.

And

And First when he observes the Porpices and other Sea Fishes which delight to sport and play upon the *Waters* of a troubled Sea, put up their heads and spout up *Water*, he must then expect that a Storm is approaching, for as we have already observed that the Original of *Winds* is from vast Swarms of *Nitrous* particles *Arising in the Bottom* of the Sea, which being put into fermentation by the *Subterrene* heat which abounds in that great Body, the first *Commotion* we call a *Bottom Wind*, which those *Marine Fishes* quickly perceive, and by their playing upon the *Waters* give *Mariners* notice to prepare against a Storm. The Night following these Swarms of *Nitre* will be risen up to the surface of the Sea, and then the *Waters* will appear as if they were all on *Fire*, and some of these *Nitrous* particles will fix upon the sides of the Ship and upon the *Masts* of it, which shining like *Meteors*, the Heathens formerly called by the Names of *Castor* and *Pollux*, and made Gods of them.

The Evening following the *Sun* will set *Red* and *Broad*, and the *Sky* be tinged with a *Crimson Red*, and if the *Vapours* form themselves into the figure of a *Ship* standing East and West, or North and South, or Crossing any other Point, we observe that from that Point opposite to the *Sun*, the *Wind* will blow that Night, or next Morning; and the
Rain

Rain and Storm follow; which I hope will send my *Atheist* to his Prayers.

Having now prepared him to meet a Storm we will make a venture into the *Main Ocean*; and there observe the *Wonders of the Deep*; how the *Leviathan* the Lord of the Seas, takes his pastime in those Brackish Waters; after which, we will encourage our selves to *Cross the Line*; and take a View of the other *Hemisphere*; see the *Southern Pole*, and those *Constellations* which the Interposition of the Earth keeps out of our sight.

Again, Man being a knowing and Rational Creature there can be nothing more agreeable to his Nature than *Contemplation* and *Conversation*; if my *Atheist* have any thing of Man left in him, I shall endeavour to gratify him in both these properties; for by Riding upon the Backs of those Liquid waves we shall at last, discover that this Earth is not flat and round like a Trencher, which was the Opinion of the *Ancients*, till *Columbus* cross'd the Line, and found it demonstratively true, that this Earth is of a *Globular Figure*, hanging pendulous in the Air, encompassed round with an *Atmosphere*; we shall also convince the *Atheist* that the Sun does not rise out of the *Eastern Sea* and goes to bed in the *Western Ocean*; and being refresh'd with a good draught of Salt Water, the next Morning riseth out of its waterish Bed; and
like

like a Giant Refresh'd with Wine delights to run his Course ; these were the wild Opinions of Men in the former days of Ignorance, before Navigation was improved to its full perfection, but are now experimentally known to be Vulgar and Ridiculous Conceits, grounded upon external Sense, and not upon solid principles of Judgment and Reason.

For notwithstanding that the Sun, by the Interposition of the Earth, goes out of sight once in twenty four Hours, yet it always keeps its Motion within its Orbit, and never Sets nor Riseth but, *quoad nos*, to the appearance of our outward Sense.

Having now encompassed the Earth, and met with People we call *Antipodes*, having their Feet *Diametrically* opposite to our Feet, my *Atheist* being no Philosopher (*Atheism* and *Philosophy* being Inconsistent) it may give him occasion to wonder that these People, with the Houses they dwell in, do not drop down to the Sky, which to his Apprehension should appear below them. To give him satisfaction in this Scruple, I must make him understand that this *Globe* of Earth is a Center of Attraction, and by its *Magnetick Virtue*, all heavy Bodies fix to it ; besides, we bear no more Proportion to this Earth, than a Mite does to a great Cheese, and it's equal to that little Animal, whether it be above or below the Cheese ; as
for

for *upward* and *downward*, they are only imaginary Terms, for what is under our Feet, we esteem downward; and that which is above our Heads, upwards.

Another *Scruple* may be upon his Mind, concerning the Diurnal Rotation of this Earth, that a *Motion* so *Rapid* should not throw down all our Houses, which frequently happens by a great *Earthquake*. To this I answer, That the *Diurnal Motion* of the Earth is *Natural*, *Even*, and *Regular*; and all heavy Bodies built upon it, are in a State of *Natural Rest*; whereas the *Shocks* of an *Earthquake* are by a *Motion* unnatural and violent; as if a Man going along the Highway, in his usual and natural *Motion*, should have his Heels *Tripp'd* up, which is a *Motion* unnatural and accidental.

By this time it may be convenient to go to Land upon some *Foreign Coast*, where we may meet with such Diversity of *Complexions*, *Manners*, and *Religions*, as cannot but be of infinite Use and Advantage to the Entertainment of his Thoughts with Pleasure, and the Improvement of his Reason.

And notwithstanding that in these *Foreign Countries* he may meet with *Turks*, *Jews*, and *Heathens*, as well as *Christians*, I doubt my *Atheist* will not find for himself a *Companion* of his own Profession; for the very *Heathen* do believe that there is a *Supream Being*

Being that governs the Universe, and have some kind or other of *Worship* and *Religion* among them: So that if it had been the Fortune of our *Atheist* to have been in the Ship with *Jonah's* Mariners, when the Storm sent them all to Prayers, if he had had no God to have pray'd to, they would certainly have thrown him over-board.

I shall only further add, That the Providence of God hath been pleased so to order it, that every Country should have something in *Perfection* that other Countries want, to encourage *Navigation* and *Trade*, one Nation with another; so that those that stay at Home, enjoy by the *Travels* of those that go Abroad, and those that Travel get Riches by their Adventurers.

I shall conclude this Class of Arguments with this Consideration, That *Navigation* being of so great consequence to the Delight and Convenience of *Humane Nature*; and God having not only given Man, Wit and Courage to attempt the Sea, but hath provided him with Materials to build Ships, and of late Years the use of the *Magnet* being discovered, which guides him to steer his Course through those vast Expansions of *Water*; I shall appeal to any Man of an unbiass'd Reason, whether this excellent and wonderful Fabrick of the *Earth* and *Waters*, could be established by any other Power than

an Omnipotent Being, Infinite in *Wisdom* and *Goodness*.

If we have now advanced so far in the Proof of a *Supream Being*, from the Consideration of such *Phænomena's* as seem more *rude* and *general*, what will the *Contemplation* of the more polished and refined parts of Nature afford us?

C L A S S II.

The second Class of Arguments, for the Probation of a *Supream Being*, will arise from the Consideration of the Nature of *Vegetables*. I shall proceed in this Method :

1. First I will prove the *Being* of a *God*, from the different *Modifications* of *Matter*, for the Reception of the several and different *Seminal Forms*.

2. From the several *Ranks* and subordinate *Species* under this *Genus*.

3. From the *Form*, *Beauty*, and *Fragrancies* of *Herbs*, *Plants*, and *Flowers*.

4. From their *Usefulness* to *Man* and *Beasts*.

class
THAT we may the better understand the Advantage we have in this *lesser* *Contemplation* of the more *Polite* parts of *Nature*,

ture, we are in the first place to take Notice of the Nature and Quality of that Substance we call *Matter*; for if it be either too *fluid* or slippery, it's unfit for any Impression, and therefore all *Matter* must *Rot* into a *slimy Moisture*, before any thing can be generated of it; as we soften the *Wax*, before the *Seal* can make any Impression upon it.

This *Modification* of the *Matter* is commonly from the Sun's Concoction, and Digestion of the Surface-Soil, and the *Aerial Acid* contributes much to the fermentation and Fertilizing of it; which being so *modified*, it becomes the *Matrix* wherein all *Vegetables* are ingendered, and thence grow up to Perfection; yet the Observation that the *Poet* made of Vegetable Productions must be taken Notice of here, *Omnis non fert omnia tellus*, i. e. every *Soil* is not productive of the same sort of *Vegetables*; for as God hath made great variety of Species under this *Genus*, so he hath ordained different *Modifications* of *Matter* agreeable to their *Natures*, and most proper for their *Production*. Thus we observe, that *Tulips*, *Gilliflowers*, and *Primroses*, will not naturally grow upon the tops of high Mountains, nor those courser Mountain-Vegetables, such as *Furz*, *Fern*, and *Bent*, in Gardens of the best Cultivation and Tillage. Yet we are taught by daily Experience, that if the barren *Heath* of *Mountains*

tains be by Burning, Liming, and Tillage, changed into a more unctuous and pinguid *Modification*, those courser *Sets* of *Vegetables*, that were natural to that sterile Soil, shall be quite destroy'd, and never more grow upon the same Soil, and a new *Set* of most rich *Grass* and beautiful *Flowers*, such as the *Clovers*, the *Cowslip* and *Primrose*, shall succeed therein. And without any Seed sown upon that improved Ground, shall grow up and come to Perfection, so as to propagate their Species by Univocal Generation.

The Question here will be, Whether this new *Set* of *Vegetables* had a spontaneous Generation, or sprung up from *latent* and *dorment* Seeds, which could not exert their Seminal Powers, until the Matter was new *modified* by the infusing into it a spirituous Ferment?

To the former I answer, That it is as morally incredible that *rude* and *undirected* Matter should, by the infusing of a new *Ferment*, either give the Form to the Stalk or Leaf, or imprint upon the Flower such lively Colours, with such curious Lineaments, as it is for soft Wax first to make the Seal, and then to engrave upon it some curious *Coat of Arms*, or the shape of some *Bird* or *Beast*.

For the solution and clearing of this dark *Phænomenon*, we must distinguish between *Seminal Principles*, and imbodyed *Seed*, such
as

as *Wheat, Barley, &c.* the former being only the specifick *Forms*, or spiritual *Entities*, of such Creatures as *God* designed should assume Bodies, when they meet with *Matter* modified for their Reception; and these Seminal *Principles* were disseminated through the whole Mass of Matter, at the first Formation of this Earth; but cannot exert their Powers, 'till they meet with proper Matter. Hence it was, that the total Destruction of the former Species of Vegetables, and the Production of a new *Set*, was from the change of the Soil, and the new Modification of the Matter.

And this new Set of Vegetables being produced from those latent and dormant *Principles*, it is of great Consequence, that they have Seed in themselves, for the Continuance and Propagation of their own Species; and also for gratifying Humane Art and Industry, much of which lies in Gardening and Husbandry.

It may seem very probable, that whilst the *Earth* was in its *Antediluvian State*, and full Strength, it might from Seminal *Principles*, produce the several kinds of Plants and Vegetables; but now it's grown so sluggish, that without the advantage of those small compendious Principles of imbodyed Seed, and Cultivation, it will yield no such *spontaneous Births*.

Having now from the different Modification of Matter evinced the Being of a God and Providence, I proceed to a second Argument of Probation, which the Contemplation of the several Orders and subordinate Species under this comprehensive *Genus* will afford us; to which we shall subjoin the Consideration of that great Curiosity there is in the *Form* and *Beauty* of the more noble *Plants* and *Flowers*, with the Fragrancy of their different Smells and Virtues.

And first of all, it's very remarkable, that *Moses*, the greatest Natural Philosopher that ever lived upon this Earth, represents *Nature* not working in haste, by precipitous Jumps, from one thing to another, but by a gradual and regular way of Proceeding; as first, making provision of Meat before she produceth the Animal, for any other Method would have been preposterous: He therefore makes common *Grass*, *Herbs*, *Plants*, *Trees*, and the whole Set of *Vegetables* the first Production.

I shall first begin with the Contemplation of common *Grass*, with which God hath over-spread the Surface of the Earth, as with a *Green Carpet*, in which Speculation, God's Providence is visible, Green being a Colour most agreeable to our Eyes; whereas he might have invested it with a Mantle of *Black*, *Brown*, or *Red*, which would have
been

been offensive and hurtful to our Sight, and that either by too much *dilating* or *contracting* of it.

This *Green Carpet* he hath embroidered and enamelled with great variety of beautiful Flowers, emitting most grateful Fragrances; and these bearing such a Suitableness and Harmony with the more refined Sense and Sagacity of the Soul of Man, cannot chuse but affect him with an Intellectual *Touch*; and being so sweetly gratified, he cannot (if he hath either common Sense or Understanding left in him) but acknowledge some hidden Cause that is Intellectual, that is the Contriver and Perfecter of those most curious and pleasant Spectacles in the World.

Again, when we further consider, that *Beauty* and *Symmetry*, and the *Comeliness* of *Proportion*, with the delightful Mixture of *Colours*, and the fragrant *Smells* of Flowers, are the proper Objects of Humane Understanding and Reason, and such essential Properties of Humane Nature, as distinguish it from brute Beasts, who having no Understanding of these Things, take no Notice of them; for a filthy *Mare*, taken out of a *Dung-hill Cart*, is as grateful to a lustful Stallion, as one of the finest Shapes taken out of a King's Stable: And when Mens Lusts are grown so Hot and Impetuous, as to make no distinction between *Pulchritude* and *Deformity*,

it's no wonder if these Men, having wholly brutified their Humane Nature, should turn *Atheists*, and deny the *Being* of that God that made them Men. But to insist no more upon this *Topick*, I shall proceed to a third Argument, from the Consideration of the Usefulness of all the sorts and kinds of Vegetables, contained in this so large an Inventory.

And it cannot but afford Matter of Wonder and Admiration to a thoughtful Man, that any one that daily feeds on God's *Bread*, and drinks (perhaps) too plentifully of his overflowing *Cups*, should be so stupified by the Prevalency of his Lusts, as to deny the Being of that God, whose good Providence hath spread a Table every where for his Creatures, and hath not only furnished it with a juiceless *Green Carpet*, but with succulent *Herbage*, and nourishing Grass.

Again, if the *Atheist* would but take the pains to be so thoughtful, as to consider, that God hath set Man at the *Head* of the *Table*, and has given him not only the choicest of all the *Herbage*, but the best and most delicious of all the Fruit that grows upon the *Trees*, &c. for it cannot be imagined that *Apricocks* and *Oranges*, that *Apples* and *Grapes*, and such like Fruit, were intended for Beasts, that have their Heads downwards, and can scarce look up to see them, much less to know how to reach
 them,

them; and besides, there are not many desire them, he would find Reason to adore that Almighty Being that has so liberally provided for Mankind above the rest of the Creation.

Again, it's eminently observable, that not only the *Vine*, but the most useful *Grains* of *Wheat* and *Barley*, &c. are made Edible and Potable by Man's *Art* and *Industry*; for without *Tillage* and *Husbandry*, they would either not be at all, or of little Use; those that grow *wild* being good for nothing unless for Beasts to feed upon; and therefore, to encourage Men's Wit and Industry, God hath made Instruments exactly fit for this Employment; as the *Oxe* and the *Horse* for Strength; *Wood* and *Iron* for Utensils and Instruments.

Having had the Pleasure of viewing the Flowry *Meadows*, the plentiful *Corn Fields*, the fruitful *Gardens* and *Orchards*; I will desire the *Atheist* to take a turn with me in the *Forests*, where he may observe the stately *Cedar*, the robust *Oak*, and tall *Firr*; and likewise the *Elm*, the *Ash* and *Birch*, and other Trees of a lower Order, yet proper for making of *Carts*, *Coaches*, *Ploughs* and *Husbandry Geer*; the former being more proper for Timber to Build *Houses* and *Ships* with, without which we should have been forced to have lived in little *Cabbins*, like *Bee-Hives*, or in *Rocks* or *Caves* underground.

Besides,

Besides, the lowest Order of Trees, such as *Shrubs*, *Thorns*, and *Briars*, they are useful for *Hedges* and *Fencing*; or at least, for *Fuel*.

From what I have advanced upon this Argument, if the *Atheist* will but follow the free Suggestions of his own Reason, he must necessarily conclude, that there is a God, who hath made such ample Provision for his Creatures, but especially for Man. But I easily foresee that the *Atheist* will object, that we have many stinking *Weeds*, and some of a poysonous Nature; and are so far from being useful to Man, that they are destructive of *Health*, and sometimes of *Life* it self; but this Objection is the effect of our Ignorance, or want of Consideration; for first, the Industry of Man is exercised by them, to weed them out, which Reason, if it seem slight, let him consider, that if Humane Industry had nothing to struggle with, the Fire of Man's Spirit, without Exercise, would be half *extinguished* in the *Flesh*.

But who knows but that it's so with poysonous Weeds and Plants as it is vulgarly fancied of *Toads* and *Serpents*, that they lick up the Venom of the Earth; so poysonous *Plants* may reasonably be supposed to draw to their Visible Bodies that Malignant *Juice*, which if diffused through the other *Plants*, would make them less wholesome and fit for Nourishment.

Lastly,

Lastly, It's very well known by those who understand any thing of Natural *Philosophy* or *Physick*, that those Herbs which the Rude and Ignorant *Vulgar* call *Weeds*, are oftentimes made use of as the Materials of most Sovereign *Medicines*; for as the Frame of our Bodies cannot subsist and become *tenantable* without the Supports of wholesome Food; yet being it consists of those two opposite *Principles* of *Siccity* and *Humidity*, the Strife between them, and the Prevalency of one or the other exposeth our Bodies to such Diseases and Distempers as have their Original Cause from too much *Heat* or too much *Cold*, God hath provided for us among these Vegetables such Medicines as are proper for the Curing of those Diseases.

And that which seems here most remarkable is, that the Beasts share with us in their *Medicinal Virtues*; I shall only instance in the *Dog*, who, when he finds himself sick at Stomach, by a Natural Instinct, knows his Cure, and presently runs to *Grass*; and having eaten it, it gives him a *Vomit*, and the *Dog* is well.

God having now spread his Table, and furnished it with all the Varieties that the Vegetable Kingdom can afford, our next Contemplation will be entertained with the Consideration of such Creatures as God has created and invited to so noble and plentiful an *Entertainment*.

CLASS III.

The Third Class of Arguments for the Proof of a God and Providence, will arise from the Consideration of the Nature of Animals, in Contemplation whereof we will proceed in this Method.

1. Their *Procreation* and *Propagation*.
2. The *Make* and *Fabrick* of their Bodies, how agreeable they are with their proper Elements; And
3. Their Usefulness to Mankind.

THE *Waters*, according to the *Mosaick Scheme*, being made first Productive of Animals, and Fowl congenial with the Fishes, our first Undertaking shall be to treat of the Nature of *Fishes* and *Birds*.

That which is most remarkable in the Natures of Animals, is the Difference we find in the manner of their *Procreation*, some being *Oviparous* and others *Viviparous*. And this Distinction is a visible Sign of *Counsel* and *Providence*; for tho' it will be granted that the Species of *Fishes* and *Birds* might have continued and subsisted if they had been *Viviparous*, yet it would have brought their *Individuals* to a very small Number.

Fishes having the Priority of Creation, I shall first treat of their *Natures* in this Method.

God's Providence being so visible in the Procreation and Propagation of *Fishes*, that I presume it may be of some Advantage to us, to understand the Time when, and the Manner how they *Ingender*; and in this I do not depend only upon the Reports of *Fishers*, whose Business it is to frequent the Waters, and to observe the Times and Seasons when *Fishes* are in a Right Condition to be taken, and most fit for Use; but I had the Curiosity to make it my own Observation, from which I give this Account of the Procreation of River *Fishes*, which is after this manner. When by their Summer Feeding they are grown fat and strong, in *September* and *October* they Swim up the Rivers to the Spring *Heads*, where the Subterrene *Heat* and *Warmth* break out, and keep the Water from *freezing*; there, with their *Noses* they dig Holes in the Sand, which they prepare as Birds do Nests for laying their Eggs in; then, not by Penetration of Parts, like other Animals, but by playing Cheek by Jowle, and the *Sympathetical Touches* of their *Bellies*, the Female scattereth her Roans or Rows, and the Male spawns his Milt, which mingling together in the Hole or Nest they had prepared for the Reception of their
Spawn,

Spawn, they cover it up, and then leave their Eggs to be Hatched by the under-ground Heat, which by the next Spring having got *Life* and *Strength*, they come down the River in most numerous Shoals.

And as the Fresh Water *Fishes* Ingender in the Spring *Heads*, so it seems most probable and agreeable to Reason, that the *Marine* and Salt Water *Fishes* do Ingender and scatter their Eggs in the Sub marine Quick-sands, where the under-ground Heat and Warmth most abounds.

I shall not here enquire into the Nature and Manner how the nobler sort of *Fishes*, such as the *Whale*, *Dolphin*, *Sea-Calf*, and others of great Bulk, propagate their Species; whether by Spawning or by Emission of the Genital Seed, in the manner of the *Viviparous Animal*, which is the Opinion of several Naturalists of good Authority; but that fluid *Element* which Providence has assigned for their Habitation, being not agreeable with the Natures of those Animals that give Suck and nourish their young ones with Milk, I must dissent from their Opinion.

Again, *Moses* tells us that God commanded the Waters to bring forth exceedingly; for as Grass and Herbs are not the Fruit of the Sea, and *Fishes* having neither Legs nor Wings to go to Land to seek their Food, it was necessary that they should feed one upon

upon another, the great ones upon the small ones: And therefore, that they should multiply in great Plenty, which they could not have done in so numerous a manner as 'tis apparent they do if they had been *Viviparous*. God's good Providence made them *Oviparous* that one might bring forth a hundred at a time: But this is to be understood only of the smaller *Fishes* which God hath made Food for the greater; and the *Whale* being the Lord of the *Seas* feeds upon all his Underlings.

As God's Providence is thus visible in their Procreation and Propagation, so it's no less apparent in the *Make* of their *Bodies* agreeable to the Element they live in.

How handsomely do their *Gills* supply the Office of *Lungs*, that their Blood might be cooled with Water, as it is by the *Lungs* of other Animals with the *Air*; the *Bladder* of Wind found in their Bodies is contrived for their more easy Swimming; as also the manner of their *Fins*, which consist of a Number of Gristly Bones, long and slender, like Pins or Needles, and a kind of a Skin betwixt, which makes them thin and flat, like a Pair of Oars.

And as their Bodies are made agreeable to their Element, so they, as well as the Terrene and Aerial *Animals*, are useful to Mankind, some of their Bodies being most whole.

wholesome and delicious Food, others affording great Plenty of most useful Oyl; and their very Bones are no less useful, especially those of the Whale.

From the Consideration of Fishes I proceed to the Fourth Class of Arguments, namely to consider the Nature of Fowls, and shall give the Reason why these, as well as Fishes, are *Oviparous*, and bring not forth alive.

CLASS IV.

THE First Reason is, that there may be more Plenty of them, That neither those *Birds of Prey*, nor *Serpents*, nor *Fowlers* might lessen the Number of their Individuals, and destroy their Species; for if they had been *viviparous*, the Burthen of their Womb, if they had brought forth any considerable Number at a time, would have been so heavy that their Wings would have failed them, and every body might have caught the old ones. But this is not all the Advantage we shall make of this Consideration; I demand what is it that makes the Bird prepare her Nest with that Artifice to Lay her Eggs in, and then to Sit upon them 'till they be Hatched? How comes it that she takes such Care to feed her young
with

with agreeable Food, and to distinguish between Food and their useless Excrements? Did she learn all this from her *Mother*? Or rather does she not she knows not what? but yet 'tis what ought to be done by the most exquisite Knowledge. Hence it is Conclusive, that something else has Knowledge for her, which is the Maker and Contriver of all things, *viz.* the Omniscient and Omnipotent God.

Having now shewn the Manner how *Birds* Generate and Propagate their Kind, we shall take into Consideration the Make and Frame of their Bodies, which being, not only as to their *Shapes, Colours, excellent Symmetry* and Proportions, most beautiful and lovely; but so agreeable with the Natures of those Elements wherein, and whereon they live, that the most profest *Atheist*, who has any thing either of Sense or Reason left in him, cannot but discern the Power, Wisdom and Providence of God in their *Make and Frame*.

These *Amphibious Animals* have the Benefit of Two Elements, and some of them the Advantage of Three, *viz.* the *Earth, Water* and *Air*.

I begin first with the Water Fowl, such as the *Swan, the Goose* and *Duck*; how obvious is it to any that will make Observations, how well they are fitted for the man-
Swimmers.

ner of Life their *Wise Creator* designed them to Live? for they that Swim in the Waters, their Feet are framed for it like a Pair of Oars, their Claws being connected with a broad Membrane, and their Necks are long that they may paddle in the Mud and fetch out their proper Food.

Waders.

Another sort of Water-Fowl, such as the *Hern*, and other such like that live upon Fish, and are forced to frequent the Waters; How do we observe them walking by the Sides of shallow Rivulets upon *long Stilts*, like People that dwell in the *Marshes*, and having long Necks like *Angle-Rods* (as *Aristotle* observes of them) whereby they are fitted to fetch out their Fish from the bottom of the Water. We further observe of them, that their Claws have no such Membranes as the *Swan*, *Goose* and *Duck*; for those would have been a Hindrance to those Fowls that only *wade* in the Water and do not *Swim*.

Divers.

A third sort of Water-Fowl are the *Divers*, such as the *Sea-Maw*, &c. How do they hover over the Water, fluttering with their Wings, by which, as 'tis observed, they tempt the Fish to come up to the Surface of the Water to gaze at them, and then with a Motion, almost as quick as Sight, they fall upon their Prey.

From the Water-Fowl that feed upon Fish and Frogs, we proceed to the *Carnivorous*
Birds

Birds that feed upon Flesh; these being Birds of Prey are also fitted for their way of living, having short Necks fit for Strength, crooked Talons fit to hold fast the Live Prey that it wriggle not from them; their *crooked Beaks*, like sharp Hooks, are fit to tear the tough Flesh; but we observe that the Bills of *Swans*, *Geese* and *Ducks* are broad, yet fit for rooting, for puddling in the Mud, and shearing of Herbs and Grass, or such easy Feeding.

From these Martial and Marshy Birds we proceed to the Wood and Field Birds, which feed much upon the Fruits of Trees, *Corn*, *Seed* and the like; the Bills of these are all sharp-pointed, fit for picking up *Corn*, and the like proper Food; their Talons are open fit for scraping in the Mould, &c.

Thus the God of Nature hath made nothing in vain, but for Good only, being all ordered by Counsel, Wisdom and Providence.

To which we shall subjoin, that Providence hath made them all in some measure useful to Man.

Some to furnish our *Tables* with most wholesome delicious *Food*; others to delight our *Eyes* with the excellent Symmetry of their Shapes and beautiful Colours; others to Serenade our *Ears* with the variety of their Musical Notes; and those Birds of Prey that are so *Carnivorous*, to lessen the number of

the smaller Birds, that they may not over-stock their Feeding. Besides, if such *Animals* as die of Age should leave their *Carcasses* to rot upon the Ground, the Stink would corrupt the Air and be offensive to *Man*.

Having now entertained our Speculation with the Consideration of the Natures of *Fishes* and *Fowl*, I shall proceed to a Fifth Class of Arguments for the Proof of a *God* and *Providence*, which will arise from the Contemplation of the Natures of the *Terrene Animals*; and we shall proceed much in the same Method we have used in the former *Classes*; we will Consider,

CLASS V.

1. *Procreation* and *Propagation*.
2. The *Make* and *Fabrick* of their *Bodies*.
3. Their *Usefulness* to *Man*.

AND First it's observable, that as *Providence* hath furnished the *Vegetable* and *Fluid Kingdoms* with great Variety of different *Species* of *Animals*, not only subordinate, but subservient one to another; so the same *Providence* hath stocked this Earth with great Variety of *Animals* of different *Species*,

Species, all subordinate and subservient to *Man*, being the Perfection of the Visible Creation, and God's Vice-gerent upon this Earth.

I shall begin our *Contemplation* with the lowest Order in this so ample and large an Inventory, which *Naturalists* call by the Name of *Insects*; these have their Life in the *Skin*, having neither Flesh, Blood nor Bones, like other Animals of the Superior Orders.

Of all which the *Crawling Worm* is look'd Of Worms. upon to be the most contemptible and useless of all God's Creatures; but this only is a hasty Thought without Consideration, which will appear if we observe the *Time* of their *Ingendering*, and the Matter on which they are *Ingendered*. The Time is in the Spring Months, when the Earth abounds with a gross, pinguid and luxuriant Slime, of which these Vermine are Ingendred, and then feed upon it; which, if it were not suck'd up, and contracted to the Bodies of these Diminutive *Animals*, but diffused through the Grass and Herbage, would occasion Murrains and other Diseases in Beasts; and also in Men, who at that Time and Season feed much upon *Sallads* and Herbage.

Again, these *Worms* are, by God's Providence, ordained for the Food of the *Vernal Birds*, such as the *Cuckow*, and others that

feed altogether upon *Worms*: Besides, at this Season the *Birds* do Hatch their young ones, and Nature hath provided these *Worms*, being of several Sizes, for their first Food and Nourishment; as the *smaller Birds* gather up the *smaller Worms*, so the *larger Birds*, such as the *Crow*, the *Raven*, and the like, those of a greater Size; and when they have filled their Crop they disgorge them to their *young Brood*, which with open Mouths greedily receive them; and this is as proper Feeding for them as Milk is for Sucklings.

Flies.

The next Order of *Insects*, which is not only thought useleſs but hurtful to *Man*, is thoſe vaſt Swarms of *Flies*, which in hot ſultry Weather fill the Air; this alſo is the Effect of Ignorance and want of Thought; for as theſe are Ingendred of Corruption in the Air, ſo they feed upon it and contract it in their little Bodies; which if it were diffuſ'd through the Air, we ſhould breath Corruption, and either *Insects* would take *Life* in our Bodies, or elſe Infect us with moſt dangerous Diſeaſes, as *Plagues*, *Fevers*, &c.

Polypodes.

A third Order of *Insects* that ſeem leſs uſeful, if not hurtful to *Man*, are the *Polypodes*, ſuch as the *hairy Worms* and the *Asp*.

As the groſs *Crawling Worm* is generated of *Humidity*, which is a Vehicle of Sweetneſs and an *Antidote* againſt *Poyſon*; ſo theſe *Polypodes* are generated of *Siccity*, and having

it predominant in their *Constitutum*, they feed upon such dry Exhalations as are of a Poysonous Nature; which, if diffused either through the Air or Herbage, would be more hurtful to us than their little Bodies: And besides God hath ingrafted in our Nature an Antipathy to their Forms, so that we know them, and can easily avoid the Danger of them. But to make Reparation for all those *little Animals* that are seemingly hurtful; God hath created the *Hive-Bee*, which by The Hive-Bee. her Labour and Industry gathers for us most delicious Food; that Cœlestial *Manna* which falling upon *Flowers, Leaves of Trees and Plants*, she sucks it up and brings it home to her *Hive* in a little Bag within her Belly; and having lodged it in her little Cell, she Seals it up with Wax, either for her own or Humane Use.

But I hasten to a higher Order among the Terrene Animals, which differing from *Quadrupedes* are accounted Imperfect *Sensitives*, such as the *Snake, the Adder and Serpent*; tho' these have a natural Enmity for our Nature, and upon the least Provocation threaten our Deaths by their Poysonous *Bite*, yet it is believed that they lick up the *Venom* of the Earth; which, if it were diffused, might be of more dangerous Consequence than their *Bite* or *Sting*. Besides, though they hide themselves in the Grass, yet upon

our Approach towards them, they give us Notice by their *Hissing*, and the *Rattle-Snake* by her *Rattles*, that we may avoid the danger of their *Bite* or *Sting*.

Having now considered the Natures of such *Animals* as are of the lowest Orders, and are by *Naturalists* accounted Imperfect Sensitives, being all either *Oviparous*, or *Spawners*, such as the *Frog* and *Toad*; for notwithstanding that some of the *Marine Fishes* of large Bodies may generate after the manner of *Viviparous* Creatures by Penetration of Parts; yet I am of Opinion, that the *Female* ejects her *Spawn* in the Waters, which takes Life, and comes to Perfection after the manner of *Frogs*.

I proceed now to the highest Order of *Animals* which are *Viviparous*, and bring forth their young alive; these being all *Quadrupedes*, are esteemed the most perfect among the Sensitives; yet among these there are some that appear rather hurtful than useful to *Humane Nature*, such as *Rats*, *Mice*, and the like; yet we must allow these to be of God's Creating, and in Nature's Storehouse Meat is provided for them; and if they prove hurtful to *Man*, he must not blame *God*, but rather suspect his own Ignorance; yet that the Number of these might not increase so as to be offensive to *Man*, *God* hath ordained the *Cat*, the *Weefel* and the *Owl* to destroy them.

And

And because these hunt for their Prey in the Night, Providence has given them such sparkling and flaming Eyes, as emit such Rays of Light, that without either the Light of the Sun, or a Candle, they can see to catch their *Prey*; besides, those Animals come out of their private Apartments to gaze at the glare of their sparkling Eyes, by which they are charm'd into an Insensibility of Danger, and so become a Prey to the Hunter. And after this manner we observe Fishes to be caught with flaming Straw.

But that the Numbers of Insects, and such Vermine, may not be offensive to us, Providence has ordained some of the superior Orders of Creatures to make it their Business to destroy them, especially when their Increase is too Numerous.

It is reported, that in the *West-Indies* there is a Beast, which *Cardan* calls *Ursus Formicarius*, whose very Business it is to eat up the *Ants*, which some parts of that Quarter are sometimes excessively plagued with: We might instance also in some Creatures, that do not only bear a singular Affection for Mankind, but are also fierce Enemies to those Creatures that are cruel and hurtful to Man; such are the *Lizard* to the *Serpent*, the *Dolphin* to the *Crocodile*, the *Elephant* to the *Dragon*.

Having

Having now taken a View of such Creatures as are seemingly hurtful, and of less use to Mankind, I proceed to consider the more noble Orders of *Brutes*, whose Usefulness is so obvious and visible, that to enlarge upon this Topick would seem unnecessary; I shall therefore be very short in this Contemplation, and only give Account, first,

1. Of their Usefulness for *Humane Food and Sustenance*.

2. For assisting us in our *Labour and Industry*, in Tilling the Ground, and Husbandry; in bearing *Carriages* for us, and for our *Riding* long Journeys upon, and other like Uses.

3. And likewise for our *Pleasure and Diversion*.

Those for *Food and Sustenance*, according to the *Mosaick* distinction of *Animals*, into Clean and Unclean, are such as chew the *Cud*, and divide the *Hoof*, and are Feeders upon Grass, Corn, and Herbage.

And notwithstanding, that the *Horse*, the *Ass*, the *Camel*, and *Elephant*, are not *Carnivorous Animals*, and eat Flesh, yet being that they neither chew the *Cud*, nor divide the *Hoof*, they are not (in Christian Countries) made use of, as either proper or wholesome Food for Man; but are made use of for Labour, to assist our Industry in Tilling the Ground, and other necessary Conveniences of Humane Life. Among

Among those many Creatures for Labour and Service, I must not omit the common *Cur*, how useful he is for the *Shepherd*, and the stout *Mastiff* to guard the *House*.

And as *God* hath not only provided for our Food and Nourishment, but for Labour and Service, so the good Providence of *God* hath provided for Man's *Pleasure* and *Diversi-
sion*; for as it hath pleased *Providence* to consider our Frame, that there being not a thoughtful Creature upon this Earth but Man, and that all or most of the Troubles our Nature is exposed to, are occasioned by our too much Thoughtfulness, he has therefore not only given us *Bread* to support our Bodies, but *Wine*, and other *spirituous Li-
quors*, to banish Thoughtfulness, and to make us to have chearful Countenances.

He hath also created a great Number of good *Creatures* for no other use but our *Pleasure* and *Diversi-
sion*; as the *Spaniel*, the *Grey-hound*, and *Hound*, not forgetting ~~the~~ the *Mastiff*; all these know their proper *Game*, and *Nature* has given them so quick and acute a Sense of *Smelling*, that they cannot only distinguish their proper *Game*, but pursue it by the *Scent* they leave behind upon the Ground.

Having now, with my *Atheist*, taken a Ramble through the whole System of *Visi-
ble Nature*, that he may not stumble so near
his

his Journeys end, I will endeavour, before I conclude this Argument, to remove such Difficulties as may lie in his way : And first, it may occasion Matter of Wonder to him, that Man, being so much God's Favourite, should come *Naked* into the World, when all other Creatures come from the Womb with their Natural *Cloathing* ; and again, why Man should be the most Impotent of all the Creatures, having neither Strength to stand upon his Feet, or so much of Natural Instinct, as to find his Mother's Breast that gives him suck.

To the first I answer, That notwithstanding God hath given to Man a Title of Dominion over all the Creatures, yet Man cannot reasonably expect that *Coats* and *Breeches*, *Silk-hoods* and *Furbelow-scarves*, should either grow out of the Ground, or drop from the Skies, it's sufficient that *Providence* affords him proper Materials, as the *Skins* of *Beasts*, the *Wool* of *Sheep*, *Hemp* and *Flax*, &c. nay more, God has brought the *Silk Worm* into the World for no other Business, than to furnish Man with more costly Cloathing, and to spin away her very Entrails to make him fine and gay ; and as God hath given Man, *Wit* and *Art*, it's a Reproach to his Nature, if he does not make use of it, for his own Advantage.

Again,

Again, it's confess'd, that Man, when he comes from the Womb, is the Weakest and most Impotent of all Creatures; yet God hath made his Parents rational Creatures, and by the Laws of Nature, they are oblig'd to support their Childrens weakness with proper and agreeable Food; and this Care and Parental Love and Affection, is gratefully to be acknowledged and repay'd by *Children* to their *Parents*, when, by Age, they are grown Old and Impotent.

Again, it may seem a Hardship upon the inferior *Orders of Creatures*, that they should be always at our Mercy to kill and butcher them, when we have occasion, either to fill our Bellies, or cloath our Backs; but this, when more closely enquired into, will prove a Kindness, rather than Cruelty, to those Creatures; for what, if occasionally and orderly, we kill some of them for Food, their Dispatch is quick, and much less dolorous, than that they should be torn in pieces by such cruel Masters, as the *Lyon*, the *Bear*, or *Tiger*; who would not give them time to die, but even eat their Flesh from their Bones alive; and if they should live to the tedious Melancholy, and Sadness of Old Age, it would first torture them, and then kill them, and leave their Carcasses upon the Ground, rotting, stinking, and useless.

Another

Another stumbling Block in the *Atheist's* way, is the Consideration of *God's* creating such cruel *Birds* and *Beasts of Prey*, which live upon the *Flesh*, not only of the inferior Ranks of *Animals*, but even threaten and endeavour the Destruction of *Man*, and the whole *Humane Race*.

To which I answer, That *God* has not only given to *Man*, Wit and Courage, but hath furnished him with *Horse* and *Arms*, and hath created the stout and generous *Mastiff* to be his *Second*, and to venture his Life for his *Master*: So that he is able to bid Battle to the very fiercest of them, and either chase them away into *Solititudes* and *Desarts*, or else bring them under his subjection, and give Laws to them. Besides, these *Martial Beasts* are not only for Ornaments of the Universe, but to exercise *Man's* Wit and Valour, when he pleaseth to encounter with them.

Again, to expect, or wish, that there should be nothing in the World, but such *Dull* and *Tame Animals* as can neither *Bite* nor *Scratch*, is as groundless and childish, as if there should neither be *Choler* in the Body, nor *Fire* in the Universe.

Before I proceed to another Class of Arguments, I desire that the *Atheist* would tell me (if he can) why there are not as many Foxes as Sheep, and as many Wolves, Bears,
and

and Tigers, as there be of the useful Beasts? Do not these all propagate their Species, and bring forth more at a time, than either the *Sheep*, the *Mare*, or the *Cow*? It's not in the Power of Philosophy to give a Reason for this, for there can be no other Cause for this Wonder in Nature, but the Divine Providence, which so streightens their Increase, that they may not be too offensive and destructive, either of Man or Beast.

CLASS VI.

The sixth *Class* of *Arguments*, for the Proof of a *Supream Being*, and a *Divine Providence*, will arise,

1. First from the Consideration of the *Frame and Structure of Humane Bodies*.
2. From the Internal Faculties of his *Soul*, and the necessary Cause of Disorder in *Man's Nature*.
3. From the Agreeableness of the Divine Wisdom, that there should be such a Creature upon this Earth as Man.

I Needed not have taken the *Atheist* thro' the Works of Nature, to seek out Arguments to prove the *Being* of a *God*, for he may be plentifully furnished at *Home*,
if

if he will but take the pains to look into himself.

Let him first look into the Frame and Structure of his own Body, and wherein he differs from the *Make* of all the inferior Orders of *Brutes*, and he will find such ample Testimonies, that he cannot be so sottish as to deny the *Being* of that *God* that made him a *Man*, and not a *Beast*.

Let him tell me, why the *Beasts* have their Heads downward, and the Frame of his Body is Erect; but that the *Beasts* being only sensual, can be capable of no other Happiness but what is agreeable to their Senses.

And tell me why hath *God* made the *Body* of a *Man* erect, with his Face toward *Heaven*, but to fit him for *Contemplation*, which none of the brutish Tribes are capable of: He can look down with pleasure, upon the several Orders of *Beasts*, being Creatures below his *Nature*; and he can look upward with more delight and pleasure, and form *Ideas* of those Spiritual and Intellectual *Beings*, which are an Order of *Creatures* superior to his *Nature*; he can contemplate *Heaven*, from whence his *Humane Soul* had its *Original*, and have a Notion of those *Glorious Mansions* prepared for its Entertainment, when it leaves his *Body*, if (by his *Atheism* and *Infidelity*) he makes not a Forfeiture of so great a *Happiness*.

Tell

Tell me, why has *God* made his *Mouth*, *Tongue* and *Lips* so fit for Articulate Speech, but that he should have, not only a Communion with his own Species, but be a Priest in this *Magnificent Palace* of the *Universe*, and send up Prayers and Praises to the great *Creator* of all things, in the Behalf of himself, and the rest of the Creatures under his Dominion?

Again, tho' the Brutish Creatures have *Eyes*, *Ears*, and other Members in common with *Man*; yet in *Man* there is more of *Divine Majesty* in his Countenance; a more exquisite Symmetry of Parts than is to be found in the Frame and Fabrick of *Brutes*; insomuch that if it had been in our Power to have made our selves, we could have framed our selves no otherwise.

How are our *Eyes*, those two *Inlets* by which our *Souls* take in *Idea's* of things without, conveniently placed in our Heads? How are they fortified with two Wreaths of Hair which are not more ornamental to our Faces than useful to keep the Sweat of our Foreheads from endangering our Sight?

How are the *Eye-lids* fortified with little *bristly Hair* against the Assaults of *Flies* and *Gnats*? besides the *upper Lid* claps down every Night to secure the *Eye* whether there be any Assault or not.

Again, Tell me why are the *Fore-Teeth* sharp like *Chizels*, and the *Inner-Teeth* broad? but that the former are to Cut, and the other to Grind.

Why have we three Joints in our *Fingers* and but two in our *Toes*? but that the Hands may be stronger to hold fast what they have in Possession, and more useful to us in Manual and Mechanick Arts.

From what I have instanced, it's demonstratively evident, that nothing is made foolishly or in vain, but by the Providence of a Wise God that ordereth all things, not only upon this *Earth* but in the whole *Universe*.

These *Contemplations* are so grateful to a *Man's* Reason, and the inward Faculties of his *Soul*, that they entertain a Man with more solid and lasting Pleasure, than all the Suavities of Sensual Delights, which are but the Momentary Satisfaction of a Brutish Lust; and when these Carnal Pleasures are forbidden by God and our own Consciences, like *Bees* they leave more Sting than Honey behind them; and oftentimes there is but a Minute of Time between the Enjoyment of the Pleasure and Repentance.

But if the *Atheist* cannot be convinced that there is a *God* and *Providence* by the outward Frame of his Body, I must desire him to look *inward*, and he there will find a

Prin.

Principle, not only superior to *Sense*, but *separate* and *independent* upon it; and this appears from the different *Objects* of either *Faculty*; for Example, *Reason* is sensible of *God*, of *Religion*, of *Spirits*, of *Shame*, of *Compassion*; but *Brutes* have no *Sense* at all of these things, nor can form the least *Perception* of them. Now tell me to what *End* should *Nature* have planted in *Man* such strong *Propensions* to *Religion*, which consists chiefly in the *Belief* of a *God*, the *Immortality* of the *Soul*, and a *future State*, if there be neither *God*, *Angel*, nor *Spirit*, nor a *future State* after this *Life*? This certainly would have been such a *Slur* committed by *Nature*, as no *Wise Being* can excuse.

Again, We observe that *Reason* bridles *Sense*, curbs it, and sometimes acts quite contrary to its *Interest*. Hence it is that some of those *Refined Wits* even among the *Heathen Philosophers*, as well as *Christians*, have, by mortifying their *Lusts*, subduing their *Animal Passions*, and sequestering themselves from the *World*, so exalted and sublimed their *Souls*, that they have lived even as if they were out of the *Body* whilst in the *Body*.

Besides, Experience daily shews us the *Contrariety* between the two *opposite Judgments* of *Reason* and *Sense*; For first, *Sense*, for Example, judgeth the *Sun's Diameter* to be but a *Span*; *Reason* here opposeth, and judgeth

judgeth it to be much bigger than the *Diameter* of the *Earth*. Infinite other Examples might be given, but this one may serve for all.

The Disagreement of the two *Appetites*, and how they draw several ways and torture the *Heart* of *Man*, is evident by every *Man's* Experience, as well *Heathens* as *Christians*. *Ovid* brings in *Medea* complaining tragically in these Words, *Metamorph. L. 17.*

————— *Aliudq; Cupido*
Mens aliud suadet; —————
 ————— *Video meliora proboque*
Deteriora sequor. —————

A new felt Force my striving Powers invades,
Affection this, Discretion that perswades.
I see the Better, and Approve it too;
The Worse I follow —————

The *Scripture* is plentiful in this Argument; *The Spirit*, saith our *Blessed Saviour*, *is willing but the Flesh is weak. The Spirit coveteth against the Flesh, and the Flesh against the Spirit. I find a Law in my Members warring against the Law of my Spirit, leading me captive into sin; I do not that which I will.* Nothing can solve this Knot but the acknowledging a *Deity*, and that *Man* borders between the two Regions of *Matter* and

and *Spirit*; and therefore it is no wonder, that there is such tugging and pulling this way and that way, upwards and downwards; for those that dwell in the Confines of two *Kingdoms*, are most subject to *Disquiet* and *Confusion*.

Having now given the Reason why there is so much Disorder of the *Passions* in the *Soul* of Man, some tying him down to the *Body*, others lifting him up towards *God*; it remains, that in the last place, I shew how agreeable it is to the Wisdom of *God* and *Nature*, that there should be such a Creature upon this Earth as *Man*; for there being so many notable Objects in the World to entertain such Faculties as *Reason* and *Contemplation*, there ought certainly to be such a *Member* of this *Visible Creation* as *Man*, that those Things might not be in vain.

For tell me, if there was not *Man* upon this Earth, which, among the *brute Animals*, would have had the Knowledge to dig into the Bowels of this Earth, to find out those hidden Treasures of *Gold*, *Silver*, *Copper*, and other valuable *Minerals*, which are immured in the *Chests* of hard Stone? Which, among the *Brutes*, would have looked up to *Heaven*, and observed the Motion of the *Planets*, and distinguished between the *fixed* and *erratick Stars*? Who would have found out the Art of *Navigation*, and discovered

Foreign Countries? Who, among the *Brutes*, would have praised the great Creator, for those vast Numbers of good Creatures, with which he hath stocked and furnished the Earth? Thus we see all filled up, and fitted without any Defect or useless Superfluity; it is then as natural to conclude, that all this is the Work of a wise *God*, as at the sight of a Noble and well contrived *Palace*, we conclude it to be the Work of a wise and ingenious *Architect*.

C L A S S VII.

My Seventh *Class* of *Arguments*, for proving the *Being* of a *God* and *Providence*, will arise from the Contemplation of the established *Course* of *Nature*, and the wonderful Power of *Natural Instinct* in *Insects*, *Birds*, and *Animals* of the lowest Orders.

AS the *Almighty Creator* of the *Universe* made the whole *System* of this *Visible World* we live in, in Weight and Measure; and that not only the outward *Fabrick*, but also the inward *Furniture* might be kept in the same Beauty and Order he at first made it, he impressed *Eternal Laws*, as well upon the *Inanimate Bodies*, as the *Animate Creatures*,
which

which Laws we call the *Course of Visible Nature*; as first, he made not only this *Earth*, but all the *Ethereal Globes*, both fix'd and floating, *i. e.* all fix'd upon their *Centers*, and all floating about their *Orbits*; and this *Circular Rotation* about their *Orbits*, we call the *Eternal Law of Natural Motion*, which these *heavenly Bodies* keep *Constant, Regular, and Uniform*, without ever varying higher or lower, swifter or slower; *The Sun*, saith the *Psalmist*, *knows his rising, and the Moon its going down.*

Upon the several *Orders and Ranks of Creatures*, he likewise imprinted Laws according to their *Natures*; upon *Vegetables*, the *Law of Vegetation*; upon *Insects*, which is the lowest *Order of the Animate Creatures*, he imprinted *Instinct*, as a *Law* upon their *Natures*; by the *Tenor* of which *Law*, they are obliged to *Propagation and Self-Preservation*; in order to which, he made all *Creatures Male and Female*, which distinction of *Sexes* cannot proceed from the *undirected Motion of Matter*.

And notwithstanding that the superior *Orders of Creatures* have this *Law* in common with their *Natures*, yet it is the peculiar *Perfection, and distinguishing Property* of this *Order*, and these little *Animals* keep it without the least *Violation*.

1. We observe ^{how} ~~here~~ even the *crawling Worms*, that have neither Eyes nor Ears, yet they, as well as the superior Orders of *Creatures*, at certain Seasons, have a natural Appetite to *Engender*, and to *Propagate* their kind by *Univocal Generation*; for notwithstanding these inferior Orders of *Animals* are produced Spontaneously, by an *Equivocal Generation*, from Seminal Principles, latent in Matter, yet being produced, they have *Seed in themselves*; and, according to the *Mosaick Philosophy*, propagate according to the *Established Course of Nature*.

2. As all *Creatures* have their *Beings* from *God*, so in *Nature's* Store-house he hath provided *Food* sufficient for them; and by their *Natural Instinct*, they know both when and where to seek it; and they have also by *Nature* a craving *Appetite*, which puts them always upon busy *Quest* after it. Thus, as the *Psalmist* observes, *The Eyes of all Things wait upon God, and he gives them their Meat in due Season*.

3. All *Creatures* of the same *Species* *con-sociate*, and are of themselves a distinct *Corporation*, and are governed by their own *Laws*.

4. As *God* made all *Creatures* to be proportionably *Happy*, according to their *Rank* and *Order*; so they have all their several ways of *Pleasure* and *Diversion*, some by dancing

dancing *around* in the open Air, to their own humming Musick; others by singing, or whistling out their chearful Notes, answering one another by turns.

5. By *Natural Instinct*, they all avoid such *Objects* as they fear danger from; and those that have *Natural Armour*, make use of it in their own defence; and those that are naked, *retreat* to such safe Holds as *Nature* hath provided for them.

Once seeing a *Hawk* in hot pursuit after a small *Bird*, the poor *Bird*, rather than fall into the Power of its Natural Enemy, did fly into my Lap for *Refuge*.

6. Those that are *Winter-Sleepers*, when the Summer warmth abates, and their Feeding fails them, they draw to such Winter-Quarters as *Nature* hath provided for them, and are suitable to their *Natures*; and as soon as the approaching Sun, next Spring, awakes them, they march out into the Fields to *Propagate* their kind.

Riding over the *Mountains* one warm Spring-Morning, I saw infinite Numbers of *Frogs* coming out of their Winter-Quarters, which was a vast heap of loose *Stones*. The *Females* were so over-burthened with their Bellies full of Spawn, that the *Male* Frogs bore them on their Backs; and in this Posture they cross'd my way in such Numbers, that my Horse trod several of them to death.

death. Their march was into the next *Marsh*.

7. Among the creeping *Insects*, the little *Ant* is the most remarkable, being the most regular in its Government, as well as provident and forecasting for *Winter-Provisions*; of these there are several sorts, (*viz.*) the *Field-Ant*, and the *Wood-Ant*. The *Field-Ant* feeds upon small Seeds; and that they may not sprout in their *Store-house*, they eat off that end wherein *Nature* hath placed the specifick *Form*.

These have their *Governours* and *Leaders*, which they follow along their little *Paths*, in exact Order, and return the same way; they all go out light, but all return home heavy loaden with their Burthens upon their Backs.

The *Wood-Ant* feeds upon *Leaves*; and in the *West-Indies*, you may see (as *Dampier* relates) great Paths made by them, three or four Inches broad, and as beaten as the High-ways. You may see them with Burthens of green *Leaves* upon their Backs, so big that one can scarce see the *Insect* for the Burthen, and yet they march stoutly. It's a pretty sight to see these *Regular Troops* marching in such Order, that the *Path* looks perfectly green with them.

These

These *Ants* are *Intermedials*, between *Cree-
pers* and *Flyers*; in *June* and *July*, they take
Wing, and their *Diversion* is to fly abroad
in the open Air in great *Swarms*; especially
when the warm *Sun* invites them out, to
take their *Pleasure* after their *Fatigue* of *La-
bour* is over.

The next remarkable *Insect* is the *Honey-
Bee*, which has exercised the Heads as well
as the Pens of many learned Men. *Aristotle*,
in the First Book of his *Natural History*,
numbers *Bees* among *Ζῷα πολιτικά*, *Civil Peo-
ple*. For the Use of Life, saith *Pliny*, they
Labour, Work, and Ordain a *Common-
Wealth*; have their private *Councils*, their
warlike *Actions*, and which is strangest of all,
they have their *Morals*.

They have their *Master-Bee*, which assigns
Tasks for the whole *Swarm*; some gather
Thyme, and bring it home upon their *Thighs*,
of which they make their *Combs*; others
bring home *Honey* in their *Bellies*, which
they suck out of the *Honey-Flowers*, as the
Honey-Suckle, *Lamb-Suckle*, the *Clover Flowers*,
but more especially in *June*, *July*, and the
beginning of *August*, when the *Honey-Dews*
fall upon the Leaves of the *Oak*, the *Ash*, the
Palm-Tree, &c. and likewise upon *Grass* and
Flowers; this they suck up, and fill their lit-
tle *Cells* with *Honey*, and then do so wax it
up, that it may not melt and run out.

This

This Year I observed several *Honey-Falls* in *July*, and the beginning of *August*, when the *Ling*, *Heath* and *Furz* were in their full *Blossom*; it was most discernable upon the smooth *Leaves* of *Trees*. One might have seen it bright and shining.

They might have tasted it with their *Tongues*, and felt it with their *Fingers*, to be *Unctuous* and *Clammy*: When these *Honey-Dews* fall, the *Air* is always *Calm*, *Hot*, and *Sulphury*. It fell this Year so thick, that it sometimes roaped down from the *Leaf* like small *Threads*. It seems to be of the Nature of that *Manna* which fell in the *Wilderness*. *Pliny* conceits these *Honey-Falls* to be the *Sweat* of *Heaven*, or the *Spittle* of the *Stars*, or the *Moisture* of the *Air*, purging it self; but these *Conceits* may be reckon- ed among the *Mistakes* of that great *Natu- ralist*; these *Honey-Falls* being only the *Effluvia* of sweet *Flowers*, and the *Blossoms* of *Ling* and *Heath*, &c. extracted by the *Summer-Sun*; and when contracted and di- gested in the warm *Air*, it falls down in a *Shower* of *Honey-Dew*, upon the *Grass*, *Trees*, &c.

It is at these times, that the *Bees* ga- ther most of their *Honey*, and fill their *Combs*.

The

The *Drones*, which are reproached as an *Emblem* of Idleness, have their *Task* allotted them; for when, in the *Wars*, they have lost their *Stings*, that they cannot work, they are kept in the Hives at home for breeding; and when their young Brood is ready for Swarming, they come down from their Cells, fly *abroad*, and do not only give Notice to the *Bee-Master* to provide *Quarters* for them, but Seek about for a convenient place to light on, or incamp in.

Bees swarm twice or oftener in the warm Months of *Summer*; and the *Drones*, being come down, the *Master-Bees*, which are supposed to be *Male* and *Female*, give notice to the *Bee-Master* the *second time*, to provide new *Quarters* for a second Swarm: And this they do by their Tones, (*Out, Out*) the *Male* Tone is *Base*, and the *Female*, *Treble*; and they call (*Out, Out*) by turns.

The *Master-Bees*, which are bigger and differ both in *Shape* and *Colour* from the rest of the labouring *Bees*, have their distinct *Apartments*; which are much larger than the rest of the *Cells*; and these are commonly in the middle of the *Comb*. These *Master-Bees* come out with the Swarm, and wherever they light, their Swarm incamps about them.

When Foreign *Enemies* endeavour to invade their *Kingdom*, they fight for their *Prince*;

Prince; not with their *Stings*, but their *Teeth*, and they know in what part the *Enemy's Armour* is the weakest; which is under the *Wing*, and there they give the deadly *Bite*; and then two or three join their strength, and draw the *Corps* out of their *Quarters*.

Sometimes they have *Civil Wars* at home, which oftentimes prove very fatal, and the ruin of their *Monarchy*.

This being a Subject much Treated on by Men of great Learning, I shall Subjoin no more upon it, but proceed to give some Instances of the wonderful Power of Natural Instinct in Birds; which are also *Oviparous Creatures*, but of a higher degree of Perfection in *Nature's Scale of Life*.

1. And first, we may observe with what Care, Industry, and Contrivance the little *Birds* do build their *Nests*, agreeable to their Strength, and proportionable to their *Bodies*: every *Species*, having its own way of building, and never vary from it.

2. With what Patience do they *Sit* their *Eggs*; and with what Care, Patience and Affection does the *Cock* or *Male* attend the *Hen* or *Female*, during that Time of Sitting, bringing in to her Food and Nourishment; and that she (sometimes) may take her *Diversion* in the open Air, relieves her by Sitting upon the *Eggs* his turn about?

3. How

3. How do these little *Creatures* expose their Lives to danger, rather than be robb'd of their young ones?

We observe that when the *Moor-Hen* finds her Nest likely to be discovered, she flies from it as if she were broken back'd, and lame both of *Wing* and *Limb*, tempting her Enemies to pursue her in hopes to take her, 'till the Sight of her *Nest* be lost.

4. With what Patience and Attendance does the *Gander* attend his *Goose*, during the time of her *Sitting*; he gives her Notice when to come off her *Eggs* and take the Refreshment of a little Water; he conducts her to it, and ushers her back again to her *Nest*; and for want of her Company, almost pines himself with Hunger and Attendance.

I once took Notice of a most wonderful Instance of *Jealousy* and *Revenge*, in a poor *Gander*; one of the neighbouring *Ganders* committed a *Rape* upon his *Goose*, who by her *Out-cry*, gave him Notice of it (being but at a little distance;) he presently took Wing and gave him so dreadful a shock, that made the guilty Criminal go off drooping.

5. We observe in *Turkies*, that as soon as ever they are well *Hatched*, and set forth into the open Air, if the *Dam* give Notice by a certain Note or Tone (which by their *Natural Instinct* they understand as we our Mother's Tongue) that the *Kite* or some other *Enemy*

is hovering over them, they presently take shelter under her *Wings*, or fly to some Bush for Sanctuary; and if the Surprize be sudden, they then clap down close to the Ground and lie as if they were *dead*, till the *Dam* by another *Tone* gives Notice that the *Enemy* is *drawn off*, and the danger is over.

6. As we have observed that those weaker *Animals*, such as the *Ant* and the *Bee*, which cannot bear the *Winter Cold*, lay in in *Summer Provision* for *Cold Winter*; so we observe, that the *Birds* who are of a stronger *Body* lay up no *Provision* for *Winter*, *Nature* having provided otherwise for them.

Birds build their *Nests* either upon the *Earth* or in and about *Houses*, or in *Trees*; the former live upon *Corn* or small *Seeds*; but the latter that build in *Trees* feed upon the *Fruits* of *Trees*, as *Sloes*, *Choups*, *Acorns*, &c. and it is observed that these *Birds* are much fatter in *Winter* than in *Summer*, and the fattest in a *frosty Season*.

All these sorts of *Creatures*, by *Natural Instinct*, foresee the *Changes* and *Alterations* of the *Weather* much sooner than we; and they discover it to us dull *Animals* by their flying higher, or lower; or by their flocking together, or by their *Chirping Notes*; and one little *Bird*, after a long *drought*, gives Notice of the ensuing *Rain*, by her *Note* (*Wet, Wet,*) and it was for this Reason that
the

the ancient *Augures* accounted them *Prophets*.

As the Wood-Birds feed upon the Fruits of Trees, which are their *Sanctuary* to rest upon, and fly to, according to the Psalmist, *Psal. 104.* *The Trees of the Lord are full of Sap, even the Cedars of Lebanon, which he hath planted, wherein the Birds make their Nest; and the Firr-Tree is a Dwelling for the Storke.* So the *Birds* are the *Natural Planters* of all sorts of Wood and Trees; they disseminate the *Kernels* upon the *Earth*, which, like *Nurseries*, brings them forth, 'till they grow up to their *Natural Strength and Perfection*.

About twenty five Years ago, coming from *Rose-Castle*, early in the Morning, I observed a great Number of *Crows* very busy at their Work, upon a declining Ground of a mossy Surface; I went out of my way on purpose to view their Labour, and I found they were a planting a Grove of Oaks: The manner of their planting was thus, They first made little Holes in the Earth with their Bills, going about and about, 'till the Hole was deep enough, and then they drop'd in the Acorn, and covered it with Earth and Moss: This young Plantation is now growing up to a thick Grove of Oaks, fit for use, and of height for the *Crows* to build their Nests in. I told it to the Owner of the Ground, who observed them spring up,
 O took

took care to secure their *Growth* and *Rising*. The Season was the latter end of *Autumn*, when all Seeds were full Ripe.

I might farther Enlarge this Class, by sub-joining several more Instances of the Power of *Natural Instinct*, and how duly this Law of Nature is observ'd and kept by these *Inferior Orders* of *Creatures*; but these seem sufficient to reflect *Shame* and *Reproach* upon *Humane Nature*; which being the highest Order, and the very Top of this *Visible Creation*, yet is the only Creature (the Devils excepted) which is Irregular, Disorderly, and violates the Law of its Creation.

O F .

MAGNETISMS

A N D

INFLUENCES.

TH E R E is no Theory or Speculation in Nature, that entertains those Noble Faculties of Humane Reason and Understanding, with a more grateful and delightful Touch, than the Contemplation of that agreeable Harmony, which we observe to be in the whole Course of Nature; wherein every part conspires to the Support of the Oeconomy and Frame of this Visible Creation.

For if we look no higher than this Elementary World, we may observe, that if those contrary and opposite Qualities of Heat and Cold, of Siccity and Humidity, should break the Laws of Friendship, and act their Antipathies one upon another, this beautiful

Fabrick would presently be dissolved into its originary Chaotick Condition.

Again, if we look up higher, we may visibly observe how the heavenly Bodies shed forth their Celestial Influences upon this Earth, and the several Ranks of Creatures that live upon it.

Moses tells us, That *God* made the *Sun* to rule the Day, and the *Moon* to rule the Night, which is not to be understood only of their different Illuminations, by which they distinguish Day and Night, but of their Influences upon *Life* and *Matter*, which (according to the *Egyptian* Mythology) were symbolized by *Day* and *Night*. How does the approaching *Sun*, in the Spring-Season, by its Magnetick Influence, exert the Seminal Principles of all Vegetables, draw up their Juices, and ripen their Fruits?

How does the *Marrygold* gradually open her Leaves as the *Sun* riseth higher; and when it's advanced to the *Meridian*, its Leaves are full spread; so that by the opening of that Flower, one may know when it is high Noon, as well as by the Index of a Dial; and as the *Sun* gradually descends, that Flower draws together its Leaves, and at Night is closed up?

How wonderfully does the *Heliotrope*, or Sun-Flower, follow the Motion of the *Sun* in its Diurnal Course?

I shall

I shall only further instance in those groveling Plants, such as the *Hop*, the *Vine*, and *Ivy*; to all which, God hath given small Tendrils, or pliant Strings, fit to grasp about a Supporter; and these, as if they were sensible of being Adjective, are always in busy Quest for their Substantive; and when they have found their Supporter, they clasp about it, and climb up to the top; and in their Windings, always follow the Motion of the *Sun*; and they will rather break than change their Course, so strong and powerful is the *Sun's* Magnetism and Influence, not only upon these groveling Plants, but also upon the *Life*, both of Men and Beasts.

As the *Sun* thus rules the *Life* of Animals, so the *Moon* governs their Bodies, for every Country-Man will go to his Almanack, to know by the Increase or Decrease of the *Moon*, when it is proper to let Blood, or sow his Gardens; but the *Moon* being a Humid Body, its Influence is more Visible upon Aquatick Plants, and such Animals as have Humidity predominant in their

That the Moon is a Humid Body, will be apparent, if you take such a Glass as we commonly make use of to Contract the Sun Beams into such a Point as will be real Fire, that you may kindle your Pipe with it: If you take the same Glass when the Moon is at the Full, you may with it Contract the Beams of the Moon into a waterish Dew upon your Handkerchief; so that if you please, you may wash your Face with Moon-shine.

Composition. And more especially upon the *Sea*, as we have already observed, to which I refer.

As the *Sun* and *Moon* have a more Visible Influence upon this Earth, Waters and Humid Bodies; so the other *Stars* are not wanting to contribute their Invisible Influences towards the Support of Visible Nature.

But that I may not over-burthen my Reader, I shall only instance in that Magnetism we observe to be between the Polar Stars and this Earth; and if, in order to this Discovery, I take leave to assert, That this Globe of Earth and Water, whereon we live, is the Center, (at least of the Planetary World) and that the Polar Stars are the Terminations of the Axis, about which the Planets and erratick Stars, have their Circumrotations, according to the different Extents of their Orbits, I presume that my Opinion will neither be judged singular nor dogmatical.

I know that *Copernicus* and *Descartes* have established a new *Hypothesis*, (*viz.*) That the Sun is the Center, and that this Earth has an Annual Motion about it; which *Hypothesis* (with Submission) I look upon to be visibly false and ridiculous; for the Polar Stars having no Orbit, but being fix'd, and
never

never moving, unless about their own Centers, we should, in our Motion about the Sun once every Year, leave behind our Backs the Northern Pole and Constellations, and (without the help of Navigation) go into the other Hemisphere, where we shall come to the sight of the Southern Pole, and those Stars which the Interposition of the Earth keeps out of our sight.

But it is not my Intention to turn Astrologer, or to quarrel with Hypotheses, but to shew that this Earth, and the Polar Stars, being fixed upon the same Axis (vulgarly speaking) it seems reasonable to suppose, that there is a Line of Communication between the Polar Stars and this Earth. And this seems to be not only probable, but evident, from the Magnetick Needle, which can never leave its trembling Posture, 'till it fix upon the same Line that points to the Polar Stars; the *Magnet* being, as it were, a *Terrella*, or the *Earth* in *Epitomy*.

The Magnetism between the Poles and this Earth, will be further apparent, if you take a small Parcel of Virgin-Clay, digged some Fathoms under Ground, and make it into the form of a Rowling-Pin, and then hang it up with a small Cord up-

on an even Balance, where there is no Wind to move it; and this Virgin-Earth so moulded, will not rest 'till it point to the *Poles*; but after the ambient Air has entered its Pores it loseth this Magnetick Virtue.

But if we shall come to the light of the Sun, and the Stars which the Earth keeps out of our

view, it is not my Intention to turn it, or to stand with Hypotheses, but to show that this Earth, and the Poles, being fixed upon the same Axis (as is manifest) it seems reasonable to suppose that there is a Force in the Earth

between the Polar Stars and this Earth. And this seems to be not only probable, but evident, from the Magnetick Virtue, which can never leave its true Place, till it be upon the same Line that points to the Polar Stars; the Magnet being, as it were, a Needle, or the Earth in Equinox.

The Magnetism between the Poles and the Earth, will be further apparent, if we take a small Parcel of Virgin-Clay, dipped some Fathoms under Ground, and then bring it into the form of a Rowing-pin, and then hang it up with a small Cord up

T H E

T H E

Platonick Anima Mundi :

O R, T H E

Chain of Life Illustrated.

HAVING already made it apparently evident that *Matter* and *Life* are the Constituent Principles of all Compounded Bodies; and, that these two Principles were Concreated, and *Life* diffused through the whole Mass of *Matter*; which two Principles by *Moses* are Symbolically decyphered by *Heaven* and *Earth*, *Light* and *Darkness*, Gen. i. 1. and their Sympathetical Union by the *Evening* and *Morning*, I shall now proceed to Illustrate and give a little more Light into this dark *Phænomenon*.

And first of all it must be acknowledg'd that the Notion of *Spiritual Forms* or naked Substances, is one of the nicest and most abtruse Points in all *Philosophy*, which by
 Vulgar

Vulgar Authority, is meanly handled; and by the Wisest is known but by Conjecture. That our Notions therefore may be more perceptible and clear, we shall first think it necessary to give a Plain and Clear Definition of *Body* which is the same with *Matter*; and then we shall with more Facility and Ease come to understand the true Notion and Nature of *Form* or *Spirit*, my Intention being only to give Satisfaction to some Men who value themselves for being *Scepticks* in every thing that is not ocularly visible and tangible, and obvious to their External Senses, and therefore look slightly upon the Notion of *Immaterial Substances* or *Spirits*, as if their Notion was a Piece of Nonsense and Incongruity.

I shall therefore comprehend the Notion and Nature of *Body* or *Matter* under this Definition.

The Definition of Body.

A *Body* is a Material Substance *Physically* extended of itself, altogether destitute of *Life* and *Motion*; Its chief Properties are *Impenetrability* and *Divisibility*. And from the Law of Opposites, which is a true Logical Way of Reasoning, we shall *define* a *Spirit* to be an *Immaterial Substance*, *Metaphysically* extended, endued with *Life*, *Motion* and *Self-Activity*.

The Definition of Spirit.

Its

Its Essential Properties are, 1. *Indivisibility.* 2. *Penetrability.* 3. *Self-Activity.* And 4. *Contraction and Dilatation* in its own Circumscribed Vehicle. *The Essential Properties of a Spirit.*

I shall first explain such Terms in the Definitions as to some may appear dark and less intelligible, and then illustrate the Essential Property of both *Body* and *Spirit*.

By a *Physical* Extention I understand *Divisibility*; for all Matter consisting of a *Juxta-Position* of Parts is capable of being divided into Atoms; and although those *Minima Corporalia*, for their extream Little-ness be utterly ^{indiscernible} undiscernible, as to our outward Sense, yet they are Intellectually *Divisible*. *Of Physical Extention.*

2. *Destitute of Motion*; for notwithstanding that one Part of Matter may move another, yet it must be by the Impulse of an External Agent, Rest being the Property of *Matter*, as *Activity* is the Property of a *Spirit*. *Impenetrable*; i. e. Bodies of the same Nature and Magnitude cannot occupy the same Circumscribed Place at the same time; for the most minute Parvitude cannot lie so close together but there will be Intervals; and therefore in the most dense Matter there is *Locus in Loco*, which is susceptible either of *Heat*, or *Cold*, or *thin Air*, there being no such thing as a *Vacuum* in Nature. *All Matter is either fix'd, fluid or volatile; without fluid Matter there would be no Motion, and without volatile Matter to implete the Intervals in Solids there would be a Vacuum.*

Having

Having now made the Definition of a Body so clear, that any who does not wilfully lay aside his Reason, may understand the Nature of *Matter*, and wherein the Notion of *Body* consists, I proceed to explain the Nature and Property of a *Spirit* in general, but more especially of the *Humane Soul*.

1. I define a Spirit to be an Immaterial Substance, Metaphysically *extended*: By a Metaphysical *Extension* I understand such an *Extension* as is in its own Nature indiscerpible and indivisible, which is the Essential Property of a *Spirit*, this Notion of *Metaphysical Extension* baffled *Lucretius*, and our Country-man, Mr. *Hobbs*: I shall therefore Illustrate it by this easie *Example*: Suppose that a small Beam of the *Sun* should be, by a small Loop-hole, let into a large Room; this Ray of Light is visibly extended; but it's impossible for the cunningest Artist to clip it into Shreds or Parts; he may by stopping the Hole exclude the *Beam*, and thereby reduplicate it, as the reflections of the *Sun* are against a Wall.

The first
property of
a Spirit is
indivisi-
bility.

This *Notion* enervates the strongest Argument *Lucretius* has urg'd for the *Divisibility*, and consequently for the *Mortality* of the *Humane Soul*.

For if the *Soul* be *divisible*, then (as he argues) by cutting off a Leg or Arm, we cut

cut off a part from the *Soul*, and so may divide it into Shreds.

He further argues, That if that chiming Maxim of *Aristotle* (viz.) that the *Soul* is *tota in toto* & *tota in qualibet parte*, be true, then, by cutting off a *Finger* or a *Toe*, we may by chance cut off the *Soul*, and divide it from the whole *Body*, if at that time it was the *Soul's* ill fortune to be in that part.

These Difficulties are cleared by the *Example* of the *Sun-Beams*, which tho' they cannot be divided into parts, yet, by stopping of the *Inlet*, they may be repulsed and reduplicated: So when a *Leg* or *Arm* are cut off from the *Body*, there is no part of the *Soul* cut off, but that *Ray of Life* which animated that *Member*, by cutting the *Nerves*, and so stopping the *Extension* of the *Ray*, it returns to the *Center* of the *Soul*; and reduplicates in the other parts of the *Body*; and thus we frequently observe, that those that are born blind, have prodigious *Memories*, the *Defect* in one *Faculty*, being doubled in another.

As the *Sun* is placed in the middle of the *Planets*, and emits from its *Center* *Homogeneous Rays* of *Light* to the *Extremities* of its *Circumference*, so the *Humane Soul* hath its *Ubi* in the *Body*, and from
its

its *Center*, extends Homogeneous and Contiguous *Rays* of Life to the extream parts of its *Vehicle*. For Example, place one end of a Staff upon the *Toe*, and with your *Finger* make an Impression upon the upper end of it; and that Impressed *Motion* will in the same Moment of Time be felt upon the *Toe*: In like manner, when an external *Object* has made an Impression upon the *Center* of the *Soul*, it commands a Motion upon the *Toe* or *Finger*, or any other part, as quick as thought: This we observe in our Fingers, running Divisions upon a Musical Instrument.

This may convince the *Nullibist*, that the *Soul* hath its *Ubi* circumscrib'd in its proper *Vehicle*, for where-ever the *Operation* is, there is the *Operator*; and when he stumbled upon this Thought, that the *Ubi* of a *Spirit* was *Nullibi*; his *Soul* was either in his *Body*, or with his *Wits* was gone a *Wool-gathering*.

Self-Activity.

A Second property of a *Spirit* is *Self-Activity*, by which it actuates Matter, and determines its Motions according to the Property of its own Nature.

Penetrability

A Third Property of a *Spirit* is *Penetrability*; and this is so clear and obvious, that it need no Illustration; for if *Heat* and *Cold*, which are only *Material Spirits*, can pervade the straitest Pores of the densest

est Matter, with much more Facility can an *Immaterial Spirit* penetrate the most solid Body, leaving no Foot-steps behind.

A Fourth Property is *Contraction* and *Dilatation*; and this is demonstratively apparent by the Light of a Candle, which may either be contracted within the Walls of a Dark-Lanthorn, or dilated to the extremity of its Sphere.

Contraction and dilatation Illustrated.

Having now illustrated and made intelligible the several Terms in the Definition; I proceed to illustrate the several Orders and Degrees of Spirits, and shew how they are distinguish'd.

The first and lowest Order of *Forms* are those we call the *Mineral Spirits*, which being diffused through the whole *Body* of the *Earth*, give Generation, Growth and Perfection to all Mines, Minerals, Stones, and Earths; for what is it that glews and cements together all the Rocks, Stones, and Solids of the Earth, and keeps them at rest in their Natural Beds, but this *Mineral Spirit*?

The first order of Spirits.

The Second order is the *Seminal Forms*, whose distinguishing *Faculty* is to organize Matter duly prepared and modify'd into the Life of *Vegetation*, proper to this or the other kinds of Plant, Tree, &c. and then by Suction and Filtration, to assimilate such Juices as are agreeable to their

Seminal Forms the second elevation of Life.

their Natures into their own Substance; the *former* was an under-ground *Spirit*; and this *Spirit of Vegetation* hath only its Head in the Earth, and its Body and Branches upwards.

*Sensation
the Third
Elevation
of Life.*

The Third Elevation of *Life*, is *Sensation*, which is the Essential Perfection of a *Beast*; and now Life is got free from the Fetters of the *Earth*, and is at liberty to go about and make choice of such Nourishment as is most agreeable to its Nature; yet all of this Order have their Heads downwards.

*The Fourth
Elevation
of Life.*

The Fourth Elevation of *Life* is *Rationality*, which being added to the Perfections of *Vegetation* and *Sensation*, makes a *Man*; which being the only Creature upon this Earth capable of *Contemplation*, hath his Head upwards towards Heaven.

*The Fifth
Elevation
of Life.*

The Fifth Elevation of Life is *Intelligence*, which being added to Sensation and Rationality, advanceth Life to that highest Order of Created *Beings* we call *Angels*. And these actuating *Vehicles*, either of thin *Air* or pure *Æther*, have no dependance upon this *Earth*, for that all spiritual *Entities* have their *Vehicles*, is not only a *Platonick* Hypothesis, but the express Doctrine of *St. Paul*, who tells us, that there are *Bodies Celestial*, and *Bodies Terrestrial*, and that in the Resurrection our Bodies shall be

be spiritualized and made fit to correspond with our Souls in all its Motions and Activities.

As there is then *Mundus Materiae*, which we may properly call the great *Body* of the visible World; so there is *Anima Mundi*, which is the great *Soul* of the Universe, that by its *Plastick* and *Vivifick* Powers, Actuates, Informs, and Enlivens this great Body; but this great *Soul* being to us Invisible, and consequently less perceptible to our understandings, we shall illustrate it by this plain and familiar Example.

Suppose a Candle placed in the middle of a large *Room*, of a round and circular Form or Figure, the Candle itself is the Center of *Heat* and *Light*; the Circles nearest the Center participate most of its Heat and Illumination, but towards the Outsides and Circumference of the *Room*, the Rays of Light are only Weak and Glimmering: In like manner the Center of Life, and Light is the *Divine Essence*, which *Plato's* Divinity calls the *Triune God*: The nearest Circles are the Intellectual *Beings*, next to them are the *Rational*, next to which are the *Sensitives*, and the weakest Glimmerings, and smallest Sparks give Life and Motion to those little *Animals*, we call Insects.

Such APHORISMS, DEFINITIONS, and AXIOMS, as we have made use of in this Treatise.

Of Nature.

NATURE's Productions are never in vain.

Nature's Productions are not by blind Chance.

Nature never works in haste.

Nature's Productions are not by precipitous Leaps, but by gradual Motions.

Nature never does that by Much, that may be done by Less.

Of Matter and Life.

Life is a Chain, and the best Method to come to the knowledge of a Supreme Being, is to ascend upwards, from the lowest Link to the top of the Chain.

The several Species of Life are concatenated by Intermedials. Matter and Life are Contemporaries.

Life

Life is diffused through the whole Mass of Matter.

Matter is the same, and though it undergo a Thousand Transmutations, no Particle is lost.

Of Animals.

Every Element hath its Animal, and every Animal a Nature agreeable with its Element.

Every Animal is perfect in its own Class or Order.

The more deformed Animals set off the Beauty of the more comely.

Of Heat and Cold.

Heat and Cold are the two Hands of Nature.

What Heat hardens, Cold dissolves; and what Cold hardens, Heat dissolves.

Of the Elements.

There are but two Elements, (viz.) Earth and Water, their Essential Qualities are Siccity and Humidity.

The Air is only Water rarified.

Fire is only a violent Agitation of dry Particles.

Siccity

Siccity contracts Poison, and Humidity expels it.

Of the Universe.

The whole Universe is fix'd and floating ; every Thing is at rest upon its Center, and every Center is floating about its Orbit.

Upward and downward, are only *quoad nos*, and are only imaginary Terms.

East and West are Imaginary.

All the heavenly Globes have their Motion from West to East. The appearance of Motion from East to West, is *Deceptio Visus*.

Of Motion.

All Motion is either Natural, Mix'd, or Violent.

No Motion is Natural, but the Circular.

The Motion upward and downward, is Central and Mix'd.

All Collateral Motions are Violent.

Lay a Globe Mathematically *Round*, upon a Mathematical *Plain*, and its Motion will be perpetual.

T H E

T H E

CONCLUSION.

IF what I have advanced upon the Contemplation of the *Visible* and *Invisible* Creation will not convince an *Atheist*, that there is a God that created the Heavens and the Earth, I know of no better Expedient than that God would e'en turn him out to Grass with *Nebuchadnezzar*, and feed him with the Bread of Affliction, 'till, with that great *Man*, he acknowledge, *That of a Truth there is a God in Heaven*, that is the Rector and Governour of the Universe.

Or else, that God would give him Liberty, with the *Prodigal Son*, to go into some far Country, and there feed his swinish *Lusts* with the empty Husks of sinful Pleasures, 'till he find, by Experience, that he cannot fill his Belly with them: For it is as morally impossible for an Immaterial Soul to be satisfy'd with the Pleasures of *Sense*, or the Enjoyments of a Material *World*, as it is for a craving Appetite to be satisfy'd with
a Table

a Table furnish'd with painted Meat; this may bring him to his right Understanding, for it was *fame pereo* that brought that graceless Youth to the Thoughts of *ibo ad patrem*.

Curtious Reader, Being called for in haste from the Inspection of the Press, I had not Time to Correct such Litteral or Verbal Mistakes as may be committed throughout these Sheets; I desire therefore that they may neither lessen the Esteem of the Argument, nor the Author.

The Author being absent, the P R I N T E R desires the Reader to Correct these Mistakes.

PAGE 50. Line ult. for *lessor*, read *closer*, p. 88. l. 1. f. *here*, r. *how*, p. 107. f. *undiscernable*, r. *indiscerpible*, p. 108. f. *indiscernable*, r. *indiscerpible*, p. 111. f. *organized*, r. *organize*.

F I N I S.

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