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1896.
A TREATISE ON THE DELUGE.

CONTAINING

I. Remarks on the Lord Bishop of Clogher's Account of that Event.

II. A full Explanation of the Scripture History of it.

III. A Collection of all the Principal Heathen Accounts.

IV. Natural Proofs of the Deluge, deduced from a great Variety of Circumstances, on and in the terrestrial Globe.

AND,

Under the foregoing General Articles, the following Particulars will be occasionally discussed and proved, viz.

The Time when, and the Manner how America was first peopled. — The Mosaic Account of the Deluge written by Inspiration. — The Certainty of an Abyss of Water within the Earth. — The Reality of an inner Globe or central Nucleus. — The Cause of the subterranean Vapour, and of Earthquakes. — The Origin of Springs, Lakes, &c. — The Formation of Mountains, Hills, Dales, Valleys, &c. — The Means by which the Bed of the Ocean was formed. — The Cause of Caves or natural Grottos; with a Description of the most remarkable, especially those in England. — Also an Explication of several lesser Phenomena in Nature.

Illustrated with two Copper Plates; one, representing the State of the Earth during the Height of the Flood; the other, the State of the Earth as it is at present.

By Alexander Catcott, A.M.
Vicar of Temple in Bristol.

— Antiquam exquisite matrem. Virgil.


LONDON,
Printed for the Author, by E. Allen, in Bolt-Court; and Sold by E. White, at Horace's-Head, in Fleet-Street.

M.DCC.LXVIII.
To the Right Honorable

DAVID STUART ERSKINE,

Earl of BUCHAN,

Baron Auchterhouse, Glendovacky, Cardrofit, &c.

Doctor of Laws of Glasgow, St. Andrew's, King's, and Marischal Universities of Aberdeen; Doctor of Medicine of Edinburgh; Fellow of the Royal and Antiquary Societies of London, of the Philosophical Society at Edinburgh, and the Literary at Glasgow——

A Nobleman, who is not ashamed, in a depraved and degenerated Period of Society, to own the Holy Scriptures as the only Sources of irrefragable Truths, and not only consistent, but demonstrative, with respect to the Philosophical System of the Universe in general, and of this Earth in particular——This Volume is dedicated

By his Lordship's

much obliged

and obedient humble Servant and Chaplain,

Bristol, August 1, 1768.

A. CATCOTT.
Soon after the publication of the first edition of this work, I received several letters from gentlemen of character and note in the learned world for their knowledge of the subject therein treated. Some of these letters contained exceptions to particular positions in the tract, desiring a farther explication and a fuller confirmation of them. In the present edition I have endeavoured to give a reply to such requests, which I hope will be deemed satisfactory. Only one thing I must mention, that some of these requests arose from inattention to the manner in which the subject is treated; especially where the proofs were not thought sufficient for the points advanced. It may be proper therefore to advertise the reader (though it is more conspicuously pointed out in this than in the former edition) that the evidence on which this Tract is built is threefold—Scripture—Heathen History—and the Natural state of the Earth. So that where one of these may seem de-
fe&live in proof, by the coalition of the other two
the point may be clear and manifest; and in many
places where the evidence was of a combined or
mixed nature, it was proper to drop part of it,
that each species of proof might be disposed under it's
proper head. So that I hope for the future, no one will
judge of any particular tenet till the whole book
be carefully perused, and the evidence produced under
each general division for any point in question be
accurately examined. And that the reader may
more easily do this, the table of contents is made
ample and full; so that by casting his eye over that,
be may readily see where the whole evidence for any
particular point is disposed of. And to a person
unacquainted with the subject it may not be amiss,
if he would peruse the table of contents before
he begins the work itself, as it will give him a ge-
neral idea of the manner in which the subject is
treated.

Every man in this enlightened age (having been
fully instructed by those genteel and easy conveyances
of knowledge, news-papers and magazines) thinks
be has liberty of making a philosophy (and I might
add indeed a religion) for himself, and not only this,
but also a just right of telling his imaginary tale to
all that come nigh him. " Hence it is that every
village has it's wise-man, who dictates as philosopher
and divine, gains his circle of admirers, and like
Cato,
Cato, gives laws to his little senate." But the reader must not be surprized, if the author of this tract has taken a different method, and instead of presenting him with a system out of his own head, has endeavoured to explain a philosophy already revealed. It appeared to him extravagantly foolish, and even impious, for any man to presume to give an account of the origin of things— the destruction, dissolution, and renovation of any part of nature, that happened long before himself was in being— unless enlightened and instructed by the Author of all things. He therefore had immediate recourse to that book, which for ages has been allowed to be the word of God, and by examining the works of nature, found such a surprizingly-exact agreement between them, that they tallied like two indentures, so as to leave no doubt that the author of one was the inditer of the other. If the following sheets should contribute to establish this truth in the mind of the reader, or any way tend to put a stop to those numerous errors and fantastic notions at present prevailing amongst us on the subject here discussed, — the view of the author in the publication will be satisfactorily answered.

As the additions to this second edition are considerably large, I have printed them separately from the work, that those who have the first edition may purchase.
purchase them, without being under the necessity of procuring the whole for the sake of a part.

It may be proper also to inform the reader, that this volume is a distinct treatise of itself, at least independent of the tract on the Creation, &c. (mentioned p. 11.) the few particulars in that, which were explicative of this, being inserted in their proper places. Not but that if the reader should be desirous of seeing a full account of the Creation, &c. or an explanation of the first chapter of Genesis at large, together with a rectification of the mistakes that have been usually made in the interpretation of that chapter, he had better consult that Treatise itself.

N. B. In substituting the Roman characters for the Hebrew, I have followed the method laid down by Dr. Robertson in his true and ancient manner of reading Hebrew without points.
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THE Knowledge of the natural State of the Earth is the foundation of all true Philosophy.

If we are mistaken in our judgments of Causes and Effects, relative to things that are within our reach, and on which we can make immediate observations and experiments, we shall certainly be so, with respect to Those that are at a distance from us; and of which we can only reason by Analogy.

Now of all events that have happened to the Earth, there is none that has made a greater noise in the world, or has left such evident marks of its Reality, as that of a Flood of Waters, in which the whole Globe was drowned.

B AND
PRELIMINARIES.

And if it can be proved, that the Earth has actually been thus covered by water, and totally dissolved therein, such an Event as this, I say, must have made many and great alterations in the before-state of the Earth, and be the Cause of many remarkable phænomena in the present. And yet, I am sorry to say it, philosophers in general, who have endeavoured to explain the whole System of Nature, and many who have wrote in particular on the Subject of the Earth, have taken no notice of this great Event; and thereby have been led themselves, and also have led others, into a variety of errors, by ascribing Effects to very different Causes than the true.

I hope, therefore, that an Attempt to lay before the publick the Evidence that may be brought in proof of an Universal Deluge, and to exhibit a display of all the various Effects, both on and in the Earth, that were owing to that one Great Cause, may not be uninstructing, nor unenterprising.

The Evidence, deducible for this great Event, may be said to be Threesfold.

First, The Scripture.

Secondly, Heathen History.

Thirdly, The Natural State of the Earth.

But before I can enter on the discussion of either of these Particulars, it may be proper to premise a few articles. And
PRELIMINARIES.

I.

First, with regard to the Scripture-Account of the Flood.

The Mosaic description of the Deluge has been accounted by several to be too short and concise, for the due relation of so important an event. But those who make this objection seem not rightly to understand the nature of the case; the proper stating of which will serve for a full answer to the objection.

First then, Let it be considered, that as at the time of the Deluge the Earth was destroyed, broken to pieces, reduced to its chaotic state, or unformed, and afterwards formed again; and this, its second Formation, answerable, both in the manner and means, to its first and original (for similar expressions are used, and the same causes are mentioned to have been employed in both cases) and as a description had been given at large of the manner of the first formation in the Mosaic narrative of the Original of things; so it would be needless to have enlarged on that point, in the account of the Re-formation of the Earth at the Deluge; just mentioning the chief articles would be sufficient, as every judicious reader would naturally recur to the first and fuller description.

Besides; Moses might explain to his Cotemporaries any particular part that might seem difficult or deficient; and the latter inspired Penmen, so often referring to, and occasionally explaining, the Mosaic Philosophy, have left us in their writings, great assistance towards solving any difficulty. So that, if the whole, recorded in the Bible, respect-
ing the first formation of the earth, or its destruction and re-formation at the time of the Deluge (which is the same thing) were collected together, the account would appear ample and full, as will, in a great measure, be seen from the quotations of this kind occasionally occurring in this Tract.

But farther still; as many of the effects of the Deluge are legibly written in the book of Nature, being engraved in the deepest characters in the hardest rocks all over the earth; so those, who would be at the pains to read this book, who would go up as high as the hills, and down to the vallies beneath, and enter into the dark chambers of the earth (carrying the divine light in their hands) should find the inestimable treasure, should see that the world had been destroyed, and formed again, and in what manner this surprising transaction had been effected; and would by this means have full proof—that there is a God—who that God is—and that he governs the world. And they, who would not be at this pains (or listen to those that had been) did not deserve this peculiar proof and knowledge. Sufficient be it for God, and even gracious must we esteem it, that he informs us of such and such things in his Word, and gives us eyes to see the rest or another part of the evidence in Nature: and they who will neglect either or both of these proofs, may deservedly remain so far in ignorance. God indeed will do for us what we cannot do for ourselves; but we must not expect that he will do what we can do: This would be to undo what himself had before done, or give us power on pur-
Preliminaries.

pose to take it away, and give it us again; and 
would also be encouraging sloth, idleness, and the 
dissuse of our rational faculties. Therefore to spur 
up our abilities, and quicken our diligence, he 
gives us That whereon we may reason, and then 
justly leaves us to reason.

From what has been said then, two points I 
think are manifest; first, the ignorance and inexcusable 
of those, who have spoken against the 
Mosaic account of the Deluge as imperfect and deficent; secondly, how unqualified those persons 
must be to give a true account of the Deluge, that 
have not examined Nature, but sat down at ease in 
their studies, drew lines upon paper, &c. vainly 
imagining that the form and inclination of Rocks, 
courses of Rivers, veins of Ore, and the situation 
of things in the solid earth, would shape and 
wind themselves according to their fancies.

II.

Another article necessary to be settled, as 
preparatory to the subject I am to speak of, is, in 
what manner, and how far, the Divine Interposition 
is to be allowed in the Miracle of the Noachian 
Deluge, or in destroying and re-forming the earth 
at that time. For as Natural Causes were made 
use of (though under the Supreme) I shall en-
deavour to explain it, so far, philosophically; on 
which account I would obviate an objection, which 
an inattentive reader might make to such kind of 
explanations, as tho' they took away or lessened the 
Divine Power in the fact related. But I trust, 
upon examination, we shall find, that this way of 

expli-
explicating or unfolding Miracles, will manifest the Wisdom and Goodness, as well as the Power of God, and in a manner too, far superior to any other. When an extraordinary effect is performed, to tell a person—that God did it—and there rest, without explaining the end, the means, and the manner of doing it, is losing great part of the evidence of the miracle, and the intent for which it was performed; and is generally spoken as a cover for our ignorance, or rather our pride, which is piqued at a difficulty we cannot solve. But God is a God of order, and when things are done for the sake of man, he adapts his operations to the state and circumstances of man.

Now it is an allowed truth, that the situation of man in this world is such, that he is confined for his ideas (the foundation of his knowledge) to sensible or material objects; and it is also certain, that the prevailing Idolatry, both long before and long after the time of Moses, even almost from the creation of man to the coming of Christ, was the worshipping the Natural Agents, or some Part or other of the System of Nature, instead of God, the Creator and Former of all. Such then being the state of man, and such the peculiar circumstances of the former world, the most suitable method to destroy this idolatry would be, to over-rule,


The Writings of the Greeks and Romans abundantly testify the same, as several Authors have shewn at large; particularly Parker in his Textamina Physico-theologica de Deo.
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Suspends, or divert the common course of the Natural Agents; which would undeniably prove, that they had a Superior, one who could turn them, whithersoever be pleased. And when such an act was performed, the part of man would be, to discover the propriety of the Agent or Agents, overruled or suspended, on particular occasions; and trace out how appositely the Means conducted to the End.

I shall illustrate and exemplify my meaning from that publick and grand dispute between Jehovah and Baal, under the conduct of Elijah and Baal's prophets, recorded 1 Kings xviii. which the reader is desired to peruse. The Contest here was concerning the true God, whether Jehovah or Baal, or rather who was the Ruler (for that is the meaning of the word Baal in the Original) the material Heavens or Agents, or any Being above them. Jehovah had already shewn himself superior to the Heavens (at least, to every unprejudiced mind) by having suspended their power or action in giving dew or rain for above three years; (see 1 Kings xvii. & xviii. Luke iv. 25.) but Baal's followers regarded not this; for all that time they eat at the royal [Jezabel's] table, and lived in plenty; verifying a common observation, that as long as men have enough of this world, they are not apt to be very solicitous about the Governor thereof. But the famine increasing more and more, the king and his servants are obliged to go from home, and seek in different places for food for themselves and cattle; and God at last, out of compassion to his people, sends Elijah to meet the king.
Preliminaries:

king, and have the contest decided at once. That Elijah's God had power over the Water of Heaven, was pretty plain; he now proceeds further, and will shew, that he has power over its opposite, the Fire, and can make it act or cease from acting just as he pleases; and from Jerem. xix. 5, it is evident that Fire (which is the most powerful operation of the Heavens or Air) was esteemed sacred to Baal,—they have also built the high-places of Baal, to burn their sons with fire for burnt-offerings unto Baal. The Text, agreed to on both sides then was—that the God which answereth by fire, and consumeth the offered victim, He should be God: and if Baal could answer by any thing, it certainly must be by one of his own emblems. The place chosen for the scene of action was Mount Carmel, which probably these idolaters had made an high-place of to Baal; since we are told, they had broken down the altar of Jehovah that was there. Thus Elijah grants them every favourable circumstance. And when they had called upon their God from morning even until noon (when the Heat, the greatest power of the day, was come) and in their furious fits of madness and despair had leapt upon their altar, and cut themselves with knives and lancets; but neither voice came, nor any to answer, nor any that regarded:—then Elijah repaired the altar of the Lord, and laid thereon a sacrifice; and to shew the mighty power of God, ordered a great quantity of water to be poured on the sacrifice and the altar, so as to fill a trench that was drawn round about it; and by this means render the sacrifice less susceptible
PRELIMINARIES.

ceptible of the action of Fire; and take off all possible suspicion of deceit. All things thus prepared, Elijah invokes his God to give the decisive proof of his Deity; and immediately, at his request, Fire streams down from heaven, consumes the offered victim, and licks up all the water in the trench. At which striking, visible manifestation of the Superiority of Elijah's God, all the people fell on their faces, and cried out, JEHOVAH, He is GOD; JEHOVAH, He is GOD. And a greater proof of Divine Interposition could not be desired, nor one more applicable to the purpose be given. Here the Heavens were made—in a particular place, at an appointed time, in an interesting dispute—to exhibit their strongest operation, Fire, and pour it down in honour of a sacrifice dedicated to JEHOVAH, and were withheld from doing the same on a sacrifice dedicated to themselves: and so themselves in fact forced to confess their own inability, bring confusion on their own votaries, and give glory to the true God.

Such also was the case at the Deluge. The grand object of false worship then was the Natural Agents, or some part or other of the System of Nature, as those words of God, Gen. vi. 17. (the prelude to that dreadful catastrophe) indicate: And behold, I, even I, do bring a flood of waters, &c. ' It is not said, Let there be, or let the Agents which I have established, or let us bring; but I, even I, in direct opposition to all the Laws of Nature, or powers established in Matter.' But the means used in, and the manner of, the
the execution declare this plainer. As the Corruption of mankind before the flood was remarkably great, and the Imagination of their heart only evil continually, it could not well be in such a general Aposlancy, but that many objects of false worship would be set up; some imagining one part, others another part of Nature, to be Supreme. But from the manner of their punishment the three principal Deities seem to have been, the Air, the Water, and the Earth: the first, the heathen Jupiter; the second, Neptune; the third, Terra. Accordingly God, to defeat this idolatry, and manifest his power over Matter, inverted the order and natural State of Thesee in particular; he made the Air to descend into the place of the Water, that lay beneath the earth, and the Water to occupy the place of the air, and by the passing and repassing of these two agents thro' the Earth, the shell or orb thereof would be torn to pieces, its solid form reduced to fluid (of each of which effects more explicitly hereafter) and all the idolatrous inhabitants destroyed by the very Means or Agents they depended on for succour. Thus the true God demonstrated his power over Matter; and tho' he made use of material Means, yet the Act was undeniably supernatural, above all the laws and powers of nature. The Natural Agents could not, or if they could, they certainly would not, have overturned their own empire, punished their own votaries, and suffered themselves to be made the instruments of punishing them. This manner of working miracles is eminently striking, and indeed irresistible; as it affords man sensi-
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Sible and material evidence, is level to the conception of all, and was peculiarly adapted to the state of the world, when such kind of miracles were wrought.

III.

Some years ago I printed a Treatise, intitled, Remarks on the Lord Bishop of Clogher's Explanation of the Mosaic History of the Creation and Formation of this World, &c. and intended this Tract should have followed soon after as a kind of second Part; but before I could quite finish it, I was seized with an illness, which affected my sight in such a manner, that I was obliged to lay aside all thoughts of prosecuting the Subject for three or four years, and in the meantime his Lordship of Clogher died; on which account I shall, in a great measure, drop the controversial part in this Treatise, selecting only one or two of the most exceptionable parts of our Author's account of the Flood, examine them, and have a principal regard to them in explaining that event. I hope also to lay down such a clear and full description of the Deluge, that any one by comparing his Lordship's tract with this, may determine for himself where the truth lies.

The chief exceptions I have to his Lordship's account of the Flood relate to the Extent of it; first with respect to the inhabitants of the earth; secondly, with regard to the Earth itself; or its solid, metallic, and mineral part. In each of these points he is of opinion, that the effects of the Deluge were not universal, but only partial.

And therefore (says he, p. 171, concerning the
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the first altho' I look upon that part of this scripture narration, relating to the destruction of mankind, and of birds, and of beasts, at the Deluge, to be literally true, in respect only of that part of the world, in which Noah lived before the flood, and which was afterwards peopled by his three sons, Shem, Ham, and Japhet, yet I cannot but acknowledge that this Deluge, which happened in the time of Noah, must have been general in some degree; as manifestly appears from the general elevation of mountains over the whole world, and from the immense quantity of sea-shells, which are frequently found in the most distant regions of the earth. Nevertheless I cannot but suppose, that other parts of the then habitable world, which by the force of the Deluge were separated into islands, and were divided from the continent whereon the ark landed, were in some sort exempted from the common calamity, brought upon the rest of the world by the Deluge; inasmuch as the Continent of America, and many islands in the East-Indies, are at present partly inhabited by wild beasts and noxious animals, which it is not reasonable to imagine, that any body could, or would, have imported thither since that time. Therefore, I own, I cannot see any other probable solution of this difficulty, than to suppose them protected by the Providence of God from the general destruction, in some extraordinary manner, for the propagation of their own species.

Which passage, I humbly apprehend, is scarce consistent
consistent with itself; at least the position, that is laid down therein, will not coincide with other parts of the author's treatise; and is contrary to Scripture and Reason. His Lordship seems to forget, that, according to his System, but a very small part of the world was, or indeed possibly could be, inhabited before the flood, viz. that tract of land only which lay between the Northern Tropic and the Arctic Circle (see of his Treatise, p. 74, 75.) there being a great 'belt of water under the equator (equal in extent to the space between the two Tropics; see Plate 3d.) which separated one part of the earth from the other; so that only one of the Hemispheres [if the above-mentioned tract could be properly called an hemisphere] was the seat of the habitation of the sons of Adam before the Deluge, p. 65, 75.' If such was the situation of mankind before the flood, had even the far greater part of America been exempted from the effects of the deluge, no inhabitants of the former world would have been saved on it; much less could any have been saved by exempting the Islands of the East-Indies from that destruction; because they lay either directly under, or quite on the other side of the aforesaid great belt of waters; and so could not possibly have been inhabited before the flood. Besides; as according to his Lordship the falling down of this great belt of waters, or 'their rushing from under the equator [the higher ground] towards the poles' [the lower] (p. 155.) was one great cause of the deluge, 'so it could not but be, that such a violent efflux of water, running in this direction, would drive all the then inhabitants of the world
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world towards the Northern Pole; where, if they arrived, they must, according to himself, 'have perished on account of the Cold.' Nay, what is more, he affords, that the waters thus rushing from under the equator 'would return to their natural and original situation of over-spreading the whole earth,' p. 155, in the manner they did on the first day of the Formation, before the least spot of Dry-land had appeared. Now how we can reasonably allow, that any persons, in such an universal flood as this, could escape being drowned, I cannot conceive.

But even let us suppose, that some of them were expert swimmers, and could live a long time in the water, yet according to our author's further description of the deluge, they certainly could not be able to weather out the whole storm, for thus dreadful was it, 'When the fountains of the great Abyss were broken up, and an immense hollow was excavated out of the earth from pole to pole, as a bed for the sea to lye in; when the rocks, and the sands, and the shells, and the earth, that were taken thereout, were thrown upon the land, and raised in mountain upon mountain, so as to affail the skies, and invade the region of the clouds: And when this heterogeneous mixture was flowered down again upon the earth, it did not only rain, but the water, and sand, and earth, and rock, and shells, were poured down in cataracts from heaven, for forty days, over the face of the whole earth,' p. 88, 153, 118. Surely in such a terrible storm as this, neither the least, nor the greatest,
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greatest, nor the strongest animal, could escape being dashed to pieces, much less a poor, destitute, affrighted, naked man: So that it must have required a miracle, far greater than That by which Noah and his family were saved, to have preserved one such person. And since God took so much care, and allowed so much time, for the preservation of a few just souls, we cannot imagine, that he would suffer, by a more extraordinary miracle, a number of wicked to survive; for whole slate, and purposely to destroy whom, he brought the deluge upon the world, and put even the righteous to a severe trial of their faith in and dependence on him. This certainly is contrary both to Scripture and Reason; as will be shewn more fully hereafter.

But his Lordship imagines, that the Text will authorize his supposing that some did escape; which therefore must be examined. He says, that the writers of Scripture 'frequently put the whole for the greatest part,' p. 168. and would therefore conclude, that the words All and Every used in the account of the flood, as 'All flesh died, and Every living substance was destroyed,' &c. ought to be understood with certain limitations, p. 170. and therefore we may suppose, that All were not destroyed. That the words All and Every are sometimes used in the Scripture to signify an integral part, is very certain; and I believe, there is no language in which they, or synonymous terms, are not so used. Since they are words which occur so often, and in such a variety of senses, it would have required much circumlocution
tion to have defined, in every instance, their precise meaning; the Context therefore is always left to determine that point. Now, the sense, in which these words are used in the Scripture-account of the Deluge, is so fixed and determined, that it cannot possibly be mistaken. Moses says, (after he had related, that the waters of the flood had risen to such a height, as to have covered All the high hills under the whole heaven) And all flesh died, that moved upon the earth, both of fowl, and of cattle, and of beasts, and of every creeping thing that creepeth upon the earth, and every man. All in whose nostrils was the breath of life, of all that was in the dry land, died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and creeping things, and the fowl of the heaven; and they were destroyed from the earth; and Noah only remained alive, and they that were with him in the ark, Gen. vii. 21. Had Moses intended to declare, that every individual living creature that was upon the Earth, before and during the flood, was destroyed by the flood, he could not have been more express and particular; he says, that every living substance, both man, and cattle, and creeping thing, and fowl of the air, that was upon the face of the ground, or in the dry land, died; and we know of but one ark which went upon the face of the waters, and so faved the men and the animals therein: of course, according to the Scripture-account, there was no living creature upon the face of the whole earth, but what perished by the flood.

AND
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And what shews this plainer is, that those, whom we know were exempted from this, otherwise, universal destruction, are expressly mentioned to have been saved; and their preservation mentioned too in such a manner as to specify, that no other persons or creatures were saved, and Noah only remained alive, and they that were with him in the ark. Nay, St. Peter describes this affair still more circumstantially, and fixes the very number that were delivered, 1 Epis. iii. 20. where-in [i. e. in the ark] few, that is, eight souls, were saved by water; and again, 2d Epis. ii. 5. God spared not the old world, but saved Noah the eighth person [who with his own wife, his three sons, and their three wives, was just the eighth person] bringing in the flood upon the world of the ungodly. All the ungodly therefore must have perished. So that the words all and every in the above passages must be taken in the largest latitude, and extended to the utmost universality, with regard to the wicked.

I may just add too, (for as many have urged the above objection against the Universality of the Flood, so I would willingly remove it by every means without being tedious) that each of the arguments, which will be hereafter brought, especially those from Scripture, in proof of the Universality of the Deluge, will shew also, that the words all and every are to be understood in the sense I contend for; because Scripture (as God was its author) must be consistent with Itself, and with Truth.

His Lordship's difficulty concerning the peopling of
Preliminaries.

of America I propose to give an easy solution to hereafter, observing here by the by, that whether we could get over this difficulty or not, it would not invalidate the above arguing; which depends entirely upon the sense of Scripture, and which may be corroborated by many proofs from the natural state of the earth; and where these two concur to offer clear, express, and united evidence, there no event in nature, which may appear accountable to some, but may be easily accounted for by others, ought to be set aside their superior authority.

The other article which I am to consider, is our Author's supposition (p. 135.) that only the upper surface of the earth was disturbed or destroyed at the Deluge. For, ‘He does not suppose with Dr. Woodward, that the whole material world was, at the time of the deluge, reduced into a soft pulp, but allows that every thing continued in its then state of solidity.’ And yet, he says, ‘it must be acknowledged, that at the time of the breaking up of the fountains of the Abyss, a great part of the materials, which were scooped out of the earth, as well as those which then lay on the surface of the sand and of the shore, would be loose, separate, and divided, and would float irregularly in that confusion of elements, which such a wonderful operation must have occasioned, not only when showered down in cataracts from on high, but also, when conveyed by the force of the waters of the sea, which gushed forth, as out of a womb,'
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womb, to the place destined for their abode,' p. 118.

So that, if I rightly understand his Lordship, his opinion is, that the upper parts of the earth only were moved at the flood; and these irregularly thrown about by the waters of the deluge, in large, loose, or detached, solid masses; but were not dissolved or reduced to their original atoms; much less were the strata, that lay beneath the places from whence these parts were torn: for thus he says, p. 140. (where speaking of part of a skeleton of an elephant, and of several horns of the moose-deer, that were found fossil in Ireland)

It likewise hence appears, that some of the low grounds in Ireland have not been covered more than from five or ten feet thick with the Sluice of the deluge;—since it is not probable, that at the time of the death of the afore-mentioned elephant and moose-deer, the places upon which they were found lying, were the natural surface of the then habitable earth; or, as it is more clearly expressed, p. 104. where we may suppose the surface of this earth was, when there were no mountains, but all this world was an uniform globe, covered with water (as at the creation) there the strata are uniform; and the several layers of them, whether sand, clay, minerals, or gravel, are disposed in an horizontal position, parallel to one another.'

This last observation (which is the only proof brought for his Lordship's opinion, and is laid down upon the authority of Monsieur Buffon) is certainly false in fact; as I will venture to affirm,
every one will find, that will but make ten obser
vations upon the regular strata of the earth, in ten
different places; it being far more common to find
the strata, which lye beneath the slutch and rub-
ble left by the waters of the deluge, upon the
surface of the earth, inclined in various directions,
rather than horizontally disposed; which must un-
deniably prove that such strata have been moved or
displaced, and of course, that the effects of the
deluge reached below what is called by some, the
fast-ground, or what our Author imagines to have
been the surface of the Earth before the flood.
And I dare say, if he will have the earth opened
in the places where the above mentioned horns
of the moose-deer, &c. were found, deeper than
ten feet, he will discover as many infallible marks
of the deluge, as the horns, &c. of the aforesaid
animals; such, for instance, as sea-shells, teeth and
bones of other animals, or plants, &c. At least
such are frequently found in England, beneath
what is commonly called Slutch; and I suppose
Ireland was not more favoured during the deluge
than England.

In short, what is called Slutch, is no more (as
I observed before) than that matter, which the
waters, in their retreat from the earth at the end
of the deluge, left on places fit to receive it, as
the flats on the sides of mountains, the bottoms
of dales, vallies, &c. as the substance of which
this matter consists, and the manner in which it
lies, evidently prove; it being generally of a mix-
ed nature, consisting of various substances—and
lying, not in regular strata, as stone, chalk, &c.
do, but in small seams or streaks, of unequal breadth in different parts, and in a train, just as the last sediment of water would naturally leave it.

So that it is no wonder his Lordship cannot be of opinion that all the metallic and mineral matter of the earth was dissolved or separated and reduced to its original atoms at the Deluge, when it does not appear from his observations, that he ever examined the earth below ten feet, but judged of the effects of the Deluge upon the whole body of the earth, from what was transacted only, and that very weakly, on the superficial part. But I hope to make it evident, both from scripture and nature, that all the strata of stone, coal, chalk, &c. and all the veins of ore in the antediluvian earth, were actually dissolved, their constituent corpuscles separated one from another, and when in this state of separation, were mixed with a large quantity of water, so that the whole was reduced to a fluid colluvies. But of this in its due place and order.
AN
EXPLANATION
OF THE
SCRIPTURE-HISTORY
OF THE
DE LUGE.

PART I.

HAVING settled some necessary Preliminaries, I shall now endeavour to lay before the reader a plain and full Account of the Scripture-History of the Flood.

I begin with Gen. vi. 13. And God said unto Noah, The end of all flesh is come before me: for the earth is filled with violence thro' them: and behold I will destroy them with the Earth. So that the Earth itself, as well as its inhabitants, was to be destroyed. The Earth, as we are told before, was corrupt before God; its primitive goodness and fertility had been abused and perverted by
by man, and instead of rendering him more de-
pendent on and thankful to his Creator, caused
him to assume independency, and even to deify
the earth, the immediate producer of its fruits,
and to forget God the original Author and For-
mer of all.  
So that God (in judgment always
remembering mercy) determines to destroy by a
flood of waters the Earth that then was, retrench
its luxuriance, and so take away the cause of the
general corruption; that thus by altering the state
of the earth, he might necessitate man to a greater
degree of labour, shorten the period of human
life, and demonstrate to the future race of men,
their real weakness and absolute dependence on
Him.

And hence appears the necessity for the de-
struction of the whole globe. So that the opinion

b Gen. vi. 12. And God looked upon the earth, and beheld it was
corrupt; for all flesh had corrupted his way upon the earth, i.e.
God's way; for their own way was corrupt enough; and they could
not properly be said to have corrupted that. Noah, we find, was
exempted from the general destruction, because (Gen. vi. 9.) he
walked with God, i.e. he went in the true way, observed the pre-
cepts of the true religion, or did not depart from his God, Christ,
(who is filled the way, John xiv. 6. and is the living way,
Heb. x. 20.) But all these who do depart, and set up other gods,
other favours, new protectors, of what kind or sort soever, are
termed Idolaters, Apostates, Imaginers, Corrupters of the way, &c.
and such will be guilty of every evil work as well as thought; for
as their perverted thoughts or imaginations lead the way, so bad
practice will of course ensue.  
Corrupting, (says Dunsford on the
place) is in special applied to Idolatry, and depraving of God's
true service, Exod. xxxii. 7. Deut. xxxii. 5. Judg. ii. 19. as, the
people are said to do corruptly, 2 Chron. xxvii. 2. when they sa-
crificed and burnt incense in the high-places, 2 Kings xv. 35. So
Idolatry was their chief corruption here, as may also be gathered
by Gen. iv. 26. See the Annotations there.
of those who have carried a partial flood to the greatest extent, and allowed that all mankind, except those in the ark, were destroyed—imagining that mankind inhabited only a large part of the world, but the brute animals the whole; and that the deluge did not reach beyond the parts inhabited by man (for whose sake alone they suppose the flood to have been brought upon the earth) so that the parts inhabited by beasts only, as the Continent of America, &c. were exempted from the destruction, and the animals thereon preserved alive (by which they think they get over one difficulty, viz. the replenishing the earth with animals after the flood)—even this opinion, I say, will not stand the test of the Scripture-account; for the Deluge, we see, was not aimed solely at the inhabitants of the earth, but included also the earth itself.

Had Man been the only intended object of destruction, there were many ways to take him off; there was the Famine, the Sword, the Pestilence, Fire, Wind, and Storm; at the word or command of God; and either of these might have been employed, without unbinging the whole frame of the earth, and dissolving all the solid strata thereof. But this last method was intended, was threatened, was executed, was necessary; and therefore the Deluge was universal.

I proceed with the Scripture-account, ver. 14. Make thee an ark of gopher-wood; (rooms shalt thou make in the ark) and shalt pitch it within and without with pitch. And this is the fashion which thou shalt make it of; the length of the ark shall be
be three hundred cubits, the breadth of it fifty cubits, and the height of it thirty cubits: (a window shalt thou make to the ark) and in a cubit shalt thou make

e I have included this sentence, together with one just before, and another almost immediately following, in parentheses, as the sense of the Context requires, and the Original fully justifies: for the word is in the next sentence, viz. in a cubit shalt thou finish it above, plainly refers to the Ark, not to the Window; since the relative is in the feminine gender, and the word for Ark in the feminine also, but the word for Window is in the masculine; so the sentence where That is, must be taken separately from the rest, or included in a parenthesis. And the sense is, in a cubit thou shalt finish it (the Ark) above, that is, the top part of the roof of the Ark was to be made a cubit high in the middle, and sloping on each side; on purpose, I suppose, that the rain and moisture, which might fall during the Deluge, should easily slide off, without damaging the Ark.

As Commentators have been much puzzled concerning what this Window in the Ark was, and I know but one Author that has properly explained it, and since his treatise is scarce, (viz. Dickin-

soni Physica vetus & vera) I shall lay down, and endeavour to prove the certainty of his explication. —— The common opinion is, that this Window was a Hole in the upper part of the Ark about a cubit square, or a cubit in height; but how such a cavity as this could possibly afford light to the three stories of the ark (one of which was doublets under water) and to all the separate partitions in those stories, and to the many passages leading to those partitions, and this during the night, at least some part of the night, as well as in the day, is altogether inconceivable: so that this opinion, I think, cannot be true. But 2dly, the foundation on which it is built, viz. those words, in a cubit thou shalt finish it above, refer, as I have already shown, to the Ark, and not to the Window. So that 3dly, let the reader remember, there is no precise outward form ascribed to this Window. And 4thly, what is translated, A window thou shalt make to the Ark, if render'd according to the Original, is, for, or for the use of the ark, LaTabe; so that a window, in the common acceptation of the word, can scarcely be the meaning of the inspired writer. —— 5thly. The word JER (translated window) properly denotes a clear light, and as JER, signifying oil, comes from the same root, and both are derived from a verb signifying to shine bright, to the command here given to Noah, in all probability was, to make a clear shining substance, or a bright oleaginous matter, for the use of the Ark. Now such would certainly be of great ser-
vice by affording light to every separate room, since it might be
hung up in small vessels, or otherwise, as the circumstances of
place required: This substance too might be of such a
salutiferous nature, or send forth such vivifying rays, as would
greatly conduce to the health of the animals in the Ark. That it
is possible to make such a self-burning matter, either liquid or solid,
the Bermudez Pseudo of Baldinus, the aerial and glacial Nodila-
tes of Mr. Boyle, and the Pantarba of Jarchus, (which last is shone
* in the day, as fire, and at night emitted a flame or light, as
* bright as day, tho' not altogether so strong') and many other pre-
parations of the like sort sufficiently evince (see Stackhouse's History
of the Bible, Vol. I. p. 130.); and that it might have been, or
that many have been, of the above supposed salutiferous nature,
Widemfield, in his second Book de Medicamentis, has plainly shewed.
And by the command here given to Noah, without any particular
directions about preparing this substance, we may fairly collect,
that he well knew of what, and in what manner, to make it.—
6thly. The Jewish Rabbins seem to have had some notion of the
true meaning of the word under consideration, by supposing, that
it denoted a large bright Carbuncle, or precious stone, which Noah
hung up in the middle of the Ark, to give light all around; but
this certainly would not wholly answer the end, for such a stone
(supposing there was such) could not emit light into every separate
partition, and all the passages leading to the partitions, &c. so
that some such joining substance, as the above, which might be car-
rried in the hand from place to place, or hung up, or, &c. was cer-
tainly necessary and intended.—7thly. The Chaldee Paraphrase
renders the word for window by one signifying simply light.—
8thly. The Septuagint Translators (probably not knowing any word
in the Greek that would answer to the Hebrew JER) have omitted,
or else have substituted a verb (τωνοβορων) for it, which conveys
neither the idea of light nor window; and this certainly they would
not have done, had they thought the word meant a common win-
dow.—9thly. But what adds great confirmation to the above ex-
position is, that the common word for window [viz. Halun, which
is derived from a verb signifying to bore or cut thro', and properly
denotes a Hole or Window in a building] is not used in this place;
and yet it is used in the account of the ark, Gen. vii. 6, where
Noah is said to have opened the window of the ark and let out a va-
num. Here a window, as generally understood, is certainly meant,
and the common and proper word [Halun, not JER] is used;
third stories shalt thou make it. And behold I, even I, do bring a flood upon the earth to destroy all flesh, wherein is the breath of life, from under heaven, and every thing that is in the earth shall die. But with thee will I establish my covenant: and thou shalt come into the ark; thou, and thy sons, and thy wife, and thy sons' wives with thee. And of every living thing of all flesh, two of every sort shalt thou bring into the ark, to keep them alive with thee: they shall be male and female. Of fowls after their kind, and of cattle after their kind, of every creeping thing of the earth after his kind: two of every sort shall come unto thee, to keep them alive. And take thou unto thee of all food that is eaten, and thou shalt gather it to thee; and it shall be food for thee and for them. Thus did Noah; according to all that God commanded him, so did he.

What Foresight and Wisdom were here requisite! I have already proved that the Deluge was a supernatural act, and it is undeniably certain that no human knowledge, no natural experience, no deduction from causes or effects, could possibly have given mankind the least notice of such an event: of course a revelation (as Moses informs us) must have been made to Noah, in order that he might foresee, and be provided against, such a transaction.

And not only a revelation of the Fact, but the Means also declared, by which he might avoid the
the consequences of it, and have time to take due
care for the preservation of himself and family,
and for replenishing the earth with a stock of its
former inhabitants. As he was told that the
whole earth was to be destroyed by a flood of water,
so the most he could pre-conceive concerning the
impending danger (allowing he could conjecture
thus much, which, unless shipping had been in
use before the flood, he probably could not) was,
that a vessel of wood would be the most likely
means of saving him, and all that was necessary
to be secured: but of what size or form to make
this vessel, that it might suitably contain the things
that were to be taken in, and answer in all other
respects, no human wisdom, I believe, could pos-
sibly adjust. Had man been left to himself to
form a vessel that should conveniently hold a cer-
tain number of all the various species of birds,
beasts, and creeping things in the earth, and con-
tain also proper and sufficient food for them for the
space of a whole year (for so long the Deluge
lasted) he probably would have made the vessel
unnecessarily big, even so large as to endanger its
safety: and this is pretty certain, from the ob-
jections which those who have laid claim to the
greatest share of human Reason (viz. our wise free
or rather no-thinkers) have made to the Mosaic
account, supposing the Ark therein described to
have been of too narrow dimensions. But the
wisdom of man is foolishness with God, and every
objection to Scripture proves nothing but the folly
of the objector, which in this case is abundantly
manifest; for, after the strictest examination and
most
most accurate survey, it has been proved by se-
veral learned persons, that the size of the Ark, as
given by Moses, was exactly correspondent to the
things that were to be taken in.\(^d\)

That this may more clearly appear, and the
above objection be fully answered, I shall here an-
nex Bishop Wilkins's Account of this affair in his
\textit{Essay towards a real character and a philosophical
Language}, p. 162, &c.

"Having now dispatched (says the Bishop)
the enumeration and description of the several
species of Animals, I shall here take leave for
a short Digression, wherein I would recom-
mend this, as a thing worthy to be observed,
namely, That great difference which there is
betwixt those opinions and apprehensions which
are occasioned by a more general and confused
view of things, and those which proceed from
a more distinct consideration of them as they are
reduced into order.

He that looks upon the Stars, as they are
confusedly scattered up and down in the Firm-
ament, will think them to be (as they are
sometimes stiled) \textit{innumerabile}, of so vast a mul-
titude, as not to be determined to any set num-
ber; but when all these Stars are distinctly re-
duced into particular Constellations, and de-
scribed by their several places, magnitudes, and
names, it appears, that of those that are vi-

\(^d\) See \textit{Butro de Arca Noe; cujus formæ & capacitatis fuerat;}
§ 9. That the Ark was of sufficient capacity. Bishop Wilkins's
Essay towards a real character and a philosophical language. Part II.
Chap. v. § 6

"fible
fible to the naked eye, there are but few more
than a thousand in the whole Firmament, and
but a little more than half so many to be seen
at once in any Hemisphere. It is so likewise in
other things: he that should put the Question,
how many sorts of beasts, or birds, &c. there
are in the world, would be answered, even by
such as are otherwise knowing and learned
men, that there are so many hundreds of them,
as could not be enumerated; whereas, upon a
distinct inquiry into all such as are yet known,
and have been described by credible Authors,
it will appear, that they are much fewer than
is commonly imagined, not a hundred sorts of
Beasts, nor two hundred of Birds.

From this prejudice it is, that some here-
ticks of old, and some atheistical scoffers in
these later times, having taken the advantage
of raising objections (such as they think un-
answerable) against the truth and authority of
Scripture, particularly as to the description
which is given by Moses, concerning Noah's
Ark, Gen. vi. 15. where the dimensions of it are
set down to be three hundred Cubits in length,
fifty in breadth, and thirty in heighth, which
being compared with the things it was to con-
tain, it seemed to them, upon a general view,
(and they confidently affirmed accordingly) that
it was utterly impossible for this Ark to hold so
vaft a multitude of Animals, with a whole
year's provision of food for each of them.

It is plain in the description which Moses
gives of the Ark, that it was divided into three
"Stories, each of them of ten cubits, or fifteen "feet high, besides one cubit allowed for the "declivity of the roof in the upper story. And "it is agreed upon as most probable, that the "lower story was assigned to contain all the spe-
"cies of Beasts, the middle story for their food, "and the upper story, in one part of it, for the "Birds and their food, and the other part for "Noah, his family, and utensils.

"Now it may clearly be made out, that each "of these stories was of a sufficient capacity for "the containing all those things to which they "are assigned; even supposing the Cubit to be "(at the lowest computation) but a foot and "half in length.

"For the more distinct clearing up of this, I "shall first lay down several tables of the divers "species of beasts that were to be received into "the Ark, with their different kinds of food, "containing both the number appointed for each "of them, namely, the clean by sevens, and the "unclean by pairs, together with a conjecture "(for the greater facility of the calculation) what "proportion each of them may bear either to a "beef, or a sheep, or a wolf; and then what "kind of room may be allotted to the making "of sufficient stalls for their reception.

Beasts
### Beasts Feeding on Hay

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
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<th>Number</th>
<th>Name</th>
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<td>Otter</td>
<td>3</td>
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<td>Fox</td>
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### Beasts Feeding on Fruits, &c.

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<td>Martin</td>
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<td>Stoat</td>
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### Beasts Feeding on Flesh

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<th>Number</th>
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<td>Ferret</td>
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<td>1</td>
<td>Polecats</td>
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<td>Martin</td>
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<td>Stoat</td>
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<td>Jackall</td>
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<td>2</td>
<td>Caracal</td>
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In this enumeration I do not mention the mule, because it is a mungrel production, and not to be reckoned as a distinct species. And tho' it be most probable, that the several varieties of beecves, namely, that which is stiled Urus, Bisons, Bonasus, and Buffalo, and those other varieties reckoned under sheep and goats, be not distinct species from bull, sheep, and goat; there being much less difference betwixt these, than there is betwixt several dogs: and it being...
"ing known by experience, what various changes
"are frequently occasioned in the same species
"by several countries, diets, and other accidents;
"yet I have ex abundanti, to prevent all cavilling,
"allowed them to be distinct species, and each
"of them to be clean beasts, and consequently
"such as were to be received in by sevens. As
"for the morse, seale, turtle, or sea-tortoise, croco-
"dile, fenembi; these are usually described to be
"such kind of animals as can abide in the
"water, and therefore I have not taken them
"into the Ark, tho' if that were necessary, there
"would be room enough for them, as will shortly
"appear. The serpentine-kind, snake, viper,
"slow-worm, lizard, frog, toad, might have suf-
"ficient space for their reception, and for their
"nourishment, in the drein or sink of the ark,
"which was probably three or four feet under
"the floor, for the standing of the beasts. As
"for those leffer beasts, rat, mouse, mole, as like-
"wise for the several species of insects, there can.
"be no reason to question, but that these may
"find sufficient room in several parts of the ark,
"without having any particular stalls appointed
"for them.

"It appears by the foregoing tables, that the
"beasts of the rapacious carnivorous kinds, to be
"brought into the ark by pairs, were but forty
"in all, or twenty pairs; which, upon a fair cal-
"culation, are supposed equivalent, as to the bulk
"of their bodies and their food, unto twenty-
"seven wolves; but for greater certainty, let them
"be supposed equal to thirty wolves: and let it
Part I. of the Deluge.

be farther supposed, that six wolves will every
day devour a whole sheep, which all men will
readily grant to be more than sufficient for
their necessary sustenance: according to this
computation, five sheep must be allotted to be
devoured for food each day of the year, which
amounts in the whole to 1825.

Upon these suppositions there must be con-
venient room in the lower story of the Ark, to
contain the fore-mentioned sorts of beasts, which
were to be preserved for the propagation of
their kinds, besides 1825 sheep, which were to
be taken in as food for the rapacious beasts.

And tho' there may seem no just ground of
exception, if these beasts should be stowed close
together, as is now usual in ships, when they
are to be transported for any long voyage; yet
I shall not take any such advantage, but afford
them such fair stalls, or cabins, as may be abun-
dantly sufficient for them in any kind of posture,
either standing, or lying, or turning themselves,
as likewise to receive all the dung that should
proceed from them for a whole year.

And that the lower story of the Ark was of
a sufficient capacity for these purposes, will ap-
ppear from the following considerations.

*First, let a partition of fifteen feet wide

D 2

The Bishop has here annexed a large folio Drawing of the
lower Story of the Ark, and of the disposition of the animals in it.
But I have endeavoured to represent his meaning in such a manner,
that the reader may apprehend it, without the Draught; tho' if he
be very curious I would advise him to refer to that, or rather to a
more compleat Drawing, reprinted in the Gentleman's Magazine
for February 1749; wherein every Story of the Ark, and the dis-
position of every thing that was to be contained therein, are deli-
neated in a most judicious manner, from a Dutch Author.
be marked off, length-ways, at each end of the Ark. Now the breadth of the Ark being seventy-five feet, these partitions must contain in them five Areas of fifteen feet square, and an area of five feet square being sufficient to contain four sheep, therefore one of fifteen feet square must be capable of thirty-six sheep. Allowing one of these areas at each end for stairs, there will eight of them remain, (viz. four at each end) to be reckoned for the containing of sheep; which eight will be capable of receiving 288 sheep.

Besides these partitions at the end, let two other areas be marked off, passing along the middle of the floor length-ways of the Ark, each of them 25 feet wide, and about 200 feet long. Now supposing these middle areas to be designed also for sheep; an area of 25 feet square must be capable of holding 100, and there being sixteen of these, they must be capable of containing 1600 sheep, which being added to the former number of 288, will make 1888, somewhat more than 1825, the number assigned that were to be taken in for food.

On each side of the middle areas for the sheep, let us suppose a passage of seven feet wide, for the more convenient access to the sheep, and the stalls that are to serve for the other beasts.

On this division of the lower floor of the Ark, there will remain four other areas (two on each side of the middle areas for the sheep) each of them 18 feet wide, and 200 feet long, which will be more than sufficient to contain the several beasts which were to be pre-
'served for the propagating of their kind; for which, in the foregoing tables, there is allotted to the length of the stalls only 611 feet, besides the largeness of the stalls allowed to each of them. So that upon this fair computation, there will be very near two hundred feet over plus in this lower story, for the reception of any other beasts not yet enumerated, or discovered.

The next thing to be cleared up, is the capacity of the second story for containing a year's provision of food. In order to which 'tis to be observed, that the several beasts feeding on hay were before, upon a fair calculation, supposed equal to ninety-two beeses: but to prevent all kind of cavils which may be made at the proportioning of them, let them be as a 100, besides the 1825 sheep taken in for food. But now, because these are to be devoured by five per diem, therefore the year's provision to be made for them is to be reckoned but as for half that number, viz. 912. These being divided by seven, to bring them into proportion with the beeses, will amount to 180, which added to the former 100 make 280, suppose 300. So then, according to this supposition, there must be sufficient provision of hay in the second story to sustaine 300 beeses for a whole year.

Now 'tis observed (faith Buteo) by Columella, who was very well versed in the experiments of husbandry, that thirty or forty pound of hay is ordinarily sufficient for an ox for one day, reckoning twelve ounces in the pound. But we
"will suppose forty of our pounds. And 'tis affirmed by Buteo, upon his own trial and experience, that a solid cubit of dry'd hay, compressed, as it uses to be when it hath lain any considerable time in mows or ricks, doth weigh about forty pound; so that for 300 beeves for a whole year, there must be 109,500 such cubits of hay, (i.e.) 365 multiplied by 300. Now the second story, being ten cubits high, 300 long, and fifty broad, must contain 150,000 solid cubits, which is more by 40,500 than what is necessary for so much compressed hay; and will allow space enough both for any kind of beams and pillars necessary for the fabric, or likewise for other repositories, for such fruits, roots, grain, or seeds, as may be proper for the nourishment of any of the other animals; and likewise for such convenient passages and apertures in the floor, as might be necessary for the putting down of the hay to the stalls in the lower story. From which it is manifest, that the second story was sufficiently capacious of all those things designed for it.

"And then as for the third story; there can be no colour of doubt, but that one half of it will be abundantly sufficient for all the species of birds, together with food sufficient for their sustenance, because they are generally but of small bulk, and may easily be kept in several partitions, or cages, over one another. Nor is there any reason to question, but that the other half would afford space enough both for Noab's family and utensils.

"Upon
"Upon the whole matter, it doth, of the two,
appear more difficult to assign a sufficient num-
ber and bulk of necessary things, to answer the
capacity of the ark, rather than to find sufficient
room for those several species of animals already
known. But because it may be reasonably pre-
sumed, that there are several other species of
beasts and birds, especially in the undiscovered
parts of the world, besides those here enume-
rated, therefore it is but reasonable to suppose
the ark to be of a bigger capacity, than what
may be sufficient for the things already known;
and upon this account it may be asserted, that
if such persons, who are most expert in philo-
sophy and mathematicks, were now to assign
the proportions of a vessel that might be suit-
able to the ends here proposed, they could not
(all things considered) find out any more ac-
commodate to these purposes, than those here
mentioned."

To the above observations, I may add, what is
recorded by Parker in his Bibliotheca Biblica,
vol. I. Occas. Annot. 13. that Peter Jansen, a Dutch
merchant, about the beginning of the last century,
caued a ship to be built for him, answering, in
its respective proportions, to those of Noah's ark,
the length of it being 120 feet, the breadth of
it 20, and the depth of it 12. At first, this was
looked upon no better than a fanatical Vision
of this Jansen (who was by profession a Mennonist)
and whilst it was building, he and his ship
were made the sport of the leamen, as much as
Noah and his ark could be. But afterwards, it
was
was found, that ships, built in this fashion, were, in the time of peace, beyond all others most commodious for commerce; because they would hold a third part more, without requiring any more hands, and were found far better runners than any made before.

And tho' Mosēs could not but foresee, that such objections as these would be raised against his account, yet he left it to stand the test, barely relating the fact, not anxiously explaining the reason of every thing; well knowing that he was directed in what he said by Infinite Wisdom, who would order all things in measure, and number, and weight; and quite satisfied, that if man would but act the proper part, and use his reason aright, that is, not judge till he had well weighed and considered the subject, the justness and propriety of what he related would eminently appear. Hence, by the way, we may see the great necessity of much natural knowledge in order to apprehend the philosophical parts of the Bible, and that Mosēs did not suit his descriptions of things to the capacities of the vulgar, but wrote for the most improved Understandings.

Again; as it was necessary that two at least of each species of animals of the land and air, and these a male and female (or future propagation) should be taken into the Ark, so it was impossible that Noa'b and his family of themselves could have collected them together; many of the creeping kind are so small as to escape the human sight, unassisted by the best glasses, and probably many there are that cannot be discerned even by the help
help of them, at least so far as to discover which are male and which female; others are of so swift a flight, or of so wild and rapacious a nature, that they cannot be caught and tamed by man: God therefore must have directed the several kinds in suitable numbers to the Ark (probably in the manner he influenced them to come to Adam, when they were first named, Gen. ii. 19.) Agreeably to this Moses informs us, that the same divine Person who forewarned Noah of the flood, assured him, that two [or rather, as the word may be rendered, couples; for more than two of some species were taken in] of every sort should come unto him to be kept alive, Gen. vi. 20.

All these articles were necessary to be known, all these preparations necessary to be made by those who could possibly be saved; and answer the end of their salvation (by being able to replenish the Earth with a stock of its former inhabitants) in such a Flood as was That in the time of Noah. But these articles could not be known, nor could these preparations be made, without divine assistance; such assistance therefore was undeniably given to Noah; and it is equally undeniable, that all those, who had it not, perished. Hence our Saviour represents the Flood as coming upon the ungodly quite unexpectedly, Matt. xxiv. 38. In the days that were before the flood, they were eating and drinking, marrying and giving in marriage, until the day that Noah entered into the ark, and knew not until the flood came and took them all away. Surely then none either did or could escape; for if even a few had reached the highest mountains,
mountains, yet as they had had no time to prepare themselves with food and the common necessaries of life, they must soon have perished thro' hunger.

Again; had not the Deluge been universal, but partial only, and extended even over one half of the globe, there certainly had been no need of the Ark. Noah and his family might have retired from the destruction, in the same manner as Lot and his family did from that of Sodom, and the countries adjacent, into some other part of the earth; and this might have been done in much less time, and with far less care and trouble, than to have built so large a vessel as the Ark was, and prepared all the necessary things for the safety of the animals that were to be included. At least had the Deluge been partial, there had been no occasion of taking in animals of every kind, male and female, of every sort, to keep seed alive upon the face of all the earth; (Gen. vii. 3.) for had any islands or countries, with the creatures peculiar thereunto, been exempted from the common calamity (as our Author supposeth) it had been needless to have preserved such by means of the Ark; or indeed to have taken in any of the Brute-creation at all, since they might have been conducted to those parts of the earth which the Deluge reached not, by the same means that they were brought to the ark to be saved thereby; many of the beasts, such as are of the swift and wild kind, might easily have escaped thither; and the birds, without difficulty, might have fled, from the approaching danger, into the most distant regions of
Part I. of the Deluge.

of the earth. But as all this precaution was taken, all these measures executed, it is certain that God intended that the Deluge should be universal; and we shall see hereafter from the effects of it, that it really was so.

For, as soon as Noab and the animals were entered into the ark, we are told, that

All the Fountains of the Great Deep were broken up.

The Maker of this earth (who certainly knows its inward as well as outward structure) has informed us, that there is a vast collection of waters within it, characterised (to distinguish it from all lesser Deeps, Seas, &c.) under the name of the GREAT DEEP; it is called, Gen. xlix. 25. The Deep that lieth under, i. e. the earth; and Deut. xxxiii. 13. The Deep that coucheth beneath. From this reservoir all fountains and rivers receive their supplies, as the wisest of natural Philosophers has told us, Eccles. i. 7. All the rivers run into the Sea [the general collection of waters, part high up, and part beneath, the earth] yet the Sea is not full [doth not reach the height of, or run over, its shores]. Unto the place from whence the rivers came, thither they return again. The shell of the earth is represented as lying directly over this abyss; or covering it, as an Arch stretched over an orb of water; so the Psalmist, xxiv. 1. The earth is the Lord's—for he hath founded it upon the seas, and established it upon the floods;

* This collection of waters I have designated by G. H. in Plate the second, which the reader will consult, and also what is said in Note o.
FLOODS; and again, cxxxvi. O give thanks to the LORD of Lords, who alone doth great wonders;—
to Him (for this is a wonderful and very beneficial act) that stretched out the earth above the waters. So of the first sediment, strata, and laying the foundations of the earth, Prov. viii. 27. When He prepared the heavens, I was there; when He set a Circle upon the face of the Depth; when He appointed the foundations of the earth. And Job xxxviii. 4. Where wast thou when I laid the foundations of the earth? Whereupon are the sockets thereof fastened? Or who had laid the Corner-stone [the key-stone of the arch] thereof? And ch. xxvi. 10. He set a Circle upon the face of the waters. So that the shell of the earth is of a circular form, comprehending (as the shell of an Egg contains the fluid within) an immense quantity of Water, characterised in Scripture under the name of the great Deep or Abyss.

As this notion of the earth’s containing within itself an Abyss of Water is maintained by some of the most antient Heathen writers, and it doth not seem probable that they procured the knowledge of it by any discovery of their own, and therefore that they obtained it at first from Revelation by Tradition, I shall here annex their evidence as being, in this respect, properly divine.

PLATO in his Phaedon (near the end) writeth thus, "Καὶ ὅλην μὲν ὁ ἐν τῷ γῆς, &c. And such "is the form and constitution of the whole earth, "and the things that are about it. There are "several circular Hollows in its inside, some "deeper, some wider, some narrower, &c. But "all
Part I.

of the Deluge.

"all the Cavities everywhere perforate one an-
other, and are open at both ends, by means 
of which a great quantity of water flows from 
one into another, as into cisterns. There are 
also under-ground incredible large rivers, and 
perpetual springs of waters both hot and cold. 
But One of these concavities in the inside of the 
earth is greater than the rest, piercing from 
side to side through the whole Earth; which 
Homer mentions in this verse, Iliad. Θ. v. 14.

Τηλε μαλα, πχι βασισκαυ υπο χθονος ετερεθμον.
Far hence, in the earth there gapes a gulph immense.

"Which both he elsewhere, and many other 
Poets, call Tartarus, into which all rivers have 
their confluence, and flow out of it again by 
turns. Each river comes out tinged with 
the nature of the earth thro' which it flows. 
And the reason why the rivers flow thither, and 
come back again, is, because the Abyss has neither 
bottom nor base; and therefore tho' they are 
lifted up, they naturally flow down again: as 
also does the Air or Spirit that attends them. 
And as in the respiration of animals, there is an 
incessant ingress and egress of the air, so the air, 
that is mingled with the waters, accompanies 
them in their ingress and egress, and raises 
raging winds. When these waters fall into 
this lower Abyss, they diffuse themselves into all 
channels of the springs and rivers, and fill them 
up; just as if one were drawing water up with 
two pails, one of which fills as the other emp-
ties: for these rivers flowing from thence fill
up all our channels; from whence diffusing
themselves about, they constitute our Seas,
Rivers, Lakes, and Fountains.

So Hesiod, Theog. l. 119.

Ταφλαρα τ’νησεία μυχα χθένος ευρυδέειν.
And dark Tartarus in the Earth’s recess.

AND again; Homer, Iliad. φ. 195.

Ουδε σαθυρρεια μεγα Δειος Ωκεανος,
Εξ υπερ παντες ναταροι κυ πατα Σαλασσα,
Και πασαι ξρημαι κυ Φρειατα μακρα νανω.

Nor great Oceanus, from whose fountains flow
All Seas, all Rivers, and all Springs below.

It is remarkable, that the most antient Heathen
Authors often speak of Oceanus [under which
term they comprehended the immense body of
water within the Earth, as well as that without]
as the Parent of their Gods; as indeed He was;
for the subsidence, or retirement of the great
Abyss (at the end of the Deluge) to its original
bed, the Boform of the Earth, restored to them
the Lights of Heaven (which they worshiped as
Gods) and the use of the Earth, see Gen. viii. 22.

So Homer (Iliad. ε. 200.) makes Juno speak
thus:

Εστι γαρ φομην πολυφδης περατα γαιαν,
Ωκεανος τι, Άειων ρεωσιν, κυ μητερα Τρωιως, &c.

Then
Part I. of the Deluge.

Then she—I haste to those remote abodes,
Where the Great Parents of the deathless Gods,
The reverend Ocean and grey Tethys reign,
On the last limits of the land and main:
I visit these, to whose indulgent cares
I owe the nursing of my tender years.

But more particularly Orpheus in his hymns,
writes thus, p. 178.

Ωκεανός καλεῖ, πάντες απ' ἀφθινον αἰεν εὐοίνα,
Αθανάτον τε σκοτών τε λείπειν ἅπτομεν τ' αἰώρωπον,
Οὐς ἐμπεπνευσάτω γάιας περιπερίμονα κυκλοῦ.
Εἰς ἐν τῷ ποίητες ποταμοῖς ἔν πασᾷ Ἡλάτσα,
Καὶ χθονιοι γάιας ἐπιγραμμοῖ ιεραίς ἀργαί.

O Father Ocean! 'tis to thee I call,
Of Gods and Men the Great Original;
Thee I invoke! who with thy close embrace,
Surround'st the earth, the seat of human race;
From thee all Seas and Rivers take their rise,
And Waters subterrene receive supplies.

And again, p. 114.

ΚΛΑΩ: Ποτέ θαυμαζεις χαιρε ——
Οὐς ναις ποτὲ φρουρνοι θεμέλια,
Ποντικιδών, αλιστυ, εἰρωνίζοντε, εὐνοιαγῳσκε, &c.

I cannot better illustrate the meaning of some of these epithets given to Oceanus or Neptune, or shew how applicable they are to the point in hand, than in the words of Dr. Woodward (vid. Nat. Hist. of the Earth, p. 138.) “These Phænomena
are not new, or peculiar to the Earthquakes, which have happened in our times, but have been observed in all ages, and particularly these exorbitant commotions of the Water of the Globe. This we may learn abundantly from the histories of former times; and it was for this reason that many of the antients concluded, rightly enough, that they were caused by the impulses and fluctuation of water in the bowels of the Earth. And therefore they very frequently called Neptune Νεανίς, as also Ευσυνίς, Ευσυνίς, and Τικάρτοργας; by all which Epithets they denoted his power of Shaking the Earth. They supposed that he presided over all water whatever, as well that within the Earth, as the Sea, and the rest upon it; and that the Earth was supported by water, its foundations being laid thereon: upon which account it was that they bestowed upon him the cognomen Γαστοχος, or Supporter of the Earth, and that of Θεμελιώκος, or the Sustainer of its foundations. They likewise believed that he, having a full sway and command over the Water, had power to still and compose it, as well as to move and disturb it, and the Earth by means of it: and therefore they also gave him the name of Ασφαλιος, or the Establisher; under which name several temples were consecrated to him, and Sacrifices offered, whenever an Earthquake happened, to pacify, and appease him; requesting that he would allay the commotions of the water, secure the foundations of the earth, and put an end to the Earthquake.

BESIDES
Part I. of the Deluge.

Besides all this, Lucretius (Lib. v. 261.) argues thus:

Quod suprest, humore novo mare, flumina, fontes
Semper abundare, et latices manare perennes,
Nil opus est verbis, magnus decursus aquarum
Undique declarat: sed primum quicquid aquae
 Tollitur, in summaque fit, ut nihil humor abundet.
Partim quod validi verrentes aequora venti
Diminuunt, radiisque retexens aetherius Sol:
Partim quod subter per terras diditur omnes.
Percolatur enim virus, retroque remanat
Materies humoris, et ad caput annibus omnis
Convenit; inde super terras fluit agmine dulci,
Qua via seta semel liquido pede detulit undas.

Besides; that Seas, that rivers waste and die,
And still increase by constant new supply,
What need of proofs? this streams themselves do show,
As all run murm'ring to the Sea below.
But left the mass of waters prove too great,
The Sun drinks some, to quench his natural heat;
And some the winds brush off, with wanton play
They dip their wings, and bear some parts away:
Some pass th' into the earth, diffus'd all o'er,
And leaves its salt behind at every pore;
For all return thro' secret channels spread,
And join, where first they issu'd from their bed;
Hence on the earth in fair meanders play,
And thro' the vallies cut their liquid way.

CREECH.

E Of
Of Christian writers that have mentioned the Abyss, I shall only insert the opinion of John de la Hay, as his description is very just, and contains a comment on the words under consideration, viz. And the fountains of the great deep were broken up. Facilior erit borum verborum intelligentia, &c. i.e. "We shall more readily understand these Words, if we inquire into the meaning of the word Abyss or Deep, which is nothing else than an hidden place in the Bowels of the Earth, where the Waters lie hid, and from whence Fountains and Lakes have their rise; and it is called the Great Deep, by way of distinction from some lesser Hollows in the Earth; for this is, as it were, the Mother of them all, to whom they are all joined by Veins and Passages: the Fountains therefore of that Great Abyss were broken up, is, as if he had said, such a Quantity of Water burst from that Great Deep, that its common Outlets were broke or burst open, like a Land-flood, when it meets with Resistance; the too great quantity of water breaks down the Channels and Banks, which, as it were, imprisoned it: but not only the Fountains of that Deep were broken open, but the Sea came out of its bounds, pouring over the Earth, and the Rivers burst forth with the greatest Violence."

Such then, according to Scripture and Heathen Testimony, is the Constitution of the Earth, that it contains within itself an immense reservoir of water, denominated by the name of the Great Deep; the fountains of which were broken up,
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up, in order to effect the Deluge in the time of Noab.

But before I can shew particularly how this great Event was brought to pass—what alterations were made in the Terraqueous Globe at that time—the Agents that were employed—and the manner of their acting—it will be proper to say something of the original formation of the Earth; which is thus described by Mojes.

Gen. i. 1. In the beginning [BeRASIT, in the first place] God created [gave existence to] AT, [the Atoms, the Substance of] the Heavens [VAT] and [the Substance of] the Earth.

And the Earth was without form [a formless mass; the parts for Solids and Fluids being confusedly mixt together] and void, [empty, hollow within.]

Which easy and natural interpretation of the word BeRASIT frees the Scripture from an impertinent question that some have put here, viz. In the beginning of what? As if Mojes had represented God as having created the World in the beginning of the World, or in the beginning of Time (which is the same thing, for Time began with the World) which would have been an idle tautology. But to tell us, that the first act that was done in the History that he was going to give of the Generations of the Heavens, and of the Earth, and of Mankind, (Gen. ii. 4—8.) was the production of the world de novo, or that the Altein, his God, created it, is not only sense, but highly proper, as it struck at the very root of the Idolatry then prevailing in the world, which was the worshipping of the creature instead of the Creator, or the works of God, instead of God himself. So that as F. Neirenberg says, "In uno duntaxat capit, primo Geneaeos, puto plus docuisse Moyses quam ceteros omnes philosophos et naturae interpretes; i. e. I think that Mojes has taught us more philosophy in one single chapter—viz. the first of Genesis, than all the philosophers and explainers of Nature put together. So I may say, that Mojes has taught us more theology in one single verse of that chapter, than all the heathen world could have discovered by any means of their own."
And Darkness [dark, torpid Air] was upon the face of the Deep.

And the Spirit of God [RUE ALEIM] moved upon the face of the Waters. This is the first Agent or Mover mentioned to have been employed towards reducing the formless mass of the Earth into shape. What this Spirit is, may be judged of from similar passages in Scripture.

The word rendered Spirit [RUE] is the same as is usually translated Wind, and denotes Air in motion, as Isa. xl. 7. The grass withereth, the flower faileth; because the Spirit of the Lord bloweth upon it. Here certainly the natural motion of the wind is meant; as also it is in the following passages, Psalm cxlvi. 16. He giveth snow like wool; scattereth the hoar-frost like ashes. He causeth forth his ice like morsels; who can stand before his cold? He sendeth out his Word [symbolically placed for the Light of the Sun; as his real Son is the Light of the World, and the Word of life] and melteth them: he causeth his Wind [RUE, his Spirit] to blow, and the waters flow. Psalm xxxv. 5. Let them be as Chaff before the Wind [RUE], and let the Angel [the Agent, the Wind] of the Lord chase them. Hosea xiii. 15.

Though he be fruitful among his Brethren, an East Wind shall come, the Wind of the Lord [RUE JEHovah] shall come up from the Wilderness, and his spring shall become dry, and his fountain shall be dried up. So also, Job xxxvii. 21. And now men see not the bright light which is in the clouds [more properly it means, in the skies]: but the Wind [the Spirit] causeth away and cleanseth them;
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them; i.e. by the motion of the air the sky is cleared, and the light rendered visible. So again, ch. xxxvi. 16. By his Spirit he hath garnished the Heavens.

But what more evidently confirms the above interpretation is, that at the time of the Deluge, when the Earth was totally dissolved, and all things in the same confused state they were at the beginning of its formation, the same Agent is mentioned to have been employed towards the reforming of it, viz. Gen. viii. 1. And God made a Wind [RUE, the Spirit] to pass over the earth, and the waters asswaged. Here certainly a motion in the air is meant, and as certainly it is to be understood in the former case, when we are told, that the Spirit of God moved upon the face of the waters; i.e., God by his immediate power caused a motion or raised an agitation in the (before) dark, stagnant Air around the earth, (and it is called His Spirit, because he alone did, or indeed could, produce such a motion) which MeReHPeT, moved. This word in the original, as his Lordship of Clogher observes (who also allows that the Spirit here spoken of is the Air[h]) signifies properly "a

E 3 "shivering

*h See his Vindication of the histories of the Old and New Testament, Part II. p. 47. Many antient writers have thus interpreted it, as Phito Judeus, Martin de Borbai, Jannes Mariana, and two or three of the Fathers, were of this opinion, as his Lordship observes. And even Hobbes (whose opinion may please some persons better than any one's else) argues thus, (Leviat. p. 208.) "Gen. i. 2. The Spirit of God moved upon the face of the waters. Here, "if by the Spirit of God be meant God himself, then is motion "attributed to God, and consequently place, which are intel- "ligible only of bodies, and not of substances incorporeal; and "so the place is above our understanding, that can conceive no- "thing
The Scripture-History

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"Shaking or tremulous kind of motion, such as a man maketh, when he shaketh for fear; in which sense the word is used Jer. xxxiii. 9. or as a hen [Deut. xxxii. 11. an eagle] useth when she expandeth her body and wings [fluttereth] over her brood of chickens [her young ones]. And therefore this word is elegantly expressive; five of the vibrating motion of the Air." This action of the air, we are told, was upon the face of the waters, i.e. upon the surface of the fluid turbid mass of the earth, and therefore would have suitable effects upon it, i.e. by surrounding and compressing the outside, would determine the earth to be of a spherical or orbicular shape, as the action of the Air upon any fluid body, suspended in it, at present determines it to be. But the gross action of the Spirit alone could not enter much beyond the surface, or cause any great alteration in the Inside; some other therefore, more subtile, penetrating Agent, than this, was requisite to form the shell of the earth, or drive together the solid atoms thereof. Accordingly the next thing we read of was the Production of Light.

And God said [decreed, commanded] Let there be Light; and there was Light.

HERE

"thing moved that changes not place, or that has not dimension; and whatsoever has dimension, is body. But the meaning of these words is best understood by the like places, Gen. viii. 1. Where when the earth was covered with waters, as in the beginning, God intending to abate them, and again to discover the dry land, useth the like words, I will bring my Spirit upon the earth, and the waters shall be diminished. In which place by Spirit is understood a wind, (that is, an air or Spirit moved) which might be called (as in the former place) the Spirit of God, because it was God's work."
Part I. of the Deluge.

Here an Agent is introduced, the most subtile as well as most powerful of any in nature. We all know, that Light passes freely through the hardest and closest of terrestrial substances, and when its atoms are collected in a focus, will separate and dissolve the parts of the most compact body. Here then are two very powerful Agents; one that displays itself principally by pressure, the other by penetration. And what might not such Agents as these do, in the hand of the mighty Creator? No Command in Nature could be insuperable to such servants, under the direction of such a Master. We need not therefore wonder, if we should hear of great and mighty events brought about by these Agents in ever so short a space of time, nay, if the earth, from a formless, fluid, confused mass, should be made, within the space of a day or two, into a solid habitable Globe. To effect which, these Agents are put in commission by the following Command.

And God said, Let there be a Firmament [marg. Expansion] in the midst of the waters [the fluid, chaotic mass of the Earth, called Waters before, ver. 2.] and let it [there] divide the waters from the waters. The reader then will remember that this whole transaction was to be upon or in the Earth, not in the midst of the heavens, or in the Air at a vast distance from the Earth, as many Commentators have imagined, but the whole transaction was to be in the midst of the waters of the Earth.

And the words plainly imply, as others in this chapter do, a Command to the natural Agents to operate.
operate. Light had been formed, had reached and acted upon this Globe: and wherever Light and Spirit [or Air in motion] are, there would of course be a struggle between them, and this struggle would produce an Expansion, this expansion a division, and so on. The word for Firmament, Raqio, explains what the Firmament is; the word signifies, as we see in the margin of our bibles, Expansion, and the meaning is, Let the Light and Spirit expand and diffuse themselves, and let them press into the mixture, called Waters; and let them act in, among, or between the parts of it, and drive the solid parts together, and thereby make a separation, and with the parts separated a division or wall between the waters; so that one moiety of the waters shall lie on one side of this wall, and the other on the other side.

To explain how this was done: The Earth, we are told, was created void, (Genesis i. 2.) i.e. hollow, empty within (as the word means, Isaiah xlvi. 18.) or with a large central Hollow, (called, Job xxxviii. 8, the womb of the earth) filled only with air, as every hollow place in the earth at present is filled. As soon therefore as the light had reached this central or inward air, there would instantly commence a conflict between them, or a struggling this way and that as from a center; which is obvious to every ordinary capacity in the case of a bladder that is flaccid or half-filled with air, when held before the fire. The light (which not even the closest-compacted substance can deny a passage to) issues forth from the fire, and penetrates the pores of the bladder, drives itself in amongst the gross air, which must force That to push
A. 1. The outward Expansae.  
   At first, dark Air only outside.
A. 2. The inward Expansae.  
   and in the inside of ye Earth.
B. 1. An orb of water, separated by the action of the outward Expansae from the Earthy mass; called the waters under the firmament.
B. 2. An orb of water, separated by the action of the inward Expansae from the Earthy mass; called the waters above the firmament.
C. The solid shell of the Earth formed, between two orbs of water, into various concentric strata of stone, coal, &c. by the action of the two Expansae.
The three several orbs B. 1. B. 2. and C. were at first confusedly mixed together, and then called the Earth without form.

NB. This Plate represents all the Earth during the height of the Deluge.
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push itself every way outward, and distend the sides of the bladder that encloses it.

Thus would the inward Expanse [denoted by A. 2. in plate I.] or expanding air act upwards every way from the center to the circumference of the chaotic mixture; while the outward Expanse [A 1.] or the light and spirit on the outside of this globe would act downwards, on, and through every part of it. And by these two equal and counter-acting agents, the earthy, or solid parts of the chaotic mass, would be driven together into a spherical shell [C.] at a considerable distance from the center of the earth, and there be sustained; and as the earthy or solid parts would be driven together into a close hard shell or crust, so by the same action would the fluids be permitted to slip between on each side of this crust. Thus would the shell of stone, or the Earth, be formed between two orbs of water; one orb [B. 1.] would cover the outward surface; the other [B. 2.] would cover, or by the force of the expanding air from the center be pressed close to, the inward surface of the earth. Such being the situation of things, it will now be apparent to every one, how the earth was founded upon and formed between the waters.—And as the shell, or crust of the earth, was driven together by the expansive power of the air, and formed between two orbs of water, so the Firmament acted the part it was commanded of dividing the waters from the waters.

And as the Expansion had this power from the Creator (for He first caused the motion in the before
before dark stagnant air; that motion produced Light; that Light and that Spirit an Expansion, &c.) and as it was now immediately under the influence of its Maker, and acted according to his Directions; so (and to prevent the Israelites from imagining it to be a God, and not the work of God, as the idolatrous nations did) Moses adds, And God made the Firmament; and divided the Waters which were under the Firmament, from the Waters which were above the Firmament.

This is a further description of things, in order to prevent our mistaking where the Waters divided, and where the Airs dividing, were; and to prepare the reader for what was to follow. The Expansion, as we have seen, acted from above and from below, and by forming the crust of the earth in the midst of the waters, separated the waters from the waters; which waters, thus separated, would be in two distinct orbs; one [B. 1.] covering the outward surface of the earth, which therefore would justly be designated by the waters under the open Air, Heaven, Firmament, or Expansion; in the same sense as the hills (Gen. vii. 19.) are said to be under the heaven; and as these waters then covered the whole surface of the earth, they were more immediately under the heaven. And as we have seen already, there was a body of expanding air at and round the center of the earth, so the waters [B. 2.] that were directly above this inward Expansion, i.e. those which were close to the concave surface of the earth, would properly be denominated Waters above the Air, Firmament, or Expansion.
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That there was really a body of expanding air at and round the center of the earth (on which supposition the above interpretation depends; and ignorance of this has produced all the difficulty which this part of Scripture has been thought to labour under) is evident, not only from its being asserted, that the earth was created comparatively hollow, or filled only with air; but from the text under consideration: For 1st. here is express mention made of two Expanses, and the operation of each, as I have shewn already, was on or in this earth. It is allowed by all, that one Expansæ acted on the outward or convex surface of the globe; the other therefore must be within, and act on the inward or concave surface. But 2dly. had there not been an Expansion from within, or from below, as well as from above, there could have been no separation of waters from the waters, or the shell of the earth could not have been formed between the waters; for had the outward Expansæ acted only, it would have driven the solid parts of the terraqueous mass quite down to the center, in the same manner as it now precipitates mud, or any earthy solid substances, thro' the waters of the sea; and in this case the earth would have been formed as a solid ball, or kernel, at the center; and all the water would have lain over it in one united mass, in the same manner as the atmosphere at present covers the earth. But there was a Separation of waters from the waters, by the intervening shell of the earth, formed by the expansive power of the Air; and therefore there was an inward Expansion as well as an outward.
And as there was an orb of water, separated from the terraqueous mass, by this inward Expansion, so it could be no otherwise distinguished than by being called (as it is) Waters above the Firmament, or Expansion.

But then a question may be asked, How should this inward orb of water be sustained, or kept close to the inward or concave surface of the earth, and so be prevented from falling down to the center?—I answer, by the same means that the outward orb of water was kept close to the outward or convex surface of the earth, or as the sea is at present prevented from falling down through the clouds (especially at our antipodes, to speak as the vulgar would most naturally think) or from returning again to cover the earth (tho' the earth be revolved so immensely swift on its axis)—all which is effected by the compressure of the Expanse, or the Air acting on the outward surface of it; which Agent might as well keep waters above it as under it; for there is no such thing as innate gravity, or natural tendencies of bodies to centers, &c. All matter, as our modern philosophers allow, is dead, inert, inactive, quite indifferent to every kind of motion; and therefore cannot possibly move unless impelled; and which way soever it is impelled, either upwards, downwards, or sideways, thither it must move. Sir Isaac Newton, in several parts of his writings, speaks of Gravity as being no more than Impulse, and attributes the Cause of it to an aetherial medium, or subtile fluid; which way soever therefore

fore such a fluid impels, that way must motion be. And with regard to up and down, or above and below, every child in philosophy knows that they are only relative terms, respecting our situation upon the earth. No such difference can properly be applied to the inanimate agents; which must of course act uniformly the same, up or down, just as they are placed, and have room to exert their power: and as at this time they were differently situated from what they are now—there being a body of expanding air at the center, as well as one upon the circumference of the earth—so each would produce the same effect on the side it acted against, i.e. separate and support an orb of water.

The Earth being thus totally covered with water, the next requisite step would be to free its surface of this fluid, and permit the dry land to appear.

Hence we read the next Command of God was—And God said, Let the water under the Heaven be gathered together unto one place, [or be united] and let the dry land appear. The waters were before in two places; one orb [B. 1. in plate I.] covering the outward surface of the earth; the other [B. 2.] inclosed within its inward surface. The former of these must be gathered to the latter; that is, the waters that were under the heaven, or open air (viz. those which were upon the outward surface of the earth, and which prevented the appearance of the dry ground) were to be gathered together to those beneath the earth, which was the only place where there were other waters.

The manner how this was effected by the Agents
Agents then in Commission may easily be conceived. As the matter of the heavens would be more and more melted down by the intense fire at the focus of the primæval light, so would the strength of the Expansion be increased, in proportion to the quantity of matter melted, and the degree of agitation; and how great its force must have been on this, the third day, may be partly gathered from the extent of its sphere on the fourth, which reached by that time the other orbs, and even the fixed stars, as is evident from ver. 17. The Light and Spirit having such an immense sphere of action, and acting very powerfully near the earth (as is certain from the quick growth of vegetables, &c. on this, the third day) would press strongly upon the outward surface of it; and by the continual and new admission of light, through the shell to the central air, the inward expansion would be vastly heightened and increased (in the manner described p. 56.) and by this means would be made to act more forcibly against the inward or concave surface of the earth. This force continuing to act with increased vigour would soon crack, cleave, and break the shell of the earth in many places, and so make room for the waters that covered the outward surface to descend, or be pressed down through these cracks; and as the inward air went out, the outward orb of waters would rush in, and supply its place; and so be mixed or united with the waters that were beneath the earth. So that the two orbs of water [denoted by B. 1. and B. 2. in plate I.] would be now joined, and constitute one
Part I. of the Deluge.

one Orb, or the great Abyss of Water, [denoted by G. H. in plate II.] at, or rather round, the center of the Earth (for immediately at the center there would be a Ball or Kernel of terrestrial matter, formed from what the Waters, in their descent from the surface and passage through the Strata of the earth, tore off, and carried down with them to the lowest place: which central Ball, or inner Globe, is denoted by I. in plate II.) And thus by the Waters under the Heaven [B. i. in plate I. or those that once filled the Space E. in plate II.] being gathered together to those that were beneath the Earth, [viz. H. in plate II. where was the one place appointed for them all] the dry land would of course appear, and the command be effected. [From this transaction we may also draw another argument in proof of the inward Expanse; for had there not been such a Space left within the earth, filled only with matter that would yield to the pressure of other matter, and shift at its entrance, there would have been no place for the waters to retire to; but there was a place for the Waters to retire to, therefore there was such a space as the above-mentioned.]

Verse 10. And God called the dry Land, [that which was at first immersed in the waters, and wholly moistened by them, but now dry, hard, and prominent above them] Earth; and the gathering

k " גא the earth, as distinguished from the waters. — As the Waters are called דומח from the Root דומח tumult, confusion, &c. on account of the turbulent motion of the Seas by winds and tides, hence I conclude that גא must express the condition..."
gathering together [the whole collection] of the waters, called He [under the general name of] Seas. 1 And thus would the Earth be formed much of the same shape it is at present, and as plate II. represents it.

From the description here given how the Earth was at first formed, we may obtain an easy solution of the several seeming difficulties relating to the Deluge. For, first, we have here discovered where a body of water lies (viz. G. H. the great Abyss) sufficient to flood the Earth to an immense height, for but part of this water (viz. the orb G.) once covered its whole surface. And we have also discovered two very powerful Agents, one [viz. the Spirit or Air in a violent motion] capable of performing the grandest transactions by pressure; the other [viz. the Light] capable of displaying immense power by penetration. We have seen that these two Agents (under God) separated the Solids from the Fluids of this globe, drove them together into a hard circular shell, and permitted the fluids to slip on each side; and by renewed vigour, and redoubled power, cracked, cleaved, and broke this shell in various places, and so opened a way for the water that covered the outward surface of it to descend towards the center, and in its descent to channel and furrow the earth into hill and dale, and also to form and fill the larger cavities of Lakes and Seas.

"condition of the dry land, in opposition to tumultuous motion, and consequently must denote the fixedness, hardness, or cohesion of the Earth." Parkhurst's Hebrew Lexicon, p. 21.

1 Ibid.
Part I. of the Deluge.

Seas, and by these means to diversify the surface of this globe with high and low land, with standing and running waters, as to render it a commodious and a pleasant situation for its future inhabitants.

But as these inhabitants, about 1600 years after the formation of this beautiful seat, had greatly abused the goodness of the Maker, forgot the original Author of it, and defied the creature instead of the Creator; God determined, by inverting the order of Nature, to destroy them, and demonstrate his power over the natural Agents to the future race of men, by bringing a flood of waters over the face of the whole earth, and so making the air descend into the place of the water, and the water ascend into and occupy the place of the air, and by this means destroy that wicked generation in the most dreadful manner.

Accordingly God publishes his Declaration, Gen. vi. 17. And behold I, even I, do bring [MeBIA, am the cause or instrument of bringing] a flood of waters upon the earth to destroy all flesh, &c.

And as soon as Noah and his righteous family were entered into the ark, we are told—The same day all the fountains of the great deep were broken up.

What the great deep is, we have seen already, and also that the orb of the earth surrounds it as a shell; and moreover have seen, that this shell was at first formed whole and entire by the expansive power of the air or firmament, and by an increased strength, or redoubled force of that power, was cracked and broken in various places,
in order to permit a quantity of water that covered its outward surface to descend into the inside.

Now, an Agent, that could once by the direction of its Maker do this, could do the same at any time, when that divine Author pleased. The force of the natural perpendicular pressure of the air upon the earth is known to be very great, and its lateral or horizontal pressure, as in case of high winds and tempests, will rend the rocks, and elevate the waters of the Ocean to a prodigious height. So that the Power of this Agent being preternaturally increased, and its force exerted upon the water of the Ocean, and of course upon that of the Abyss (which is connected with it, and lies immediately under it) would cause those waters to issue from their (before) confined station, burst open their common outlets or the passages for springs, fountains, &c. and flood the earth in proportion to the quantity of water emitted.

The Consequence of such an extraordinary pressure of the Air may be judged of from the Effects which a similiar pressure of this Agent had upon the waters of the Red Sea, recorded Exod. xiv.

* The Weight of Air on every superficial Square Foot is above 2000 Pound Weight. — And since the Number of Square Miles on the Earth's Superficies is computed 199250205, and in one Square Mile are 27878400 Square Feet, the Square Feet on the Earth's Superficies will be somewhat above 5547800000000; whence the Weight of the whole Atmosphere, or its Pressure on the Superficies of the whole Earth, is more than 110956000000000 Pounds, or much about 500000000000000 Tons; that is, the Atmosphere compriseth the Earth with a Force, or Power, nearly equal to that of Five-thousand Millions of Millions of Tons.” See Martin’s Philosophical Grammar, page 180, &c.
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xiv. 21, 22. xv. 8. when a strong Wind [RUE, a violent Spirit or Agitation in the Air] drove back the waters of that Sea, caused the floods thereof to stand upright as an heap, and were a wall to the Children of Israel on the right hand and on the left, as they passed through. Now a Continuation of such a Force as this upon the waters of the Sea, and those of the Abyss, would certainly break open the fountains of the Abyss, and raise the water above the Tops of the highest mountains, or to any height whatever. To one of the above acts the Psalmist alludes, when he says (Psal. xviii. 15.) Then the springs of water were seen, and the foundations of the round world were discovered at thy chiding, O Lord, at the blasting of the breath of thy displeasure.

The effects also of a strong Wind, or a violent agitation of the Spirit, are described 1 Kings xix. 11. when Isaiah had an exhibition of some grand display of the Power of God. And behold the Lord passed by, and a great and strong Wind rent the mountains, and brake in pieces the rocks before the Lord; and after the Wind [as a consequence of this violent agitation of the air] an Earthquake; and such certainly there was at the Disruption of the shell of the earth in the time of the deluge. "A very terrible event this (says a certain Author) no less than the shell of stone broken up in many places, and shattered in all the rest; all the Inlets, Under-Seas, Lakes, &c. made Fountains; and all the strata which formed their sides, and the sides of the old Springs, thrown up unto the surface; spouts
of vapours to darken the sky, and vast spouts of water rising like fountains, making a dreadful noise; rising in the sea, and running to the sea, and the sea rising and driving the people, &c. to the mountain tops, their last shift; where they with fright, rain, or hunger, perished; or those, who survived 'till the waters came, were destroyed by them.'

And thus also the beginning, process, and completion of the deluge are described in the book of Job, ch. xxxviii. 8. Who poured out (says God) the sea thro' doors, when it brake forth, as if it had issued out of the womb? When I made the Cloud [gros air] the garment thereof, and thick darkness [condensed, stagnant air] a swaddling-band for it [this must have been at the time when the flood was at the height, when the inward Air or Firmament (or the air which had pressed upon and at last broke its way through the shell of the earth) had driven out great part of the water of the abyss, occupied its place, and supported the remaining part of the water against the inward or concave surface of the earth; and when the outward Air or Firmament, surrounded and compressed the upper orb of water, close to the outward surface of the earth]. And then I brake up for it my decreed place, [i.e. the shell of the earth which I had formed and established between the waters; and by breaking this, permitted the upper waters to go to their appointed place; and when once retired thither] I set bars and doors, and

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from judic, effudit, perjudic liqueare aliquus. Mar. Cal.
Part I. of the Deluge. 69

and said, Hitherto shalt thou come, but no further; and here shall thy proud waves be stayed.

But what is more than all this, an effect greater than the disruption of the fountains of the Abyss, is That which follows,

And the windows of heaven were opened.

Mr. Hutchinson is the only Author I know of, who has properly explained these words, I shall therefore give the reader his explication; Moses's Principia, p. 70. "The windows of heaven have been taken for imaginary falls of water from above the heavens, from the clouds, from the air turning into water, &c. Synop. Crit. Tom. i. p. 97. "Cataractae caeli, &c. i. e. The Cataractae of heaven,—the windows, holes, openings, or cataractae of heaven, i. e. of the Air, as Gen. i. 7. Isai. xxiv. 18." Crit. Sac. Tom. i. p. 147. "Nam Cataractae, tese Hieronymo, &c. i. e. For a Cataract, according to St. Jerom, is a hole in a wall, such as smoak gets through. Isai. lx. 8. as doves אל אריה ויווהמ (by Sym. to their doors, ספודס) to their windows. Isai. xxiv. 18. The windows of heaven were opened;—li. 6. The heavens shall vanish like smoak. 'Tis plain, Cataractae signify windows, holes, sluices, or flood-gates, or cracks, or chinks in walls or buildings, such as smoak passes through out of one house or room into another; or windows such as pigeons go in at, or cracks or holes in the walls of great buildings or rocks, such as pigeons creep into and harbour in. This word is most clearly compared, and is the very same they say it is. The Airs, and
The Scripture-History

Part I.

"the Abyss of waters, are each called God’s
Storehouse; and the wall between them is the
Crystal of the earth, or Shell of the Strata of stone,
in which there are innumerable cracks, through
which the fumes or vapours or mixtures with air,
like smoak, continually pass at the same passage,
sometimes up for rain, &c. and sometimes
down." [So that the phrase windows of heaven may

Mr. Hutchinson, in his Observations in the year 1706, (1st.
ed.: p. 93.) remarks, long before, I believe, he had any thought
of interpreting the passage under consideration in the manner he
has done! "Through the cracks in the strata the water also passes
into springs.—In fair clear weather, when there is any wind stir-
ing, and motion in the Air above, the air below in mines passes
so sensibly at these cracks, as sometimes to blow out a candle.
But when the rains are rising, the moisture expels the air, and
tauses such a scarcity of it, or else a want of circulation of that
air, that the candles will not burn; and withal such a sensation
of heat to men, as scarcity of air, in other places, does.—It
is plain, the air will be thus expelled out, and return alternately
into these cracks, as the Steams that supply rain fill and quit
them." The same is remarked by Dr. Woodward; and the
free intercourse between the Air below, and our Atmosphere or the
Air above, through every cranny in the earth, is fully proved;
and the alterations, or the rise and fall of the mercury in the Baro-
meter, are shewn to depend thereon; vid. his Nat. Hist. of the
Earth illus. &c. Translator’s Introduction, p. 109—153. See also
Lowthorp’s Abridgment of the Phil. Trans. Vol. II. ch. iii. and Gas-
fendi animad. in 10um librum Digentis Laertii, Vol. II. p. 1052.

I may here observe, with regard to the text under consideration,
that the word עץ (translated windows) is derived from the
verb עץ which signifies to lie in wait, to lurk privately in a den, to
watch in a hole, under cover; as Psalm. x. 9. עץ he lieth in wait
secretly as a lion in his den. Job xxxviii. 40. The young lions abide in
the covert to lie in wait. And the word עץ signifies a den, or hole,
or cave in the rock, or Job xxxvii. 8. Then the beasts go into dens
[עץ]. And even the Septuagint Translation of this word,
καταρακται, includes much of the meaning of the Hebrew, as
καταρακται, is derived from καταρασσω to issue out, to break through;
and may be rendered the place of rupture, or breaking through; it
also
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may here be rendered the passages of the Airs.

—"In the narrowest acceptation the passages of

also signifies a Gate, see Sep., Lexi. So that the same idea of a hole, cave, passage, opening, &c. is preferred in all the above places, the context in each place determining the precise meaning of the word.

Hence other passages, which seem to differ, may be reconciled to this explication, as 2 Kings vii. 2. where, on account of an extreme famine, a Nobleman for disbelieving the word of Elisha, (who had foretold that there should soon be a great plenty of flour and barley)—says, If the Lord would make windows [openings, passages] in [not of] heaven, [and through them pour down flour and barley, as he had heretofore rained down manna upon the children of Israel, Psalm lxxviii. 23, 24.] might this thing be? So in Isaiah's description of the final destruction of the Earth, ch. xxiv. 18. For the windows from on high are open, and the foundations of the earth do shake. The earth is utterly broken down, the earth is clean dissolved, the earth is moved exceedingly. The earth shall reel to and fro like a drunkard, and shall be removed like a cottage, and the transgression thereof shall be heavy upon it, and it shall fall, and not rise again. From this last particular it is evident, that the final dissolution of the earth is here intended, which we are told by St. Peter, Ep. ii. chap. iii. 10. will be effected by Fire, and in the manner following; The Heavens shall pass away with a great noise, and the elements shall melt with fervent heat, the earth also, and the works that are therein, shall be burnt up. From whence it is plain, that this conflagration will begin in the heavens above, when the heavens themselves will, in a manner, be opened, clefs, and divided, and streams of fire be poured down upon the earth, as was the case in the destruction of Sodom and Gomorrah; or else the Lightnings of God's wrath will be darted from the clouds that are on high, as from concealed lurking-holes, till the whole be consumed. And again, Malachi iii. 10. where God, accusing the Jews for robbing him in his tithes and offerings, promises (if they would repent) that he would rebuke the destroyer that he should not destroy the fruits of their ground, and says, Prove me now, —if I will not open you the windows of heaven [the passages of the Airs] and empty out a blessing, that there shall not be room enough to receive it.

In the above quotation is the very same phrase used in the text under consideration, and must be understood in the same sense. The Abies is called God's forehouse; and the fruitfulness of the earth or vegetation depends much upon the influences thereof, or water sent from thence, as any one may be convinced by consulting the Authors just referred to, but I shall confine myself to Scripture.
"the Airs are through every fissure, and between every fragment of Stone, and they are so many, that most sorts of Stone are divided by great cracks into pieces of perhaps a ton weight, &c.

—How far the parts were divided, and the cracks opened at first, is not to be determined; but they were opened, and the fragments distanced so wide, or in so many places, that the Airs went down into the Abys as fast as the Waters came up, quantity for quantity. But the Continuance and Repetition of this force would by degrees reduce them smaller and smaller. If we carry this expression of the passages of the Airs being opened to the utmost extent, the Waters, much more the Airs, pass between.

Scripture. Ezekiel, comparing the proud Assyrian to a flourishing Cedar in Libanus, nourished by the subterranean waters, says, (xxx. 4.) The waters made him great, the Deep set him up on his head; with her rivers [so rivers proceed from her, the Deep] running about his plants, and sent out her little rivers unto all the trees of the field: therefore his height was exalted above all the trees of the field, and his boughs were multiplied, and his branches became long, because of the multitude of waters, when he was yet in the womb. And the Blessedness or Fruitfulness of a land is attributed to the Deep below as well as to the Heaven above, Deut. xxxii. 13. Blessed of the Lord be Joseph’s Land for the precious things of heaven, for the dew, and for the Deep that toucheth beneath. And Gen. xlix. 25. we have express mention of the Blessings of the Deep or Abys. So that, with-holding or closing up the passages in the earth, through which the waters, fountains and kindly vapours arise for moistening the Earth, and nourishing its plants, would certainly render a land dry, barren, and desolate; and on the contrary, opening these passages, and permitting the vapours to ascend, would greatly conduce to the fruitfulnes or blessedness of a land.

The reader by viewing the irregular black spots in the figure of the shell of the earth, represented by F. in Plate II. may have a still clearer idea what these passages of the Airs are, and how the Abys is the Storehouse from whence they are supplied.
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"tween the grains or sands of most sorts of stone;
"and perhaps it will at some time appear, that the
"parts of the Airs pass between every atom of
"stone, and then the words' imply a Dissolu-
"tion, as it really was, though executed by
"degrees, as men, &c. were destroyed."

As there are other texts which mention the
Dissolution of the Earth, it may be proper to cite
them; Psalm xlvi. 1. God is our refuge;—there-
fore will we not fear, though the Earth be removed
[BEMIR, be changed, be quite altered, as it was at
the Deluge] and though the mountains be carried
into the midst of the sea; though the waters thereof
roar, and be troubled, though the mountains shake
with the swelling thereof;—God uttered his voice, the
earth melted [THEMUG, flowed, dissolved to
atoms?]. So JOB xiv. 19. which I shall translate
nearly according to Pagninus's version, that being
the nearest of any other to the original; For truly
the falling mountain dissolved; and the rock [the
frata of stone] was removed out of its place. The
waters dashed the stones to pieces; and washed away
the products of the dust of the earth: and thou de-
stroyedst the hope of man. Again; Chap. xxviii.
9. in which also I shall chiefly follow Pagninus's
version, He sent his hand [the Expansion, his Instru-
ment or the Agent by which he worked] against
the Rock; be overturned the mountains by the roots;
he caused the rivers to burst forth from between the
rocks [or broke open the fountains of the abyss].
His eye [symbolically placed for the Light] saw
[passed through or between] every minute thing
[every

*MAR. CALAS, * out Dissolutio & Diminutio.*
[every atom of stone, &c. and so dissolved the whole]. He (at last) bound up the waters from weeping [i.e. from pressing through the shell of the earth, as tears make their way through the orb of the eye-lid; or, as it is related Gen. viii. 2. be stopped the fountains of the abyss and the windows of heaven]. And brought out the Light from its hiding-place [i.e. from the inward parts of the earth from between every atom, where it lay hid, and kept each atom separate from the other, and so the whole in a state of dissolution; his bringing out these parts of the light, and finer air, which caused the Dissolution, would of course permit the Agents to act in their usual way, and so re-form the earth]. 2 Esdras, viii. O Lord, whose service is conversant in Wind and Fire; whose word is true;—whose look drieth up the depths, and indignation maketh the mountains to melt away, which the Truth witnesseth, [which the word of God, and present natural state of the Earth, bear witness to.]

I may here add (as I have done already with respect to the notion of an Abyss of Water within the earth, and for the same reason, vid. p. 44.) the testimonies of some Heathen writers, and others, who, in their accounts of the deluge, have expressly mentioned the dissolution of the solid Body of the Earth at that time.

Manilius (who, according to Scaliger, lived in the time of Augustus) describes the dissolution of the Earth in the following terms; (Astronom. Lib. 4. v. 828.)

Concupitus
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Concitatque Tellus validis compagibus barenis,
Subducitque solum pedibus; natat Orbis in ipso;
Et vomit Oceanus Pontum, sitiensque resorbet,
Nec seferipse capiit Sic quondam merferat Urbes,
Humani Generis quum solus consitterit Hæres
Deucalion.

The Earth now shakes, before tho' firmly bound,
And from their feet withdraws the treacherous
ground.
The melted Globe swims in itself: the main
Spews up a Sea, and sucks it in again;
Nor can the great Abyfs itself contain.
All nature thus was in confusion hurl'd,
And the Deep gorg'd itself with all the World.
Deucalion only then remain'd behind
The Solitary Heir of all mankind.

Thus also Virgil, Æneis. Lib. xii. v. 204.

— Non fù tellurem effundat in undas
Diluvio miscens: ——

Not tho' great Jove should once again dissolve
The Earth to Water, by a Deluge torn.

The Phrase tellurem effundere in undas, may be
thought by some to have been used by the Poet
for the sake of the verse, under the figure Hy-
pallage; but as this effect was really produced at
the time of the deluge, I see no reason for this
supposition. Certain it is, that Seneca, in the ac-
count that he gives of his Deluge, supposes the
Earth
Earth or the Land capable of such a dissolution.

Quest. Nat. lib. iii. c. 27.

"Solutis quippe radicibus, arbustà procumbunt
"& vitis, atque omne virgultum non tenetur sólo,
"quod molle fluidumque est: Labant ac madent
"tecta, & in imum usque receptis aquis funda-
"menta desidunt, ac tota humus stagnat, frustra
"titubantium fulcra tentantur. Omne enim fun-
"damentum in lubrico sigitur, & lutosa humo
"nihil stablet. i.e. "Their Roots being
"loosened the Trees and the Vine fall, and no
"Shrub whatever maintains its situation in the
"Soil, which is now soft and fluid.—The build-
"ings fall, and are overflowed, and the waters
"making their way to the deepest recesses, the
"foundations sink, and the whole ground be-
"comes a Bog. In vain are props applied to
"things in such a tottering situation. For every
"foundation is in a sliding state, and there can
"be no firmness in ground so quaggy." And
then he goes on to describe the effects of the
deluge throughout the whole earth, and con-
cludes the Chapter thus; Scies quid deceat, si co-
gitaveris orbem terrarum naturè. i.e. "If you
"would have a right opinion of these things, you
"must suppose the whole Earth to swim." And
speaking of the same deluge in Chap. 29.
"Maximam tamen causam, ad se inundandam,
"terra ipsa praestabit: quam diximus esse muta-
bilem, & solvi in humorem." i.e. "The Earth
"itself will afford the greatest cause for its own
"inundation: which we said before was change-
able and reduceable into a fluid,—Undare ergo
"terra
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"terra debet—Inciptet ergo putrescere, debinc laxata ire in humorem, & affidua tabe desfluere."
i.e. "It is necessary that the Earth should be as capable of undulation as Water.—It will therefore begin to putrify, and then pass into a fluid itself; and by a continual solution be absolutely liquated." And again, Chap. 30. "Advise nunc, quod immanes sunt in abdito lacus, & multum maris conditi, multum fluminum per operta labentium. Undique ergo erunt causae diluvio, cum aliae aquae subinfluent terras, aliae circumfluunt, quae diu coercitae vinci cent, & amnes annibus jungent, paludibus stagna. Omnium tunc mare ora fontium impilebit, & majore hiatus solvet. Quemadmodum corpora nostra ad egestum venter exhaurit, quemadmodum eunt in judorem vires; ita tellus liquefiet, & aliis causis quietisentibus, intra se, quo mergatur, inveniet." i.e. "Add to this, that there are immense Lakes hidden from our eyes; great part of the Sea also lies concealed, and there are many Rivers which flow in secret. There will therefore be causes sufficient for a Deluge on all sides, since some Waters enter in under the earth, others surround it, which having been long restrained shall break out and overcome it, Rivers shall join with Rivers, and Lakes with Marshes. Then the Sea shall fill the mouths of all Springs and Fountains, and loosen them to a great extent. As the belly in emptying itself exhaunts our Bodies, as our vital strength turns into Sweat, so the Earth shall dissolve, and without the
"the assistance of other causes, shall find within itself what shall drown it."

Agreeably to this Description of the matter, Lucian, or the Author of the Book de Dea Syria, in the account he gives of the deluge, says, "πάντα ὅλω πνευμα. i.e. All things are become Water." So the Pseudo-Sibyll,

Τὸν ἐγὼ ἀποκάτα, ἢ υδάς ὅλω πνευμαν ἀπολέιται.

Water is all, and all Things are destroyed by Water.

Lycophron writes thus:

Οὐ μᾶς ὄψαν ομφανεὶς κλωτὴν,
Ζηνος κακλαξαίων νασμια.

When Jove, in Tempests raging, storm'd the Earth,
He dash'd the Whole into minutest Parts.

"Where the Scholia, If. Tzetzes, expounds "πας ὄψαν by ἀμμον ἐποιησε, κατειλησε: and that very "properly, since all Stone was reduced into Sand, "and the hardest Bodies in the Earth into soft "and tender. So that at the deluge, in such State "of Things, as Nonnus, in his Dionysaca (Lib. vi.) "well observes,

Κασμενος ακοσμον εγενετο.

"The World was unmade, or taken to pieces."

Philo-Judeus, speaking of the Deluge (Liber de Abrahamo, p. 279.) says, "Τα μέρη το πνευμα εν μιαν φυσιν τις υδατον αναζωικημενα. That the Particles"

9 Vid. Woodward's Nat. Hist. of the Earth illustrated, &c. p. 64.
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es of every thing were changed into the Nature of Water.

To proceed with the Scripture-History;

Ver. 12. And the rain [the vapours which were carried high up into the Atmosphere, and formed into rain] was upon the earth [falling and subsiding] forty days and forty nights.—And the waters increased, and bare up the ark;—and the waters prevailed and increased greatly upon the earth; and the ark went upon the face of the waters. And the waters prevailed exceedingly upon the earth; and all the high hills, that were under the whole heaven, were covered; fifteen cubits upward did the waters prevail, and the mountains were covered.  

So that, there was no high Hill or Mountain upon any part of the earth which was before covered

From mention being here made of Mountains, as subsisting under the waters of the deluge, some have imagined that They were not, and of course that the whole earth was not, dissolvd during the flood. But such seem not to consider, that the Dissolution (as observed above) was executed by degrees, as men, &c. were destroyed. It is said indeed, that on the day that Noah entered into the ark ALL the fountains of the Great Deep were broken up; but it is not said, that ALL the windows of heaven, or all the passages of the airs were opened on that day; and it does not appear that they were all opened, or the earth totally dissolved 'till the third and last prevalence of the waters, or the event mentioned ver. 24, was effected; as the comment on that verse will shew.

Another objection (not much unlike this, and taken also from the words of Scripture) to the total dissolution of the earth during the Deluge, has been drawn from the Mosaic description of the situation of Eden, and the names of the lands and rivers adjacent thereto (Gen. ii. 10, &c.) as existing under those appellations in the time of Moses. Now it has been argued, that if such Countries and Rivers, and so called, existed in Moses's time, as did soon after the Creation of the World, then this part of World was not destroyed during
vered with air, but what was now covered with water; of course the Deluge was universal. But an irrefragable argument may be drawn from these words against a partial Flood, or an universal one effected by partial means, if I may so say, that is, by the waters first washing over one part of the earth, and then the same water proceeding on and overflowing another, and so successively, 'till in the end the whole was drowned. For, according to Scripture, the water rose gradually and equally, and at last covered all the high bills and mountains at one and the same time, so that the Flood could not have been of the above-mentioned wandering nature, as some, for want of knowing where a sufficient quantity of water lay for flooding the whole earth, have falsely imagined.

Besides, it is altogether impossible to conceive, that the waters could have risen to the height of any high bill under heaven, and not at the same time to have been of equal height over the whole earth; for the parts of water are diffusive,

during the deluge. But why there might not have been Lands and Rivers similarly situated, and called after the same Names after the Deluge, as they were before, I see no reason, or rather great reason, why all such things should be alike. For, certain it is (as I have amply shewn above) that the same Agents were employed in the Ref-formation of the earth after the deluge, as were concerned in the first formation of it, and also that they acted in the same manner, and under the same direction, and therefore may reasonably be supposed to have produced the same Effect. So that the Earth, with regard to the disposition of Land and Water, would be formed after the deluge, much as it was before, and of consequence the situation of Countries, Rivers, &c. would be alike; and by the descendents of Noah, (who were acquainted with their former situations) would be called after the same Names.
five, having no tie or connection with each other; so that as they mounted upwards they would spread and extend themselves equally on all sides; and at the same time that they covered one high hill, they would of course cover all others of equal height over the whole face of the earth. For we are not to imagine, without a miracle of a most astonishing kind (which in this case is not to be admitted, because not mentioned) that "a huge mass of water could have hung about any particular part of the earth, as if congealed; or stood upon the middle of it like one great drop, or a trembling jelly, and all the places about it dry and untouched," as an author observes; and then that this said mountain of water should be removed, or rolled to another place, and so on, 'till at length it had covered the whole earth. This shift, to avoid one real miracle, is only multiplying a number of others that never were effected; and I may just add here the observation of a judicious Divine, "that no man departed from the common faith upon pretence of avoiding any absurdity therein supposed, but that he ran himself upon the necessity of believing greater absurdities than any he pretended to avoid."

What is related above—that the waters prevailed fifteen cubits upwards, and (or according to the translation of Jun. and Tremel. after) the mountains were covered—does not seem to be spoken to determine the precise height of the waters, but only to denote, that all living creatures
must have perished in such a flood; for it immediately follows,

And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beasts, and of every creeping Thing that creepeth upon the earth, and every man. All in whose nostrils was the breath of life, of all that was in the dry land, died. And every living substance was destroyed, which was upon the face of the ground, both man, and cattle, and the creeping things; and the fowl of the heaven; and they were destroyed from the earth: and Noah only remained alive, and they that were with him in the ark.

This destruction of the land animals for the sin of man, may, at first sight, seem to carry some reflection upon the wisdom and goodness of God, as a transaction unnecessary and unjust. But certain it is, that the Creator has full power to dispose of his creatures as he sees fit; and however unaccountable the dispensation may appear to us, yet it will always be consonant to the rules of Justice and Mercy. And in this case it is manifestly so. For as these creatures were made for the use and service of man, so when man was, in a manner, to be destroyed, it was necessary that they should perish together with him, as being of no farther service: And not only this; but had they been preserved alive (which must have been by a most extraordinary miracle) they would have been so very numerous after the flood, in comparison of the few human creatures, that they would have defeated the very end for which they were made, by overpowering and destroy-
ing the small remnant of the human race. So that it was necessary and proper that they should be destroyed, and begin again with man’s re-beginning.

The particular manner, in which the destruction of the brute creatures is notified, sufficiently points out the Species that were to be destroyed, viz. the land animals only, as verse 21. All Flesh died that moved upon the Earth—all that was in the dry land, died—every living substance was destroyed which was upon the face of the ground, both man, and cattle, and the creeping things, and the fowl of the heaven. So that we may hence fairly conclude (especially as Noah was ordered only, Gen. vii. 2, 3. to take pairs of the above species into the ark, to keep seed alive upon the face of all the earth) that the fish, or the inhabitants of the waters, were preserved alive, without a miracle, in their own proper element. For though the first shock, when the fountains of the great abyss were broken up, was very terrible, and probably destroyed great numbers of them, yet as many might have been preserved as destroyed, as is commonly the case in the most tempestuous motions of the sea. And after this first shock, we are told, the whole process was gradual, both the increase and the decrease of the waters, so that with regard to any danger arising from the agitations of the waters, they may well be supposed to have been preserved. But it has been further urged, that if they could survive these, yet the great mixture of terrestrial particles, when the whole body of the earth was dissolved in the wa-

G 2
ters, must have produced such noxious qualities, that it was impossible they should have out-lived this injury, even in their own element. In answer to this, it must be observed, that the earth was not totally dissolved, or the mountains reduced to atoms, till the waters had risen to a vast height above them, (see p. 85.) So that there is no reason for supposing that the dissolved parts of the earth reached to the surface of the waters; and even supposing that some part of them did, yet it is a well known observation, that in the most turbid mixture of earth and water, the earthy particles will soon begin to descend, and the surface become clear and limpid; and also, that in such turbid waters, the fish naturally rise to the top, which, in the case of the Deluge, would be the most advantageous situation possible for them, as the surface of the waters would abound with every thing suitable to their nourishment, as the carcases of dead men and animals, and all sorts of flying insects; and the trunks of trees that swam upon the top would serve for the shelter of the Spawn and the Fry.

Verse 24. And the waters prevailed upon the earth an hundred and fifty days.

As this is mentioned after the mountains are said to have been covered fifteen cubits (which was only related to denote the means by which all flesh perished) we may reasonably suppose, that the waters prevailed anew, or continued to prevail, for some time at least, after the mountains were covered fifteen cubits; especially if we consider, that there is no mention yet made of the fountains
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fountains of the Abyss, or the passages of the Airs, being closed; so that the waters were still pressed upwards, and reached in their real altitude far above fifteen cubits higher than the mountains; as many appearances in and on the earth undeniably evince.

It may be proper to remark here, that the word rendered prevail, signifieth somewhat more than the bare increase or augmentation of the waters, (though that idea is also included) for a distinct, and very proper word for the increase of the waters is used ver. 17 and 18, and the waters increased [IReBU, were multiplied]. And the word, which we render prevail, very justly has that meaning; it denotes power, strength to prevail, get the better of, to subdue; so that by the waters prevailing upon the earth may be meant (especially as this prevalence is mentioned three times, ver. 18, 19, and 24) the total subduing or Dissolution of the earth by the waters: Moses by this expression giving us to understand, that the waters (in conjunction with the Airs) had acted upon the earth in such a manner, and affected it to such a degree, as to have reduced it to a fluid loose state; at least, this must have been the consequence of such a prevalence of the waters; for, as the passages of the airs are said to have been opened, and the fountains of the Great Deep broken up, before this Prevailing of the waters, it could not but be, that the waters, as they rose upwards from the Abyss, would make their way through these Passages, and by continuing and repeating this action, would separate and widen the pores
of the earth, undermine and dissolve the mountains, and, at last, reduce the whole mass into a fluid Colluvies, or its original unformed, chaotic condition, mentioned Gen. i. 2. So that the Earth must now have been totally dissolved in the water, and the meaning of the word מַגְוָה [Deluge] compleat-ed. "מגוה (says Mr. Bate in his Critica Hebræa) signifies a Deluge or Flood, not from its "overflowing only, but from its soaking and mixing with what it drowns, as the waters did the "earth, quite through the shell of it; the whole "shell of the earth being soaked full of water, and "dissolved, at Noah’s Flood."

Vengeance having been thus executed upon the wicked, a polluted earth destroyed and cleansed by water; the next procedure would be to form it again. Accordingly we are told, ch. viii. 1. that God (who delights not in seeing things in disorder, but pities when he distresses) remembered Noah, and every living thing, and all the cattle that were with him in the ark.

And God made a Wind [RUE, the Spirit] to pass over the earth, and the waters asswaged.

The same word, that is here rendered Wind, is translated Spirit, in the account of the first Formation of things, (as I have already observed) Gen. i. 2. And the Spirit of God moved upon the face of the waters. And as the motion, then raised in the air by the immediate power of God, was the primum mobile, or chief cause, of bringing the Earth out of its chaotic state into its intended beautiful form, so the same Agent is here employed in order to re-form the earth after its destruction.
fruction or dissolution during the deluge; and of course the same effects followed.—The Waters were before increasing and prevailing upwards; but now they are assuaged, and prevented from extending their orb by the passing of the Spirit over them. The Spirit had before acted through the earth, and by its impulse broke open the fountains of the Abyss and the windows of heaven, but it was now made to act in its usual way of pressing only or chiefly upon the surface: things therefore would now be returning to their former course, and the same effects ensue, as had been largely described in the account of the first formation, and so needed not to have been repeated here.

Hence we read in the next verse, The fountains of the Deep, and the windows of heaven were stopped, and the rain from heaven was restrained.

This was no more than a consequence of setting the Powers of Nature to work, as at the first. The earth had been dissolved, and all the atoms of the strata of stone floating loose and irregularly in the waters; but as soon as the natural agents began to operate, as soon as the outward and inward Expanse [i.e. the Light and the Air without and within the earth] began to act, to make a division between the waters, they would drive all the solid parts of the earth together (much in the same manner as the same Agents at present separate and impel the particles of slime and mud in dirty water) into a shell or crust, and permit all Fluids to slide between; so that there would be two orbs of water, and one shell of stone, or the crust of the earth,
between them; as things were circumstanced on
the second day after the creation, Gen. i. 6, 7,
when, by the interposition of the solid shell of the
earth, the waters were divided from the waters, and
the earth would be in the situation it is described
to be in by St. Peter (2 Epist. iii. 5.) during the
height of the Flood, And the Earth standing out of
the water and in the water; whereby the world that
then was, being overflowed with water, perished.

The account of the destruction of the earth, and
of its Re-formation, mutually illufrate and con-
firm each other. In order to destroy the Earth,
the fountains of the Great Deep were broken up,
and the passages of the Airs through the strata opened;
but at the Re-formation, Moses tells us, they were
both stopped or closed, and even the vapours for rain
prevented from rising. So that the solid shell of
the earth permitted neither the waters to descend,
nor the vapours to ascend; and of course the Shell
must before have been dissolved to atoms; for had
it been only broken, or fractured into large pieces,
it could not have been so closed or joined together,
but that both waters and vapours would have passed through; and in this case it could not have
been said, that the passages of the Airs were stopped.

The shell of the Earth having been thus consol-
idated and formed anew, did not, and indeed
could not, remain long whole and entire. For,
as the Expanse or Firmament had now received
its full, if not new, powers of acting, the Light
(which penetrates all terrestrial bodies) would
soon make its way through the waters and strata
of stone to the comparatively thinner medium or air
at
at the center of the earth (for it must be remembered, that the air, or that part of our Atmosphere which at the beginning of the deluge was forced down into the Abyss, drove out the waters from thence, and elevated them over the surface of the whole earth, would there continue as long as that elevation lasted, and so constitute an inward Air or Firmament) cause there a rarefaction, and so increase the force of the inward Expanse, which by this means would act more strongly against the concave part of the shell of the earth, and by continuing to exert and extend its power on all sides from the center, would by degrees make small cracks and crevices in the shell, and at last, by receiving new strength and increased vigour, open and widen these cracks, so as to permit the water, that covered the surface of the earth, to be pressed down through them into the Abyss by the force of the outward Expanse, as was the case at the first Formation. Hence it follows in the next verse,

And the waters returned from off the earth continually.

In the verse preceding, the fountains of the abyss and the windows of heaven were closed, so that neither vapours nor waters could pass; but here we find that the waters are returning, i.e. going back to the place from whence they came; they came, we saw, from the Abyss, so that new inlets or apertures into the abyss must now have been made for the descent of the waters, otherwise they could never have returned from whence they came, or have been gathered into one [and their former] place. They
They returned from off the earth continually, or as translated in the margin, in going and returning, in flowing backwards and forwards, in fluctuating here and there; for as the Airs began to ascend before the Waters began to descend, they would of course impede, and in part drive back the waters, and so cause a fluctuating or reverberating motion in them; and by this means also, the waters would be prevented from rushing down too fast, and from tearing the shell of the earth too much. For had the apertures into the Abyss been very large, and no impeding body to withstand the descent of the waters, the surface of this earth would have been of a very different form than what it is now. For instead of the present gentle risings and fallings of hill and dale (all which were made by the gradual retreat of the waters at the end of the Flood, as will appear in the process of this Tract) the whole surface of the land would have exhibited the most frightful and tremendous aspect of inaccessible Precipices, broken Rocks, and unatombable Gulphs: and the water that at present breaks out from Spring-heads on the tops and sides of Mountains, instead of softly gliding through the declining Valleys, would have broken in direct falls and cataracts over our heads: so much depended upon the gradual descent and retreat of the Waters. And an Author, who was well acquainted with the Subject I am writing on, says, "The waters in their going down acted in the same manner as they did at the first Formation; they formed the Surface of the Earth (if one might use such..."
Part I. of the Deluge.

"such an expression without offence) for their own use, and in doing that formed it for our use". Hutchinson's Mofes's Principia, p. 106. And by this mutual and contrary action of the Air and Water, the body of the earth would not only be preserved from being broken too much, but the safety of the ark upon the face of the Waters easily accounted for, without having recourse to a Miracle, as some have done. For, how impetuous soever the descent of the Waters might otherwise have been, yet the counter-action of the ascending air would certainly weaken its force; and however violent the effects of these two agents might have been upon the body of the earth, yet it must be remembered, that the Ark went upon the Face of the Waters, and was at a vast distance from the Place where this action was: and at the surface of the Waters there might have been, in a manner, a calm, or but a gentle fluctuation; in the same manner as when Water is let out of a funnel, or the orifice of a large and deep Vessel, there is but little motion or undulation at the Surface, however violent and turbulent the effects of the descending water, and ascending air, might be at the bottom. And notwithstanding, according to the present Translation of the Bible, we are told, God made a Wind to pass over the Earth; yet this Wind could not be a common Wind, or an horizontal motion of the Air, for that would have agitated the Waters more than before; and we are further told, the consequence of this wind was, that the Waters were affwaged, or prevented from being risen.
risen higher; a just and natural consequence of the interpretation of the Words, as given p. 86. Besides, Moses, in his description of the Deluge, is very particular in his Account of the gradual increase and decrease of the Waters, which gradual operation would greatly tend to the preservation of the Ark. So that (notwithstanding all imaginary Storms and Tempesta, and an improper introduction of the Deity) we may justly credit what follows,

Verse 4. *And the Ark rested (in the seventh Month, on the seventeenth Day of the Month) upon the Mountains of Ararat.*

[And being settled there was safe from all subsequent perturbations and agitations of the Waters.]

The truth of this memorable Event is testified by Christian, Jewish, and Heathen Antiquity, and by a Tradition at present remaining among the Inhabitants of the Country, as the reader may see at large, by consulting the Universal History, Vol. I. p. 239, &c.

Verse 5. *And the Waters decreased continually until the Tenth Month: in the Tenth Month, on the first Day of the Month, were the Tops of the Mountains seen.*

Verse 6. *And it came to pass at the End of forty Days (Noah wisely judging, that notwithstanding the Tops of the Mountains had appeared, yet the sides of the Hills and the Vallies might have been overflowed with Water, waited forty Days longer) that Noah opened the window of the ark which he had made. And he sent forth a Raven,*
Raven, which went forth to and fro, [or, according to the Hebrew, was in going forth from the Ark, and in returning to the Ark, for the sake of food as well as rest] until the Waters were dried up from off the Earth.

Verse 8. And Noab sent forth a dove from him, to see if the waters were abated from off the face of the Ground: but the dove found no rest for the sole of her foot, and she returned unto him into the ark. Again he sent forth the dove out of the ark. And the dove came in to him in the evening, and lo, in her mouth was an olive-leaf [or branch, an emblem of peace †] plucked off: so Noab knew that

† Some have imagined, from the circumstance of the Dove's bringing Noab a leaf or branch plucked from a tree, as a proof of the decrease of the waters, that this Tree must have been standing upright, or in its original position; otherwise a branch plucked from it could not have served for such a proof; and therefore, if the Tree was thus standing on the ground, it must follow, that the earth was not totally dissolved during the Deluge.

But such seem not to have considered, that whether the earth was dissolved or not (but that it was, I think, I have abundantly proved above) it had been impossible for any thing upon the surface, such as houfe, trees, &c. to have withstood the prodigious torrents of water that must have rushed down from the mountains, after they had been covered far above fifteen cubits high; but of all things, far less capable were trees and vegetables of withstanding these torrents, because as the waters had been out upon the surface of the earth for several months, it could not be, but that, by their irregular motions in flowing backwards and forwards, they must soon have dissolved, liquified, or dissipated the vegetable mould, and all the loose parts on the upper surface of the earth; so that all trees would have fallen of course, as the ground, on which they stood, gave way: hence Noab could not but conclude (had he ever seen a common storm, attended with violent rain) that—in such an inundation as was—That in his time, when God assured him, he would destroy the whole earth, all trees, &c. must have been thrown down upon the surface; and therefore if the Dove brought him a leaf from one, it must have lain along upon the ground; and so be as full a proof of the
that the waters were abated from off the earth. And be said yet other seven days, and sent forth the dove; which returned not again unto him any more.

VERSE 13. And it came to pass in the six hundred and first year, in the first month, the first day of the month, the waters were dried up from off

the abatement of the waters, as if it had been standing upright. And that the olive-tree did thus lie, seems evident from the present state of things on and near the earth’s surface; it being very common to find prodigious numbers of trees lying just beneath the vegetable mould, in such a manner as the waters rushing from the neighbouring mountains would naturally leave them.

But there is another solution to this difficulty, which, considering the emblematistical style of Scripture, and the circumstances of the case, may be thought more just than the former, though very reconcilable with that interpretation. As it is particularly mentioned that Noah said just seven days before each time of sending out the Dove, so in all probability the day on which he sent her out was the Sabbath; and the time of the day, just after he had performed religious service; as he might most reasonably think that would be the best for expecting a blessing or a favour from heaven. Accordingly, at the second return of the Dove, the divine signal was brought—an Olive-branch, an emblem of peace, in token that the waters were abated, and the fury of God’s wrath upon a wicked world was ceasing, and that joy and comfort would soon succeed to the afflicted righteous. And unless this branch be looked upon as a divine signal and providentially given, it will be difficult to say what could induce the Dove to bring any branch at all—and why an Olive-branch—and that this should be particularly mentioned; when saying that a leaf or branch was brought, had been sufficient, without specifying the tree from whence the branch was taken; unless something particular had been intended thereby. And, that the Olive-branch was an emblem or sign of Peace, Friendship, or Abatement of Anger, Discord, &c. throughout almost the whole world, see Virgil’s Æneid, Lib. viii. 116. & Lib. xi. 101. Livy, Lib. xxix. 16. Polybius, Lib. iii. And we learn from Columbus’s Voyages, chap. 101. that this Symbol was used even in America. So then Noah, as soon as he saw the Divine Signal, deciphered the meaning thereof, and knew that the waters were abated. In this view, it does not at all signify, whether the tree, from whence the branch which the Dove brought was plucked, was lying down or standing upright; for the particular species of tree spoke its own meaning.
Part I. of the Deluge.

off the earth: and Noab removed the covering of the ark, and looked, and beheld the Face of the ground was dry.

VERSE 14. And in the second month, on the seven and twentieth day of the month, was the earth dried.

This verse may seem a contradiction to the former: but it is not. The drying up of the Waters from off the Face of the Ground is one thing, and the drying, or draining the body of the Earth from the effects of the Deluge, till all the superfluous waters had returned into the Abyss, is another. The first would naturally precede the latter, and this latter might have been (as is here related) near two Months after the former. Which by the by (especially if we include the time from the first appearance of the Mountains, which was two Months before this) shews, that there was time sufficient, in a natural way, allowed for the production of grass and herbage over the face of the Earth, for the nourishment of the animals that should come out of the Ark.

All things being thus graciously provided, we are told,

VERSE 15. And God spake unto Noab [as God had ordered Noab to enter into the ark at a particular time, fo Noab waits the divine command for his coming out] saying, Go forth of the ark, thou, and thy wife, and thy sons' wives with thee. Bring forth with thee every living thing that is with thee, of all flesh, both of fowl and of cattle, and of every creeping thing that creepeth upon the earth; that they may breed abundantly in the earth, and be
be fruitful and multiply upon the earth. And Noah went forth, and his sons, and his wife, &c. And God blessed Noah and his sons, and said unto them, be fruitful and multiply, and replenish the earth.

Here the same blessing for replenishing the earth with men is bestowed upon Noah and his family, as was pronounced upon the first pair of the human species; and a similar declaration made with regard to the brute animals that came out of the ark to be fruitful and multiply upon the earth, as had been done at their first formation: whence it must follow, that the earth, after the flood, was as entirely void of any living creature of the land or air (except those that were preserved by the ark) as it was before any such were in being. And therefore the Deluge, in this respect, was unquestionably universal.
An Explanation of Plate the Second,

Representing the internal structure of the terraqueous Globe, from the center to the circumference, and the air around it.

D. The outward Expanse, or the open Firmament of Heaven.

E. A circular Space filled with water during the height of the deluge, but now with the air that came from the central hollow of the earth; and at present constitutes what we call our Atmosphere.

F. The shell of the earth broken into innumerable apertures and fissures, of various shapes and sizes; the larger of which, f. f. f. f., being filled with the water that descended from the surface of the earth, constitute seas and lakes; the lesser (which branch from the former, or pass immediately from the under-part of the shell of the earth to the tops of the highest mountains) serve as canals for the water which supplies springs and rivers to run in; the least of all (denoted by the irregular black strokes in the solid shell of the earth) represent the cracks through which vapours principally ascend.

G. H. The great abyss of water within the earth; with which all seas, lakes, rivers, &c. communicate; and from whence they receive their supplies. G. H. are divided from each other by a dotted circle, because one of them represents the water that, during the deluge, covered the whole surface of the earth, but which was afterwards forced down, through the above-mentioned larger apertures and fissures, to its original place, as the inward air was forced out thro’ the lesser and oblique fissures: and the other of them represents that part of the abyss which, during the deluge, remained beneath the earth.

I. A solid ball or nucleus, of terrestrial matter, formed from what the water in its descent from the surface, and passage through the strata of the earth, tore off, and carried down with it into the abyss, and reposed at the lowest place, the center of the earth.

So that the opinion of the ancients concerning the earth’s resembling an egg has great propriety in it: for the central nucleus, (I.) by its innermost situation and shape, may well represent the yolk; the abyss of water, (G. H.) which surrounds it, and is in a middle position, may stand for the clear fluid of the whites; the crust of the earth (F.) (allowing only for its breaks and cracks) by its roundness, hardness, uppermost situation, and little inequalities on its surface, is justly analogous to the shell, and on this account the term, the shell of the earth, is frequently used in this treatise.
HAVING given at large an explanation of the Mosaic History of the Deluge, I shall now subjoin the testimonies of several Heathen Nations in proof of the same fact. For, it may justly be supposed, that did any such event really happen, it could not be but that all or most nations upon the earth must have retained some knowledge or tradition of it. And if upon enquiry it should appear that the same of the Deluge has gone throughout the whole world, that almost every nation upon the earth has some story
The Heathen Accounts

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story or other to relate concerning it; it will certainly follow, that there has been such an Event, and that it was universal. But of such deductions and corollaries as these hereafter.

To collect all the evidence that might be produced on this occasion, would be endless and needless; I shall therefore select here and there particular accounts from the most eminent nations; and in gathering these, shall travel quite round the world.

I begin with the great and famous nation of the Romans. Many of their writers, both Poets and Historians, make mention of an universal Flood; but one may speak the voice of all. I shall take That of Ovid; who, purposing to relate some particular circumstances of the history of mankind from the beginning, regularly proceeds from the formation of man, through the several ages of the world, to the time of the Deluge; the cause and manner of which (after having related the height of impiety and wickedness that reigned upon the earth during the iron age) he thus describes, Metam. Lib. 1.

Neve foret terris securior arduus aether, &c. i. e.

“Nor were the Gods themselves more safe above; Against beleaguer’d Heaven the Giants move; Hills pil’d on hills, on mountains mountains lie; To make their mad approaches to the sky. Till Jove, no longer patient, took his time T’avenge with thunder their audacious crime; Red lightning play’d along the firmament, And their demolish’d works to pieces rent.

Sing’d
Sing'd with the flames, and with the bolts transfix'd,  
With native earth their blood the monsters mix'd;  
The blood, indu'd with animating heat,  
Did in th' impregnant earth new sons beget.  
They, like the seed from which they sprung, accurs'd,  
Against the Gods immortal hatred nurs'd;  
An impious, arrogant, and cruel brood;  
Expressing their Original from Blood.

Which when the King of Gods beheld from high—  
He sigb'd; nor longer with his pity strove;  
But kindled to a wrath becoming Jove."—  
"Mankind's a monster, and 'tis ungodly times,  
Confederate into guilt, are sworn to crimes.  
All are alike involv'd in ill, and all  
Must by the same relentless fury fall."  
"Thus ended he; the greater Gods assent,  
By clamours urging his severe intent;  
The less fill up the cry for punishment.  
Yet still with pity they remember man,  
And mourn as much as heav'nly Spirits can.  
__________ ———— But Jove

Concludes to pour a watry Deluge down,  
And what he durst not burn, resolves to drown.

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* This answers to the Scripture account of the Giants, the Apostates (tho's rebels to the Will of Heaven or Word of God) that were before the Flood, and to the children, the sons, that sprang from them, who were worse than their Fathers, see Gen. vi. 1—5.

* Gen. vi. 12, And God looked upon the earth, and behold it was corrupt; for all Flesh had corrupted his way upon the earth. And it repented the Lord that he had made man on the earth, and it grieved him at his heart. And the Lord said, I will destroy man whom I have created, &c. and bring a flood of waters upon the earth to destroy all flesh, &c. The reader, as he proceeds, may make many such striking resemblances as these' between Scripture and Heathen History.
The Northen breath, that freezes floods, he binds,
With all the race of cloud-dispelling winds.
The South he loosed, who night and horror brings;
And fogs are shaken from his flaggy wings.
With rain his robe and heavy mantle flow,
And lazy mists are low'ring on his brow.
The skies from pole to pole with peals refund,
And shower's inlarg'd come pouring on the ground,
--- Impetuous rain descends.
Nor from his patrimonial Heav'n alone
Is love content to pour his vengeance down,
Aid from his Brother of the seas he craves;
To help him with auxiliary waves.
The watry Tyrant calls his brooks and floods,
Who roll from mossy caves (their moist abodes);
---
The floods, by nature enemies to land,
And proudly swelling with their new command,
Remove the living stones, that stopp'd their way,
And gulping from their source, augment the sea.
Then with his mace their Monarch struck the ground,
With inward trembling earth receiv'd the wound.
And rising streams a ready passage found.
Th' expanded waters gather on the plain;
They float the fields, and over-top the grain;
Then rushing onwards with a sweepy sway,
Bear flocks, and folds, and lab'ring hinds away.
Nor safe their dwellings were, for sap'd by floods,
Their houses fell upon their household gods.
The solid piles too strongly built to fall,
High o'er their heads behold a watry wall.
Now Seas and Earth were in confusion lost;
A world of waters, and without a coast.
Part II. of the Deluge.

The most of mortals perish in the flood;
The small remainder dies for want of food.
A mountain of stupendous height there stands
Betwixt th’ Athenian and Bæotian lands,
_Parnassus_ is its name; whose forkly rife
Mounts thro’ the clouds, and mates the lofty skies.
High on the Summit of this dubious cliff,
_Deuclian_ wafting, moor’d his little _skiff._
He with his wife were _only_ left behind
Of _peribd man_; they _two_ were _human kind._
The mountain Nymphs and _Themis_ they adore;
And from her _Oracles_ relief implore.
The _most upright_ of _mortal men_ was he,
The _most sincere_ and _holy woman, she._

When _Jupiter_, surveying earth from high,
Beheld it in a lake of water lie;
That where so many millions lately liv’d,
But two, the best of either sex, surviv’d;
He loos’d the _Northern Wind_; fierce _Boreas_ flies
To puff away the clouds, and purge the skies:
Serenely, while he blows, the vapours driv’n,
Discover _Heav’n_ to Earth, and Earth to _Heav’n._

_Dryden._

From _Rome_ let us proceed to _Greece._ I shall
here take the testimony of _Lucian_, or the author
of the book _de Dea Syria_, as it will include that
of the _Scythians_, _Syrians_, and _Arabians_, as well
as _Grecians_. _O ὁ μεν ὁυν πολλοὶ Δευκαλιών, &c. i.e._

"Many say that this temple [that at _Hierapolis
in Syria_] was built by _Deucalion_, the _Scythian_;
That _Deucalion_, I mean, in whose time the

_H 4_ greatest
greatest inundation of waters was. I have heard in Greece what the Grecians say concerning this Deucalion. The story they relate is as follows: The present race of men was not the first, for they totally perished; but is of a second generation, which, being descended from Deucalion, increased to a great multitude. Now of these former men they relate this story: they were insolent, and addicted to unjust actions; for they neither kept their oaths, nor were hospitable to strangers, nor gave ear to suppliants; for which reason this great calamity befell them: on a sudden the earth poured forth a vast quantity of water, great showers fell, the rivers overflowed, and the sea arose to a prodigious height; so that all things became water, and all men were destroyed: only Deucalion was left unto a second generation, on account of his prudence and piety. He was saved in this manner: he went into a large ark or chest which he had, together with his sons and their wives; and when he was in, there entered swine, and horses, and lions, and serpents, and all other creatures which live on earth, by pairs. He received them all, and they did him no hurt; for the Gods created a great friendship among them; so that they failed all in one chest while the water prevailed. These things the Greeks relate of Deucalion. But, as to what happened after this, there is an ancient tradition among those of Hierapolis, which deserves admiration; viz., that in their country a great chasm opened, and received all the water; whereupon Deucalion erected altars, and built the temple of Juno over the chasm. This
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This chasm I have seen, and it is a very small one under the temple; whether it was formerly bigger, and since lessened, I cannot tell; but that which I have seen is little. In commemoration of this history, they do this: twice in every year water is brought from the sea to the temple, and not by the priests only, but all Syria and Arabia; many come from beyond Euphrates to the sea, and all carry water, which they first pour out in the temple and afterwards it sinks into the chasm; which, though it be small, receives abundance of water. And when they do this, they say Dedication instituted the ceremony in that temple, as a memorial of the calamity, and of his deliverance from it."

We will next pass to Egypt; whose ancient inhabitants have retained the knowledge of the Deluge under the histories of Osiris and Typhon, as is evident from what Plutarch says concerning them in his Isis and Osiris. For first he informs us, p. 30, (of Squire's edition) that they relate, "that when Osiris was born, a voice was heard, saying, The Lord of all the earth is born," and p. 42. that "in their funeral-lamentation over him, they bewail'd him, who was born on the right side of the world, and who perished on the left." p. 17. "He is said to have been put into a chest," and they particularly assert, that it was on the 17th day of the month Akbahr [see Gen. vii. 11.] and thrown into the sea." After these things, Osiris is said to have returned from the other world, and to:

to have appeared to his son Orus.—The person who thus used Osiris is said to have been one Typho, which name the Egyptians explain by interpreting it the Sea, and they call the salt of the sea Typho’s foam, p. 42, and p. 54. Agreeable to this interpretation is what we are further told, “That Typho was once in possession of the portion or province which belonged to Osiris; by which they mean, that Egypt was once covered with the Sea. Which opinion, say these philosophers, is probable enough, from that great number of sea-shells, which are not only dug out of their mines, but found likewise upon the tops of their mountains; and hence likewise it is, that their fountains and wells, though many in number, have all of them a brackish or saltish taste with them, containing the vapid relics of the sea-water, which once covered their whole country.”

From Egypt we will proceed to Babylon, and see what the Chaldaens relate of the Deluge. I shall cite their testimony as preserved by Josephus, in the first book of his Jewish Antiquities, p. 10. Tα εν κατακλυσμον τουτη, &c. i.e. “But of this [the Noachian] deluge and the ark all the heathen historians make mention; among whom is Berofus the Chaldaen, who, relating the particular circumstances

* The name Typho, according to some learned men, signifies a Deluge or Inundation; see Jurieu’s Doctrines and Worship of the Church. Part. iii. Tr. 4. And Typhon, or as the Latin Poets call him, Typhonis, is represented as a monstrous Giant warring against heaven; and who was at last overcome by Jupiter, and as one says, lies now submerged in water. Apoll. Rhod. Arg. Lib. ii. v. 1219. The Arabs at this day express the general Deluge by the word Al Tusfan. Universal Hist. Vol. I. p. 209.
cumstances of the Deluge, writeth thus, "It is reported, that part of the ship as yet remaineth in Armenia, on the mountain of the Cordyæans; and that some persons taking off the asphalthus [bitumen or pitch] carry it away; and that men make use of that which is thus taken off, by way of charm, to avert evil." And again, in his dispute with Apion, he publickly appeals to the testimony of the same Berosus, as being agreeable to that of Moses (Book the 1st. p. 1044.) Οὐτὸς τοὺς Ἐνρεσον, &c. "Now this Berosus, following the most ancient records, writeth the history of the Deluge, and of the destruction of mankind therein, just as Moses hath related it; and also of the Ark, in which Noah, the Chief or Leader of our race, was saved when it was carried to the tops of the Armenian mountains." And if the Babylonian Antiquities, that now pass under Berosus's name, be truly translated from the Original (and I see no reason to imagine that they are not, since, as far as they remain, they are consistent with, at least do not contradict, what Josephus and other writers have quoted from the Original) his account of the Deluge is as follows, "Ante aquarum cladem famosam, &c. i.e. Before that famous devastation of waters, in which the whole world perished, many ages had passed, which were faithfully remarked by our Chaldeans. They write, that in those times there was a great city of

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I think what his Lordship says on this head in the first part of his Vindication of the histories of the Old and New Testament, p. 121—128, justifies this assertion. Berosus was a Chaldean Priest, and lived about 270 years before the birth of Christ.
of Giants, called Æno, situated near Libanus, who governed the whole world, from the rising to the setting of the sun. These trusting to the greatness of their bodies and strength, and having invented arms, oppressed all, and being slaves to their lust found out musical instruments, and all kind of delights. They devoured men, and procured abotions on purpose to dress them for food; they promiscuously lay with mothers, daughters, sisters, men and brutes; and there was no kind of wickedness which they did not commit; they were despisers of religion and of the Gods. Then many foretold and prophesied, and carved out upon stones the things relating to that destruction which was soon to come upon the world. But they, following their old course, derided all such admonitions, though the anger and revenge of the Gods were ready to fall upon them for their impiety and wickedness. There was one among the Giants who reverenced the Gods, and was more wise and prudent than all the rest; his name was Noa; he dwelt in Syria, with his three sons Sem, Japet, Cham, and their wives, the great Tidea, Pandora, Noela, and Noegla. This man, fearing the destruction which he foresaw from the stars would come to pass, began, in the seventy-eighth year before the inundation, to build a ship covered like an ark. Seventy-eight years from the time he began to build this ship, the Ocean of a sudden broke out, and all the inland seas, and the rivers and the fountains bursting from beneath (attended with most violent rains from heaven for many days) overflowed all the moun-

tains;
tains; so that the whole human race was buried in the waters, except Noa and his family who were saved by means of the ship; which, being lifted up by the waters, rested at last upon the top of the Gordyean mountain; of which, it is reported, there now remaineth some part, and that men take away the bitumen from it, and make use of it, by way of charm or expiation, to avert evil. —We must therefore allow from these premises, that which both the Chaldeans and Scythians write of, that, after the earth was dried from the waters, there were no more than the above-mentioned eight persons in Armenia Saga, and that from these all men upon earth sprung; and for this reason it is, that the Scythians justly say and call Noa the father of all the greater and lesser Gods, the author of the human race, the Chaos, and seed of the world.

From the Babylonians we will go to the Assyrians. For whom let Abydenus speak, whose authority is thus cited and publickly appealed to by Eusebius, Prepar. Evang. Lib. ix. Cap. 12. "Μήν οὐ αἰχμῇ τῇ πρήσει, καὶ Σισιθρῷ, &c. After whom others reigned, and then Sisithrus; to whom Saturn foretold that there should be a great flood of waters (or many showers) upon the fifteenth day of the month Desiris; and ordered him to hide whatever writings he could find, in Heliopolis, a City of the Sippari. Sisithrus, having performed this, immediately sailed towards Armenia; and instantly after, those things which God had foretold came to pass. And on the third day, when the tempest was ceased, he made a trial,
a trial, by sending out birds, to see if they could espy any land uncovered of water. But they finding nothing but the immense Ocean, and not knowing which way to direct themselves, returned to Sisithrus; and after these he sent out others. That the third time it answered, for the birds returned with their feet all muddied. But as for Sisithrus, the Gods took him from among men. And the Ship was carried to Armenia, and afforded the people of the country amulets of wood, to dispel diseases."

From Assyria we will pass into Persia. Dr. Hyde, in his Historia religionis veterum Persarum, p. 171. writes thus, "Veterum Persarum orthodoxi credunt—diuuum, &c. " The orthodox among the ancient Persians believe a Deluge, and that it was universal, and overwhelmed the whole earth. But as they have various opinions and sentiments concerning all those things which are so remote in antiquity, they differ somewhat among themselves and run into fables. For Ibn Shabna, the Arabian, in his book de Primis & Postrernis, affirms, That there are some among the Magi who deny a Deluge;—others, he says, acknowledge it; but say that it was not universal,

* That by the Floods of Deucalion and Sisithrus, as also that which is said to have happened in the time of Ogyges, the ancients could mean no other than the general Deluge in the time of Noah, is abundantly evident from the relations themselves; but if the reader is desirous to see it circumstantially proved, he may consult the following Treatises, Bp. Stillingeet's Origins Sacrer, Lib. iii. ch. 5. §. 5. Gale's Court of the Gentiles, Part. I. Book iii. ch. 6. Ray's Three Phys. Theol. Discourses, p. 66. Kircher's Arca Noae, Lib. ii. cap. 6. Grotius de Verit. Lib. i. cap. 16. Heidegger's Hist. Patriar. Exer. xvii. §. 43.

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and that it did not reach beyond the top of a
mountain near Hulvan, a city situated between
the confines of Assyria and Perseia. From the
opinion of Zoroasfer they maintain, that there had
not been a Deluge, neither had the world been
drowned, but for the iniquity and diabolical wiles
of that most wicked of mortals, Malcus.—In the
Book Pharb. Sur. the famous mountain, where
Noah dwelt when the waters of the deluge broke
out from it, is mentioned; and Zala-Cupha is
said to be the name of the old woman, from
whose oven the waters first issued out.”

From Perseia we will enter the East-Indies,
which country being vastly extensive, the inha-
bilants numerous, and of different sects and or-
ders, it is no wonder that some (as is asserted)
deny a Deluge, and others affirm that there has
been one. But if the tradition of it has reached
this part of the world, it will be sufficient for
our purpose. Lord in his Discourse of the Ba-
tian Religion, ch. vi. and vii. informs us, “That
the Bramins say, that the four tribes, or castes, of
which the first race of men consisted, degene-
rating from their primitive innocence—the Priest
neglecting his piety, the Soldier becoming inso-
 lent and tyrannical, the Merchant practising de-
cit in trade, and using false balances, and the
Artizan spending the profits of his inventions in
riot and excess;—their impiety and wickedness
grew at length to so insufferable a height, that
God’s indignation was justly provoked, and he
sent a Flood, which destroyed all nations without
exception. After which God, to repair mankind,
created three persons of greater excellency than those of the former generation; to one of whom, named Bremaw, he gave the power of creating men and animals, which he executed accordingly: the first human pair proceeding, one from his right side, the other from his left. The man was called Manow, and the woman Ceteroupa, and by them was the earth replenished." a Father Boucet, speaking of the Indians, especially those that live about Maduras and Carnate, writeth more largely thus, b "They say, that Parabara-wason, i.e. the Supreme God, has created three inferior Divinities, viz: Bruma, Vichnou, and Routren. To the first he has given the power of creating; to the second of preserving; and to the third that of destroying.—The God Routren, who is the grand destroyer of all created beings, resolved one day to drown all mankind, pretending he had just reasons to be dissatisfied with their behaviour. This design was not kept so secret, but it was found out by Vichnou, Preserver of all creatures, who discovered the very day on which the Flood was to happen. Though his power did not extend so far as to suspend the execution of what the God Routren had resolved upon, yet, as he was the God-presenter of all created beings, this gave him a right to prevent, if possible, the pernicious effects of it. The method he took for that purpose was as follows. He one day appeared to Sattiavarti, his great confident

b See his Letter to the Bishop of Avranches, printed in Picart's Cosm. abrid. p. 379.
confident, and privately assured him, that an universal Flood would soon happen; that the earth would be covered with water, and that Routren's design was no less than that of thereby destroying all mankind, and every kind of animal. He nevertheless assured him, that he himself need not be under the least apprehensions; for that in spite of Routren, he would find opportunity to preserve him, and to take such measures, that the world should afterwards be re-peopled. His design was to make a wonderful bark rise up on a sudden, at a time when Routren should least suspect any such thing, and to store it with a large provision of souls and seeds of beings, eight hundred and forty millions at least. As for Sattiavariti, he, at the time of the Flood, was to be upon a very high mountain, which he pointed out to him very exactly. Some time after, Sattiavariti, as had been foretold him, perceived a numberless multitude of clouds drawing together, but beheld with unconcern the storm which was gathering over the heads of the guilty, when the most dreadful rain that had ever been seen poured down from the skies; the rivers swelled, and spread themselves with rapidity over the surface of the whole earth; the sea broke its appointed bounds, and mixing with the rivers, which now had left their channels, soon covered the highest mountains. Trees, animals, men, cities, kingdoms, were all drowned; in a word, all animated beings were instantly destroyed. In the mean time, Sattiavariti, with some of his penitents, had withdrawn to the appointed moun-

I
tain, where he waited for the succour which God had promised him. However, this did not prevent his being seized with some short intervals of terror. As the water gathered strength continually as it rolled, and each moment drew nearer to his Asylum, he was every now and then in a panic. But that very instant which he thought would be his last, he beheld the bark that was to save him: no sooner did he set his eyes upon it, than he immediately got into it, with all the devotees in his company, and also the eight hundred and forty millions of souls and seeds of beings. The difficulty now was how to steer the bark, and to preserve it from the impetuosity of the waves, which raged with prodigious violence; but Vichnow took care of this; for immediately assuming the shape of a fish, he steered the ship with his tail, as though it had been a rudder. The god, who was now both fish and pilot, played his part so well, that Sattiavarti waited very quietly in his Asylum, 'till such time as the waters were run off from the surface of the earth."

We come now to China. Among whose Inhabitants we find the knowledge of the Deluge still remaining; only some assert that it was but partial; though others maintain that it was general. The authors of the Universal History, Vol. I. p. 204. (quoting Anciennes relations des Indes, & de la Chine, p. 67.) write thus, "An Arab, who travelled into China about the beginning of the ninth century, giving an account of a conversation he had with the Emperor, among other things, says, that mentioning the Flood to
that Prince, on occasion of a picture of Noah which he shewed him, and telling him, that that prophet, and those that were saved with him in the ark, peopled the whole earth; the Emperor laughed, and said, "Thou art not deceived as to the name of Noah; but as to the universal Deluge, we know nothing of it. It is true, that the Deluge [so even these allow a Deluge] did drown a part of the earth; but it did not reach so far as our country, nor yet to the Indies." Which last circumstance is just as probable, as what those among the Persians, who denied the universality of the Deluge, asserted, viz. that it reached no farther than Hulpvan, a city on the confines of their country (p. 111). But we have already shewed the impossibility of such a Deluge, (p. 80.) and therefore this confession must be the remains of the Flood in the time of Noah. And that it really is so, or that the tradition of the Flood as held by some of them is the same with Noah’s, seems certain, because (as Martinius observes, Sin. Hist. Lib. i. p. 12.) “The Chinese history of the Deluge faileth in nearly with the time of the Noahian, for it preceded the common christian æra about three thousand years.” Besides, many reasons may be given to prove that their first king, Fobi, was no other than the scripture Noah. For first (to use the words of Dr. Shuckford on this occasion in his Connect. of Sacr. & Prof. History, Vol. I. p. 29, 192.) “The Chinese antiquities reach no higher than the times of Noah, for Fobi was their first King. Their writers in the general agree, that Fobi lived about 2952 years before

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Christ: the Author Mirandorum in Sina & Europa computes him to reign but 2847 years before our Saviour, and Alvarez Sevedo places his reign not so early, imagining it to be but 2060 years; and all these computations agree well enough with the time of Noab; for Noab was born, according to Arch-bishop Usher, 2948 years, and died 2016 years before Christ; so that all the several computations fall pretty near within the compass of Noab's life. And therefore we may conclude Moses's Noab and the Chinese Fobi to be the same person. But, 2dly, They say Fobi had no father, i.e. Noab was the first man in the postdiluvian world; his ancestors perished in the Flood, and no tradition thereof being preserved in the Chinese annals, Noab or Fobi stands there as if he had had no father at all. 3dly. Fobi's mother is said to have conceived him encompassed with a rainbow; a conceit very probably arising from the rainbow's first appearing to Noab, and the Chinese being willing to give some account of its original. 4thly. Fobi is said to have carefully bred seven sorts of creatures, which he used to sacrifice to the supreme Spirit of heaven and earth; and Moses tells us, that Noab took into the ark of every clean beast by sevens, and of fowls of the air by sevens. - And after the flood built an altar, and took of every clean beast, and every clean fowl, and offered burnt-offerings. 5thly. The Chinese derive the name of Fobi from his oblation, and Moses gives Noab his name upon account of the grant of the creatures for the use of men, which he obtained by his Offering. Lastly, The Chinese hi-
tory supposes 

**Fobi** to have settled in the province of **Xeufi**, which is the North-west province of **China**, and near to **Ararat** where the Ark rested."  

**From China** we will pass into **America**, an immense tract of land unknown to us 'till lately; and yet when first discovered, the people thereof almost universally retaining the knowledge of the **Deluge**. **Acofla**, in his *History of the Indies*, (one of the first Treatises printed on the subject) Lib. I. c. xxv. speaketh thus in general: "They [the American Indians] make *great mention* of a **Deluge**, which happened in their country; but we cannot well judge, if this Deluge were the universal (whereof the Scripture makes mention) or some particular inundation of those regions where they are. Some expert men say, that in those countries are notable signs of some great inundation; and I am of their opinion which think that these marks and shews of a Deluge was not that of **Noe**, but some other particular, as that which **Plato** speaks of, or **Deucalion's Flood** which the poets sing of: whatsoever it be, the Indians say, *That all men were drowned in this Deluge*. And they report, that out of the great lake **Titicaca** came one **Viracocha**, which staid in **Tia- guanaco**, where at this day there are to be seen the ruins of antient and very strange buildings, and from thence came to **Cusco**; and so began mankind to multiply. They shew in the same island a small lake, where they feign that the Sun hid himself, and so was preserved, and for this reason

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*See Note* p. 110, and what follows shews that it was a *tradition of the Universal Flood.*
reason they make great sacrifices unto him in that place, both of sheep and men. Others report that six, or I know not what number of men, came out of a certain cave by a window; by whom men first began to multiply; and for this reason they call them Pararitampo. And therefore they are of opinion, that the Tambos is the most ancient race of men. They say also, that Mango Cupa, whom they acknowledge for the founder and chief of their Inguas, was issued of that race, and that from him sprang two families or lineages; the one of Havan Cusco, the other of Hurni Cusco. They say moreover, that when the King [Inguas] attempted war, and conquered sundry provinces, they gave a colour and made a pretext of their enterprise, saying, That all the world ought to acknowledge them; for all the world was renewed by their race and country: and also, that the true religion had been revealed to them from heaven."

But as America may be looked upon as a little world of itself, it may be expected that I should be somewhat more explicit than giving a single general testimony; I shall therefore traverse it throughout, as I have done in relation to other parts of the earth.

And first, for the upper or northern part of America, Hennepin in his new discovery of a vast country in North-America, (vid. Continuation of the new Discovery, &c. p. 54.) says thus, "Other Savages upon the same continent are of opinion, that a certain Spirit, called Otkon by the Iroquois, and Atahauta by the other barbarians at the mouth of the
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the river St. Laurence, is the Creator of the world, and that one Messou repaired it after the Deluge. —They say, that this Messou or Otkon, being a hunting one day, his dogs lost themselves in a great lake, which thereupon over-flowing, covered the whole earth in a short time, and swallowed up the world. They add, that this Messou or Otkon gathered a little earth together by the help of some animals, and made use of this earth to repair the world again."

From the nations of the Iroquois, &c. we will descend southward to Cuba. Antonio de Herrera in his History of America from the first discovery thereof, with the best accounts the people could give of their antiquities, collected from the Original relations sent to the Kings of Spain, translated from the Spanish by Capt. John Stevens, Decad. I. Book ix. c. 11. informs us, "That the people of Cuba knew that heaven, the earth, and other things had been created: and said they had much information concerning the Flood, and that the world had been destroyed by water, by three persons that came three several ways. Men of above seventy years of age said, that an old man, knowing the Deluge was to come, built a great ship, and went into it, with his family and abundance of animals; that he sent out a crow, which did not return, staying to feed on the dead bodies; and afterwards returned with a green branch; with other particulars, as far as Noah's sons covering him when drunk, and the other scoffing at it; adding, that the Indians descended from the latter, and therefore had no coats nor cloaths;
but that the Spaniards, descending from the other that covered him, were therefore clothed and had horses. What has been here said was told by an Indian of above seventy years of age to Gabriel de Cabrera, who one day quarrelling with him, called him dog; whereupon he asked, Why he abused and called him dog, since they were brethren, as descending from the two sons of him that made a great ship, with all the rest that has been said above. The same he repeated in the presence of several Spaniards, after his master had reported it.”

From Cuba we will pass to Terra-Firma, the first country of South-America. The last cited Author acquaints us, Decad. xi. Book I. chap. iv. that the inhabitants of Castilla del Oro (in Terra-Firma) said, “That when the universal deluge happened, one man with his wife and children escaped in a canoe, and that from them the world had been peopled; as also that there was one Lord in heaven, who sent the rain and caused all the celestial motions. That there was likewise a very beautiful woman in heaven, with a child; but they went no farther, nor did they know any thing of their own original.”

Bordering upon Terra-Firma is Peru. “The ancient Indians (says the above cited Author, Decad. iii. Book xi. chap. i. speaking of the Peruvians) reported, they had received by tradition from their ancestors, that many years before there were any Ingas [Kings], at the time when the country was very populous, there happened a great Flood; the sea breaking out beyond its bounds,
bounds, so that the Land was covered with water, and all the people perished. To this the Guancas inhabiting the vale of Xausca, and the natives of Chiquito in the province of Collao, add, that some persons remained in the hollows and caves of the highest mountains, who again peopled the land. Others of the mountain-people affirm, that all perished in the Deluge, only six persons being saved on a float; from whom descended all the inhabitants of that country.

From Peru we will pass into Brasil. Nieuhoff in his Voyages, &c. to Brasil, p. 150, writes thus: "The most barbarous of the Brasilians inhabiting the inland countries scarce knew any thing of religion or an Almighty Being. They have some knowledge remaining of a general Deluge, it being their opinion, that the whole race of mankind were extirpated by a general Deluge, except one Man and his own sister, who being with child before, they by degrees re-peopled the world." But Mons. Thevet speaking of the Brasilians that lived near the sea-coast, viz. at Cap de Frie or C. Frio, gives their account of the Deluge very circumstantially thus, (Cosmographie universelle, tome quatrième, Livre xxi. cap. iv.) "Le Deluge donc, que ces Barbares chantent & duquel m’ont souventfois parlé, &c. The Deluge which these Savages talk so much about, and of which they spoke often to me, was in their opinion universal; they say, that Sommay, a Carribee of great dignity—had two children, the name of one was Tamendonare, the name of the other Ariconce, who were of different complexions and natures,
and therefore mortally hated each other.—Tamendonare (they say) was a good œconomist, having a wife and children, and took great delight in cultivating the earth: Aricone, on the contrary, regarded not this, being solely bent on war, and desiring nothing but to subdue by his power all the neighbouring nations, and even his brother. It happened as this warrior returned one day from the battle, he brought the arm of his enemy to his brother Tamendonare, telling him with great haughtiness, go, coward as thou art, I shall have this wife and children in my power, thou art not strong enough to defend thyself. Tamendonare, hearing his brother speak thus, was very much grieved at his pride, and said to him, If thou wert so valiant as thou boastest, thou would'st have brought thine enemy entire. Aricone incensed at this reproach, threw the arm against the door of his brother's house; but at the same instant, the whole village, where they were, was carried up into the sky, and they remained on earth. Tamendonare seeing this, whether out of astonishment or passion, struck the ground so violently, that out of it issued a great source of water, which flowed so high, that in a short time it reached the hills and mountains, and seemed to exceed the height of the clouds, and which continued till the earth was entirely covered. The two brothers seeing this, and solicitous to save themselves, ascended the highest mountains of all the country, and with their wives got upon the trees that were thereon. Tamendonare climbed up a tree, named Pindona, (of which there are
two sorts, one whose fruit and leaves are much larger than the other) taking with him one of his wives: Aricone with his wife climbed up another tree, named Genipar; that they might see if the waters were abated. Whilst they were there, Aricone offered some of the fruit of his tree to his wife, saying, break off a piece of this, and let it fall down; which being done, they knew that it was not yet time to descend into the vallies, and that the waters were yet very high. They affert, that by this deluge all mankind and all animals were drowned, except the two brothers and their wives; from whom afterwards sprung two different people, called Tonaicarres, surnamed Toupinambaux, and the Tonaitz Hoy-anas, surnamed Tominous, who lived in perpetual discord and war: hence also it is that the Toupinambaux, when they are desirous of praising themselves as above their neighbours, say, we are descended from Tamendonare, and you from Aricone; as if by this they would infer, that Tamendonare was a better man than Aricone.”

Thus I have travelled quite round the world, and shewn that the fame of the Deluge has gone throughout. I am now to draw some conclusions or corollaries from what has been advanced. These shall respect principally the certainty that there has been a Flood—that it was universal—that the Mosaic account is true, or written by one inspired by God, the author of the Event.

First, with regard to the certainty of the Flood, I may argue in the manner of Aristotle, & What seems true to some wise men is somewhat probable;
probable; what seems so to most or to all wise
men is very probable; what most men, both wife
and unwise, assent unto, doth still more resemble
truth; but what men generally content in hath the
highest probability, and approaches near to de-
monstrable truth." Surely then, what men uni-
versally agree in, what, I may say, all nations
(otherwise differing in opinion, customs, lan-
guage, religion, and even ignorant of one an-
other's existence) have, throughout all known
ages, assented unto, may well pass for an esta-
blish'd axiom and a demonstrable truth. And such
I have shewn is the state of the case with regard
to the knowledge of the deluge.

Again; the report of the Flood must have
come from some quarter or other, and when or
wheresoever it was first published, the relation
of a fact so extraordinary, would naturally raise
the curiosity of the first hearers, and excite them
to inquire into the truth of it. Now if they dis-
covered that the report was false or groundless,
the history would have been immediately discre-
dited, and the relater and his story no more heard
of: but the tradition prevailing universally, it is
certain that such an event did happen;—and
moreover that it was universal in its effects, else
it could not have been universally believed.

Which (second) article is further evident from
the afore-cited testimonies themselves; for in all
those that are tolerably full and explicit, we find
a method mentioned by which a few escaped out
of the general destruction, from whom the world
was afterwards peopled; which is a plain con-
feission,
feffion, that according to their opinion the whole race of mankind (except the few allowed to be faved) was destroyed; and so the deluge universal.

But farther yet; an universal deluge is not an article of mere speculation, or a point, the certainty of which might be proved only by properly examining the asserter thereof, but is an Event, or Fact in Nature, and of such a peculiar kind that, did such ever happen, it could not but have left undeniable marks of its existence on every part of the earth; and so the relater of such an event might have been confuted or his adversaries convinced on the spot. Especially was this confusion or confirmation easily to be established in the first ages of the world; or rather, This is a point which could not but be then settled. For as men began to multiply after the flood, they would of course separate and divide, and so peopled the earth; and as they thus separated, they could not fail of knowing whether the Flood was universal or not. For, if they could find no human inhabitants in the countries to which they came, nor any marks of their former works, as houses, palaces, temples, gardens, &c. and could see nothing but ruin and devastation in the things that did remain, they would certainly conclude that the deluge was universal: on the contrary, if, as they dispersed or endeavoured to disperse, they found the neighbouring countries still full of inhabitants, the lands cultivated, &c. they would as certainly conclude that the deluge had not been universal. And from this infallible and unavoidable means of knowing the truth, the relation
lation of the flood would have been handed down to posterity; but posterity all over the world speak of it as universal, or allow that there has been a deluge, which comes to the same thing; for had it been partial, or extended only over a few countries, the remaining part of the world would have been utterly ignorant of such an event, or at least if they spoke of it, they would not have acknowledged, as they generally do, that it happened in their own country, and have supposed that a king, or an eminently righteous person of their own nation (including some others) was preserved from the destruction. All this abundantly proves that the deluge was universal.

The certainty and universality of the flood appearing thus evident,

I shall now (thirdly) make some observations concerning the Truth, Perfection, and Divinity of the Mosaic account.

First, As Truth is the purer the nearer to the fountain head, so Moses has the advantage of all other historians in this respect; none can presume to equal him in antiquity; he is allowed by all learned

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There is mention indeed made, Joshua x. 13, of the Book of Jasher, and of the miracle of the Sun's standing still upon Gilboa, and the Moon in the Valley of Ajalon, being recorded in it; Is not this written in the Book of Jasher? And as this event happened soon after the death of Moses, some have imagined that the author of it must have been at least coeval with Moses, and that the Book of Jasher must have been of great authority, as the Scripture itself refers to it for evidence. But, in short, if we consult the original, or even our marginal version, there will be no doubt of the author of the Book; for what is translated, Is not this written in the Book of Jasher? is justly rendered in the margin of our Bibles, Is not this written in the book of the Upright? I.e. in the word of God, in

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learned men whatever to have wrote a considerable distance of time before them all.

And as he lived nearer the event than any other writer, so is his relation more full and express; nay, if you take all the above-mentioned heathen accounts together, and collect from them every different part, you cannot exceed the Mosæic in fulness of description; far less can you do this, if you add to it the considerations I have mentioned p. 4, 5.

And not only in fulness of matter does Moses surpass, but in justness of thought and diction, and in the consistency of the scheme he delivers. In the heathen historians there are many imperfections

the authentic copy, preserved in the Temple, and acknowledged by all the nation.

And had the translators rendered the words for Sun and Moon in the above passage, according to the sense of the original, and according to common sense, the light of the Sun, and the light of the Moon (as the words really mean) the charge of false philosophy could not have been brought against Scripture. But we first of all make mistakes ourselves, and then wonder how they came to be in the word of God. Mr. Pike in his Philosophia Sacra, p. 44, &c. has undeniably shewn, that the words שמש and ים translated Sun and Moon, really mean, in every place of Scripture where they occur, the solar light and the lunar light, and not the bodies of the Sun and Moon. And with regard to the passage under consideration, he observes thus; “I conceive that the chief of this mistake arises from quoting the place imperfectly. ’Tis usually said thus,—Does not Joshua say, Sun stand thou still? and the next words are generally dropp’d or forgotten: whereas it runs thus,—Sun stand thou still in Gibon, and thou Moon in the Valley of Ajalon. Now I ask, was the body of the Sun in Gibon, or the body of the Moon in the Valley of Ajalon? Surely no: but the light proceeding from the Sun, and the light reflected from the Moon, were both there. ’Joshua therefore plainly means not the bodies, but the lights of the Sun and Moon here.” In the same sense I understand the word for Sun in Psalm xix, and the whole will be true philosophy.
sections of this kind, some failing in more, some in fewer articles. But Moses, though he extends the duration of the Deluge far beyond what any of them do, and affirms its Universality in the highest degree, has yet provided against all exigencies; he safely embarks the numerous creatures in the ark, prepares every thing necessary for their being and well-being there, and as safely lands them.

As the heathen accounts differ more or less from the Mosaic, which was confessedly prior to them all, so we may assert of the relaters of them, as Scaliger is said to write of the Greek historians, "They ought rather to be pitied for not having had the advantage of authentic antiquities and records, to set them right, than to forfeit their authority for such deviations from the truth of the story, as render their confirmation of the truth of the Sacred History much stronger, because much less to be suspected, than if they agreed with it in every circumstance." So that the imperfect, and, in many respects, false accounts of the Heathen, bear witness to the truth and perfection of that of Moses.

But what distinguishes the Mosaic writings, and sets them in an eminently conspicuous light, and intimates their high Antiquity and Divinity, is, that in them there is no reference made, for the truth of what they contain, to any prior traditionary accounts, histories, or records, as is the usual manner with other historians; which kind of proof all mere human writers are glad to embrace, thinking nothing more venerable and true,
true, than that which has been delivered down to them from their forefathers. But Moses, as greatly superior to them in time, so much more in dignity and authority, demands audience from us as from God himself; he refers, for the truth of what he says, to an immediate Inspiration from the Deity, the Author and Disposer of all events; I AM, says, he (Exod. iii. 14.) hath sent me; Jehovah Himself commissioned him to act, and a Thus saith the Lord authorized him to write.

And had not Moses been thoroughly persuaded that he was inspired by God in his writings, he certainly never would have ventured the truth of all he says upon the assertion of a most improbable and astonishing fact, viz. That the whole world had been destroyed by a flood of waters;—a Fact, which he could not by any natural means have had proof of, unless he had travelled all over the world, or had received his information from one that had, which I believe no person will suppose any one to have done in those early ages;—a Fact too, the truth or falsity of which could not but have been discovered, as mankind dispersed to re-peoples the earth, or as commerce had opened a correspondence throughout;—a Fact also, which Moses, as a human writer, does not appear to have been under any necessity of mentioning at all; or if he thought proper to record it, he might not have made it so extensive as he has done, and yet in all probability have saved his credit as an author. But, instead of all this, conscious of Truth and of the unerring Wisdom of his Inspirer, he openly declares the Universal
lity of the Flood, and that the whole world was de-
stroyed, and leaves the issue to Providence, and
the disquisition of the truth of his assertion to fu-
ture ages.

But what sets Moses in the highest point of
view, and his writings on the firmest founda-
tion, is his exerting supernatural powers, per-
ing Miracles and delivering Prophecies, in
proof

Some have asked, Why did not Noah convey down to posterity a
true account of the Deluge, as he was present at the beginning and
ending of it, and saw the whole transaction; he was certainly a more
proper person than Moses, who did not live till some hundred of years
after the event?

But such objectors seem not to reflect on the situation of Noah
during the flood, namely, that he and all his family were shut up in the
Ark, and if they had been seated on the top of it, they could not
have seen to any very great distance, at least could never have known
that the whole globe was covered and enviroined with water; neither
could they have judged of the amazing quantity of water from that
time from the abyss beneath; for though the water, in its passage up-
wards, would naturally elevate the ark to whatever height itself
rose, yet the persons in it could not tell from whence it came, or
to what height it ascended: far less then could they judge of transac-
tions that passed at a still greater depth below them, namely, the
deflection, dissolusion, and re-consolidation of the whole body of the
earth; all which were effected beneath the waters, inertributable to
the human eye, thought, or conclusion, unless enlightened by re-
velation: so that Noah, though present during the event of the
Flood, was as ignorant (considering his then situation in a natural
light) of these great transactions, as any of us at present can be,
nay more so, for our opportunities of searching and examining the
Earth, and making deductions therefrom, are greater than his
could be, and therefore he could not convey to us that knowledge
which himself had not, unless he was informed of it by revelation,
which indeed he was, as I have proved already, p. 26. And if
it were proper to give Noah, by supernatural means, any informa-
tion of these things for his own and his family's sake, certainly it
was far more requisite that Moses should be acquainted with them,
who was to convey the knowledge of these things, and also some few
more useful Truths, to all posterity, Deut. xxix. 29.

That the miracles asserted in the Bible to have been performed
by Moses were really transacted as there related, and of course that
proof of his divine Inspiration; some of which are remaining at this day. I shall mention one, respecting the affair of the Deluge. Moses writes thus, Gen. ix. 12. And God said, This is the token of the Covenant which I make between me and you, and every living Creature, for perpetual generations: I do set my Bow in the Cloud; and it shall come to pass, when I bring a cloud over the earth, that the Bow shall be seen in the cloud: and I will remember my Covenant which is between me and you, and every living creature of all flesh; and the waters shall no more become a flood to destroy all flesh. This Token we see is frequently exhibited, so that this faithful Witness in heaven is still preserved. No flood has really yet happened (since that on account of which this promise was made) in which the whole earth has been drowned. Now if there be any God superior to Moses’s God, it behoves him to destroy this Prophecy by annihilating the sign of it out of heaven, or the remembrance of it out of the mind of man, else it will remain an indubitable proof of Moses’s Mission from the Supreme Being,

K 2

the doctrines delivered upon the authority of those miracles are indisputably true, or were of divine Inspiration, the Reader may see a regular and succinct proof of in the Rev. Mr. A. S. Catcott’s Sermons, p. 131—48. It would be too tedious to introduce such a proof here, and therefore the Author refits the evidence of Moses’s Inspiration upon a Prophecy, relative to the Subject he is treating of, and which is existent at this day, and affords ocular Demonstration of Moses’s Mission from the Divine Being.

* That these words of the Psalmist (Ps. lxxxix. 37.) are really to be understood of the Rainbow, (and not of the Moon, as usually interpreted) appears to be sufficiently evident from what the Author of An Essay on the proper Lessons, appointed by the Liturgy of the Church of England, &c. says on this text, Vol. II. p. 87.
—the God of Heaven and Earth, the Creator, Formor, and Preserver of all Things in this world.

—If it be said, that the Rainbow was existent before the flood; therefore the argument will not stand; I reply, that supposing it to have been so, it could not have existed as a Sign from the Supreme Being, that a flood of waters should never cover the earth (because such did cover it) and therefore it will not in the least affect the argument here used; which does not respect its bare natural State, but its super-natural use and divine appointment. And lest it should be imagined, that Moses assigned this token as of himself, and to shew the folly of such imaginations when men presume to make appearances in heaven signs or tokens of things upon earth, without a divine direction, I shall here quote a Fact recorded by Gassendus in his Animadversiones: on the tenth book of Diogenes Laertius, Tom. II. p. 932. "Memorabile certe est, &c. i.e. It is really worth remarking, what is written in the histories, and in almost all the books of the last age; when the Astrologers, by reason of the many great conjunctions of the Planets, and not a few of them happening in the watry Constellations, foretold, that in the month of February in the year 1524, there would be a general Deluge, and so great a devastation of things, as was never heard of before: so that numbers of persons in France, Spain, Italy, and Germany, being terrified with these apprehensions, had prepared Ships, or had got together what provisions they could, and other necessaries; and made to the highest places. But so it happened, that
that the whole month of February was the most serene and fair weather ever known; apparently, as if it had been so ordered on purpose for refuting the predictions of these Astrologers (when otherwise it is very unusual, that the month of February should be without rain;) which even Cerdin and Origen [two noted judicial Astrologers of that time] could not deny; greatly grieving that this Judgment concerning the Deluge was declared by Steafler so much to the insanity of Astrology." As long then as the above Appeal to the true God, and Challenge to all false Deities remains, so long will each succeeding age have undeniable proof, nay ocular Demonstration of Moses's Mission from, and Inspiration by, the God of all truth, power, and wisdom: and when we consider that this bold Appeal has been recorded in writing already above three thousand years, and no detection yet made that it was false or unauthorized by the true God, we may justly suppose it will remain as long as the Heavens themselves shall endure, i.e. to the Consumption of all things.

On the Peopling of America.

After this I think a proper place (before I have quite done with Scripture and ancient History) to take notice of his Lordship's objection to the Universality of the Flood drawn from the peopling of America; and its being inhabited with wild beasts, &c. when we first discovered it. To account for which he supposes, " that some parts of the habitable..."

K 3 ante-
On the Peopling of America. Part II.

ante-diluvian world, which by the force of the Deluge were separated into islands, and were divided from the Continent whereon the Ark landed, were in some sort exempted from the common calamity brought upon the rest of the world, &c." But how inconsistent this supposition is with his own description of the Deluge, and with the truth of Scripture, I have shewed already (p. 12, &c.) and also observed, that supposing we could not solve this difficulty, yet a seemingly unaccountable event in Nature (or rather that which may appear unaccountable to some, but not to others) ought not to set aside the united evidence of Scripture, Reason, and Fact, concurring in all other respects to prove the Point under consideration.

But to shew how or by what means America became inhabited by men and other animals.

And here it will be necessary to premise a few things, introductory to the discussion of this article.

First, then, America was peopled after the Flood. This is certain from the inhabitants thereof having the knowledge of that Event.

Secondly, Since the Tradition of the Flood was universally spread throughout that vast tract of land, and acknowledged by the several nations thereof to have been delivered down to them from the highest antiquity, we may reasonably suppose, that it was peopled soon after the Deluge; whilst the knowledge of the Fact was fresh and lively upon the minds of the original inhabitants.
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And since, when this part of the world was first discovered by the Europeans, the inhabitants were found to be ignorant of the art of writing with letters, and could record things only in the ancient hieroglyphical way, by signs and emblems, it seems also hence evident that it was peopled early.

Which will further appear from their ignorance of the art of working iron into useful tools or warlike weapons, till the method was discovered to them by the Spaniards. For though there is plenty of iron ore in America, yet the ancient inhabitants were ignorant of the use which the Asians and Europeans make of it; and instead thereof used shells, bones, or generally hard stones, which with immense labour and trouble they shaped by grinding or whetting into the utensils or weapons they wanted. And though the art of manufacturing iron was known before the flood (Gen. iv. 22), yet it seems to have been lost soon after; and the loss was probably owing to these two causes; first, that as all the metallic and mineral bodies that were in the earth before the Deluge were destroyed, and even dissolved, during that Catastrophe (as will be shewn hereafter) so of course all the instruments and utensils that were made of these bodies perished.

K 4

k Purchas's Pilgrimage, p. 811, quoting Acosta, Gomara, Peter Martyr, &c.

Dr. Woodward's Letters, relating to the method of Fossils, Letter III.

k And Zillah, she also bare Tubal-cain, an instructor of every artificer in brass and iron. From this person's Name and Office was derived the fictitious Vul-can of the Latins.
likewise; which would certainly tend much towards obliterating the memory of such instruments in the post-diluvian world. And secondly, since, for some considerable time after the flood, the inhabitants of the new earth would be employed, and their time wholly taken up in providing and securing the common necessaries of life at first hand, or when they came to separate from one another in travelling and seeking out agreeable countries to inhabit, so the art of mining and working metals, and such like knowledge, (among their cares and concerns for many things immediately needful and absolutely necessary) might be forgotten. And it seems certain, that this art was lost, 'till some time after the flood; for there are found, even at this day, in almost all parts of the world, many instruments, such as axes, chisels, heads of arrows, &c., consisting wholly of Stone, generally of the hardest kind, which certainly were made before the use of iron was recovered after the deluge, for they are neglected and disposed wherever iron is known. And since when we first discovered the Americans, they had no other tools or weapons but such as were formed out of stone, &c., it is evident, that they departed from us before the working of iron was in practice after the Flood; for had they ever known this useful art, it is not probable that they would ever have lost it, any more than ourselves; and since we have retained it for these several ages back, even from time immemorial, it is certain that

Woodward's Letters.
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that the Americans departed from us even before that early time.

Another consideration which may be brought in favour of the early peopling of America, is, that the inhabitants were ignorant of that noble and useful Structure the Arch; and even of building with mortar or any kind of Cement; and yet their edifices consisted of Stones great beyond imagination, and these Stones were so artificially wrought, and placed upon one another, that in many places their joinings were not visible: "And that which is most strange (says Acosta), these Stones not being cut nor squared to join, but contrariwise very unequal one with another, both in form and greatness, yet did they join them together without cement, after an incredible manner; all this was done by the force of men, who ridicked their labour with an invincible patience." Certainly, if they had known the use of mortar or cement, they would never have taken such ingenuous method as this. Now the first post-diluvian account we have of Cement being used in building was at the Tower of Babel (Gen. xi:). But as this, in all probability, was that pitchy substance called Athbal, with which that Country particularly abounds; so unless the Americans had discovered a substance of a similar nature in their new land, they might not think of making use of any other, and be as much at a loss for what


* Acosta measured one of these Stones in a building, and it was 38 feet long, 8 broad, and 6 thick; which, I think, vastly exceeds any of those that are now remaining in our ancient Druidical Temples.
what we now call mortar as if they had never heard of any thing like it. So that indeed we cannot conclude from hence, that they departed from us before the Building of Babel, but only before the general use of Mortar or Cement; and even this was very early, as the remains of the oldest Buildings in the world, such as the Pyramids of Egypt, &c. testify, in which the mortar is visible at this day.

The last circumstance I shall mention, tending to prove the Antiquity of the American Colonies (for I might enlarge upon several, as their ignorance of coined money, the plough, the bellows, &c. all which would serve to shew that they departed from us in the very infancy of the post-diluvian world, before these arts were known to mankind) is, that they were ignorant of Shipping, or the art of making large vessels with Sails, &c. till they first saw ours; knowing before no other kind of vessels than small boats, made of the bark of trees, skins of fishes, &c. or canoes, consisting of a single trunk of a tree hollowed out by means of fire, and these to be directed only by the help of oars or a paddle. From whence I would

Thirdly, observe, that America must have been peopled by land; for had the original inhabitants been carried thither in a Ship, either by distress of weather or designedly (both which are suppositions that can scarcely be allowed when we consider the difficulties attending them) they certainly

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* Dr. Shaw's Travels, p. 415.
Part II. On the Peopling of America.

certainly would never have forgot that useful part of shipping, the *Sail*; even supposing that fabricating a large vessel might be inconvenient or impossible to them when they first arrived on their new land, and therefore the knowledge of it be lost to their posterity; yet, I say, the use of the *Sail* would in all probability have remained among them, since it would have been of such service in navigating their small canoes.

But what seems most to confirm the opinion, that *America* was peopled, or at least stocked with animals, *by land*; is, that that vast Continent is every where inhabited by wild beasts and the most noxious creatures, such as Lions, Tygers, Rattle-Snakes, &c. which we cannot imagine that any persons would be at the trouble, or expose themselves to the danger, of conveying over thither in Ships, and at the same time leave behind them such useful creatures as the Horfe, the Camel, &c. which were not known in the *West-Indies*, till transported thither from us. Nay, what is most remarkable, *America* has at present creatures peculiar to itself, such at least as are not known to exist in any other part of the world; which therefore cannot be supposed to have been carried from hence thither: and besides they are of such a nature that of themselves they could not have crossed the Seas, and therefore must have come thither by land.*

It appearing then thus clear, that *America* was peopled early and *by land*, the next question to be solved is, *by whom or from what land?*

In order to solve which, let it be observed, that the sacred and most ancient Historian informs us, in his account of mankind after the flood, that the whole earth was overspread by the descendants of the three Sons of Noah—Shem, Ham, and Japhet, who went forth of the ark, Gen. ix. 19. From whence it is certain, that no part of the world could have been peopled by any other antediluvians than those that went out of the Ark; and of course, that America was peopled after the Flood, and by the posterity of Noah.

Secondly, Let us consider, that Moses proceeds next to give us the names of the first descendants of these three Sons, and to mention the names of the Countries which the principal of these inhabited, especially those whose affairs would afterwards be mixed, or have some connection, with the Transactions related in the Bible, particularly with the Israelite Nation. But as for the rest he takes little or no notice of them.

So that, Thirdly, we cannot expect that any great notice should be taken of the inhabitants of so distant a part of the world (from that where Moses wrote, and the intent of his writing) as the Continent of America; and yet, one would be apt to imagine, that as He, who inspired Moses in his account, saw all things from the beginning to the end (and who had made of one blood all nations of men for to dwell on all the face of the earth, and had determined the times before appointed, and the bounds of their habitations, Acts xvii. 26.) so He would, in speaking of the migration of mankind towards re-peopling the earth, make some men-
tion, let drop some few words concerning the manner by which so large a part of the world, as the Continent of America, became inhabited.

And such there is reason to think he has done, and left recorded in the following remarkable passage (the event denoted by which was so singular, as to give name to one of the post-diluvian Patriarchs; and is twice repeated in Scripture) viz., Gen. x. 25; 1 Chron. i. 19. And the name of one (of Heber's sons) was Peleg, for in his days was the earth divided [NePeLeGE]. On which words, that celebrated Biblical Critic Bengelius thus occasionally remarks in his Ordo Temporum, p. 94. "Peleg a divisione terrae nominatus est; fæctiæ Peleg was named from the division of the earth, which happened in his days; — The earth after the deluge was divided by degrees, by a genealogical and political division, which is expressed by the words נבשק and יִדְנֶה. But a very different kind of Division is meant by the word פלג [NePeLeGE], namely, a physical and geographical division, which happened at once, and which was so remarkable, and of such extent, as suitably to answer the naming the Patriarch therefrom. By this word [PeLeG] that kind of Division is principally denoted, which is applicable to Land and Water. From whence in the Hebrew דְּנֶה and בָּלֵגbrew

As Gen. x. 5. They are the three Sons of Noah; and of them was the whole earth overspread [תִּפְסָדו].

As Gen. x. 5. By these were the islands of the Gentiles divided [תִּפְסָדו] in their lands; every one after his tongue, after their families, in their nations: so also ver. 18, and 32; and ch. x. 9. From thence [from Babel] did the Lord scatter them abroad [תִּפָּסֵד] upon the face of all the earth.
brew tongue יְלֹם [PeLeG] signifies a River, and in the Greek ΠΕΛΑΓΟΣ [PELAGOS] the Sea;" [and in the Latin, Pelagus denotes the same]. From this precise meaning of the word then we may conclude, that the Earth was split or divided asunder for a very great extent, and the Sea came between, in the days of Peleg. Now surely when any person views the situation of America, and considers how it stands disjoined from this part of the world, and what an immense Sea divides it from us, he will not be backward in allowing, that This was the grand Division intended by the Passage under consideration. And therefore we may justly suppose, with the above-mentioned writer, "That, soon after the Confusion of tongues, and the dispersion of mankind upon the face of the whole earth, some of the sons of Ham; [to whom Africa was allotted] went out of Africa into that part of America, which now looks towards Africa; and the earth being divided or split asunder in the days of Peleg, they with their posterity (the Americans) were for many ages separated from the rest of mankind. This separation of the human race, by means of so large a sea, prevented in like manner any evil and pernicious conspiracy, as the Confusion of tongues did."

AND if this account can be seconded by any similar event related in ancient Heathen History, our supposition may deserve a greater degree of credit.

* From what the Indian says to the Spaniard, p. 119, it appears, that the Americans themselves retained some kind of tradition that they were descended from this Son of Noah.
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credit. And such an event we have recorded by Plato in his Dialogue named Timeus; in which he treats of Nature, or the System of the Universe, its generation or beginning, and the Nature of Man. And as a prelude to his Subject he makes mention of a Fact that happened in the most early ages, the nearest of any known to the beginning of the world; and that is of a vast Tract of land, or an Island greater than Libya and Asia, situated beyond the bounds of Africa and Europe, which, by the concussion of an earthquake, was swallowed up in the Ocean. Plato introduceth this fact, as related by Solon (one of the first of the seven wise men of Greece) who, while he was in Egypt, had heard it of an old Egyptian Priest, when he discoursed with him concerning the most ancient events. This Priest tells Solon, that the Greeks, with regard to their knowledge in antiquity, had always been children; and then informs him of the history of this famous Island (which they knew nothing of before): The description of which and its catastrophe is as follows (which in itself is so remarkable, that there must have been some ground in nature for the tradition of it). "There was formerly an Island at the entrance of the Ocean, where the pillars of Hercules stand [and so beyond the then supposed bounds of Europe and Africa]. This Island was larger than all Libya and Asia; and from it was an easy passage to many other islands; and from these islands to all that Continent which was opposite, and next to the true sea [πλησίων]. Yet within the mouth there was a gulf with
with a narrow entry. But that Land, which surrounded the Sea called *Pelagus* [Πελαγός, where the Division was made] might justly be called a Continent.—In after-times there happened a dreadful earthquake and an inundation of water, which continued for the space of a whole day and night, and this island *Atlantis*, being covered and overwhelmed by the waves, sunk beneath the ocean, and so disappeared; wherefore that Sea [Πελαγός] is now impassable, on account of the slime and mud that has been left by the immersed island."

This passage of Plato may receive some illustration, and the point I am upon, some degree of confirmation, from what occurs in the 18th ch. of the third book of Ἑλιαν's *History of various things*. "Theopompus relates a certain discourse that passed between Midas the Phrygian and Silenus. This Silenus was the son of a Nymph, and was inferior to the Gods, but superior to mortals. When these two had discoursed of many things, Silenus, above all, tells Midas, "That Europe, Asia, and Libya ought to be considered as Islands, which the Ocean wholly surrounded; and that that part of the world, which lay beyond this, ought only to be esteemed the Continent: as it was of an immense extent, and nourished very different and vastly larger kinds of animals than this side of the world; and the men that inhabited it were twice as big."

From what has been offered, I think, we may conclude, that *Africa* and *America* were once joined, or at least separated from each other but
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by a very narrow gulf; and that some time after the Flood the earth was divided or parted asunder, probably by means of an earthquake; and then this middle land sunk beneath the Ocean:

According to Scripture this event came to pass in the days of Peleg, for we are told, that in his days the earth was divided. From whence some have imagined, this division fell out exactly at the time of his birth; but the extensive expression of his days rather implies the contrary, and denotes that it happened when he was in an advanced age, when he had seen many days, not when he had seen but one. So that his name must have been given him prophetically, in the same manner as was Noah's, under which was predicted an event which did not come to pass till some hundreds of years after his birth (Gen. v. 29. viii. 21.) Several other of the Patriarchs also had such prophetic names.

Now it appears from Gen. xi: 16,—17. that Peleg was born in the 101st year after the flood, and lived 239 years; so that if the circumstance, that caused his name to be given him, happened when he was in an advanced age, we may fairly suppose that it fell out about 300 years after the flood.

Allowing this distance of time, we shall find upon calculation, that there must have been a sufficient number of mankind upon the earth to have re-peopled it abundantly. In order to shew this, and also in what manner the post-diluvians may be justly supposed, even in a natural way, to have separated and dispersed, and re-peopled
the globe, I shall transcribe some lines from the Abridgement of Picart's religious Ceremonies, p. 279. " 'Tis very probable, that America was as populous a few centuries after the deluge as it is at this time; after which States and Kingdoms were soon formed: however this was done progressively, according as Families separated, and that the children themselves, becoming Parents of a numerous progeny, were obliged to quit their native countries. These Separations gave rise to States, in which ambition and a desire of superiority might even in those ages have had some share. Nevertheless 'tis probable that Asia did not send out any colonies, 'till after having been forced to drive out such young people as were capable of subsisting by themselves. But these Settlements were very easily made in those times: husbandry was then the only employment; mankind then spent their lives in leading their flocks to pasture; and 'tis by the opportunities which rural occupations gave to people, whose passions were as yet but in their infancy, that the first conquests were made in Asia, and the sending out of the first Colonies. A Shepherd, who was at the head of a numerous family, master of several flocks, and who found himself well settled in Chaldea, sent one of his Children, or Dependants, several leagues off, with a detachment of oxen, asses, and camels. The flock went gently on, grazing in their paflage, and insensibly drew farther from the true owner. In the mean time the Detachment grew more numerous; from this flock there sprung another. The Shepherd, who at
at first was no more than a deputy, became himself the Master and Father of a family: he then also separated part of his wealth, and gave it as an inheritance to that Son whom he intended should settle in a foreign country, or to some dependent that was going to settle farther off.

"We presume that in this manner an hundred years was time sufficient to people Europe, Asia, and Africa, very considerably; and an hundred more, to people the Continent of America. Let us suppose for this purpose, that at the flood Shem, Ham, and Japhet had each twelve children," and that all these children were fit for marriage about fifteen or eighteen years after the flood. 'Tis very probable, that after they had been married twelve years, they might see a posterity of four hundred and thirty-two persons. In this manner Noah might have been at the head of above

Left the subsequent Calculation should seem unreasonable, the reader is desir'd to attend to the following, which is founded upon a Scripture-matter of fact. "It is evident from sacred History, [Exod. xii. 37.] that in the space of about two hundred and sixty-six years, the posterity of Jacob alone, by his [twelve] sons, amounted to fix hundred thousand males above the age of twenty, all able to go forth to war. Now by Mr. Graunt's observations on the bills of Mortality it appears, that about \( \frac{1}{5} \) are between the ages of sixteen and fifty-six: which may be near the proportion of males numbered to the entire number of them all. So that as 34 is to 100, by the Golden Rule, must fix hundred thousand be to the entire number of the males of Israel at that time: which was therefore one million seven hundred sixty-four thousand and seven hundred. To which add females, near \( \frac{1}{5} \) fewer, as suppose, to make the sum even, one million fix hundred thirty-five thousand three hundred, the total is, three millions and four hundred thousand; add forty-three thousand for the Levites (not included in the former accounts), the entire sum will at last amount to three millions, and four hundred forty-three thousand souls." Whiston's Theory, p. 250.
above five hundred descendents in the space of thirty years; and if we then suppose that every one of Noah’s great grand-children had ten children, these four hundred thirty-two persons might have begot four thousand three hundred and twenty children in ten years time. All this might have happened in the space of half a century; so that multiplying them always by ten, and leaving an interval of about twenty or twenty-five years between one generation and another, Asia, Europe, and Africa may have been peopled with four hundred thirty-two millions of inhabitants, an hundred and fifty years after the flood.

"I methinks this could not be disputed, were we only to have regard to the ordinary methods of propagation. ’Tis true indeed, that we suppose every Head of a family to have had ten children, when probably several of those Chiefs might not have had near so many. But then how many do we see in our days who have more than ten? and if we consider what Bp. Burnet has told us concerning Meff. Tronchin and Calandrini of Geneva; the former of whom, at the age of seventy-five, had one hundred and fifteen children, or persons married to his children, that could call him Father; and the other, at the age of forty-seven, had one hundred and five persons who were all his nephews or nieces by his brothers or sisters; if, I say, we consider these two instances, 'twill be found that our computation is modest enough, for an age when poverty and the cares of life had not yet destroyed man’s vigour, nor reduced him to the necessity of refraining from marriage
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Marriage (the lawful method of propagation) for fear of not being able to support his family. But although the increase of our species had for one hundred and fifty years been much less than we have supposed it, and that only four hundred millions of people had come into the world; nay farther, though we were still to subtract thirty millions from that sum, for the immature and violent deaths, diseases, and wars, which in all probability were not so bloody in those ages as they have been since, 'tis very natural to think that some millions might detach themselves from the remaining three hundred and seventy millions, in order to seek their fortunes in America. And though we afterwards suppose, that propagation may have been very much prejudiced by reason of the fatigues they laboured under in their voyage, and from the change of climate, &c. we shall nevertheless find that ten or twelve millions of people may have been able to furnish America with forty millions of souls, in fifty years time. What is here advanced ought not to be looked upon as a paradox, nor should any difficulties be raised with respect to our calculation; difficulties which are founded only on the length of man's life in our days. Mankind in those ages had not invented all those pernicious arts, which, at the same time that they shorten life, do also lessen propagation."

And if to all this we add the consideration of what we are told in Gen. ix. 1. viz. That God, immediately after the deluge, blessed Noah and his sons; and said unto them, Be fruitful and multiply.
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And replenish the earth; if, I say, we add to the above observations the consideration of this divine Blessing and injunction, we cannot doubt that the Progeny of Noah and his Sons was very much increased soon after the Flood, and sufficiently numerous to re-peopling the earth.

And, when we farther consider, that after the Confusion of Babel (which happened about an hundred years after the deluge) it is said, Gen. xi. 9. And from thence did the Lord scatter them [i.e. the Projectors of Babel] abroad upon the face of the whole earth; I say, when we consider this, that those who were reluctant to God's design were forced to go, and doubtless many co-operated with the divine intention willingly, and as mankind, within two or three hundred years after the flood, were abundantly sufficient for re-peopling the whole earth, so we may fairly conclude, that within that space of time they actually peopled it.

With regard to the brute part of the world, they certainly complied with the divine injunction, Gen. viii. 17. and were fruitful, multiplied upon the earth, and bred abundantly. And with respect to their dispersion, their peculiar qualities and instincts would prompt them to seek such countries and climates as would be most suitable to their natures; in the same manner as many of them now pass from one country to another, to immense distances, when the alteration of the season affects them. Add to this, that the mild and meek kind of animals, such especially as were designed to be the prey of others, would naturally avoid the wild and rapacious, and the last would
would as naturally pursue; so that both would be induced to get as far from the place where the ark landed, as they conveniently could; and by this means the whole globe would be soon re-supplied with animals.

Thus then, within two or three hundred years after the Deluge, the whole Earth would be re-peopled with men, and stocked with other animals. And as about this time the Earth was divided or split asunder, and we may justly suppose that the land, which united Africa and America together, suffered in this division, was disjoined from the two Continents, and sunk beneath the Ocean;—so would both Continents be still inhabited; though for the time forward the inhabitants of each would be separated from the other.

Thus we have discovered an easy way by which America might have been, and I apprehend, the true way by which it really was supplied with inhabitants after the flood; a way this, that affords a very convenient passage (through a warm and fruitful climate) for the most tender and delicate animals, and such as could not endure any great degree of Cold, and of course a very easy one for robust man.

As a further proof of the manner in which I apprehend America was first peopled, I shall here insert a Letter which I received from the Rev. Mr. Jones, on his perusal of the foregoing sheet, and also an Extract from a Spanish writer, which I did not discover till the above-mentioned sheet had been printed off.
H ave lately been favoured with a sight of some printed Pages, containing that part of your work, in which you account for the peopling of the American Continent. The point does well deserve to be examined and cleared up; many writers, of little knowledge and less Faith, having made the obscure state, in which that part of the globe remained for so many Ages, an handle for perplexing weak minds with doubts about the authenticity of some Articles related in the Holy Scripture.

I was much pleased to find, that, without knowing it, you are come to the same conclusion with myself; and, in part, by the same premises too. As we have both fallen upon the same scheme, without consulting one another, it is to be presumed, that neither of us can be very far from the truth.

That the Western Continent did once communicate more nearly with Europe and Africa, than it does at present, I was first inclined to believe on reading the following account of Teneriff, one of the Canary Islands.—That the whole Island is deeply impregnated with Brimstone, and is supposed in former ages to have taken fire, and blown up all at the same time.—That many mountains of huge Stones, calcined and burnt, which appear every where about the Island, were raised and heaved up out of the bowels of the Earth.
Earth at the time of that general conflagration; and that even the Pico Teneriffæ itself was raised up by this means to that amazing height at which it is now seen. Huge heaps of these calcined rocks, or pumice stones, are spread for three or four miles round the bottom of the Pico, in such a manner, as to persuade any beholder that it must have been generated by the sudden eruption of a Volcano: and even to this day, the mountain smoaks and burns perpetually, and there remain the very tracts of the burning rivers of Sulphur, as they ran all over the South-western parts of the Island, and destroyed the ground past recovery. There is a Volcano in another of the Canaries, called the Palme Island, which raged so about twelve years before this account was written, that it caused a violent Earthquake in Teneriffæ, though at the distance of near twenty leagues, and the people ran out of their houses, fearing they would have fallen upon their heads.¹

¹ For these particulars, see Dr. Sprat's Hist. of the Royal Society, p. 200.

² This Supposition will not at all invalidate the Account given of the Formation of Mountains in the subsequent part of this Treatise; for the Pico is no other than a formless Maf, or huge Heap of Rubbish, consisting of burnt Stones and Cinders, and was as certainly thrown out by a Volcano as the famous Monte di Cineri in the Lucrine Lake was, or as those little Islands, or rather Moles, in the bay of Sant-Erini in the Archipelago were raised by subterranean fires and combustible Explosions in the year 1707 [see No. 314 of Philos. Trans.]. As neither of these Eminences have any thing similar to the horizontal Strata or internal Constitution of Mountains, so they cannot come under the denomination of such, nor ought they to be called Mountains or Islands, as some writers have named them.
all probability the most violent that ever happened in the world, and such as must have made strange havock, the monument of this Catastrophe being so singular in its height—a Thought suddenly struck me, that in some very remote age, a great alteration might have been made in this part of the globe, and a vast tract of land swallowed up in the Ocean, of which the Canaries, Azores, and perhaps the great banks of Newfoundland also, are so many remaining fragments, standing like pieces of a wreck above the waves, and still exhibiting to us some foot-steps, as it were, of the ancient path that once led from Africa to the West-Indies. I was so possessed with this notion, that I could not help proposing it to some learned friends, long before I had heard of Plato's tradition, as a probable conjecture, whereby the peopling of America might be accounted for; and endeavoured to recommend it to their consideration, by placing a terrestrial Globe before them.

You may imagine then, with what satisfaction I found this opinion confirmed even beyond my hopes, when the passage you have extracted from Plato's Timeaus first occurred to me. This passage is referred to by Pliny the natural historian, and it is hardly to be imagined, that such a curiosity in its kind should escape the notice of so indefatigable a Compiler; though it was of much less value to him then, than to us now. America was then unknown; and there was no prospect,
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prospect, that the tradition, which Solon pickt up in Egypt, would ever be confirmed as an article of true history by the discovery of a new world. Therefore Pliny speaks of it with some doubt, inferring the words—si Platonis credimus: and some of the ancient Commentators on the works of Plato did, for the same reason, convert the whole into an Allegory. And some excuse may be made for the Critics who did it in those days, but none at all for those who would do it now; as it must appear to any person that will consult the judgment of Serranus in this matter, who, in his preface to the Timæus, is very severe upon these unreasonable allegorizers, and refutes them copiously from the words of Plato himself. It was very ill-judged in Acosta, therefore, to mention this story from Plato, and put it off with the obsolete pretence of its being an allegorical discourse*. He hath indeed urged some reasons in defence of what he says, but they are too trivial to deserve any particular consideration. We are obliged then to understand it as an historical tradition. Those who are inclined to flight it, and think the Earthquake Plato has described is incredible, because some fabulous circumstances are blended with the account, should endeavour to shew us, what could possibly give rise to such a Report in the eastern world: for that Plato should so expressly describe an opposite continent (τὴν ἐκταντικὴν περιφερείαν) such as is actually now discovered, together with the way that led to it from the Streights of Gibraltar, and that this strange report

* Acosta's Nat. and Moral Hist. of the Indies, p. 72.
report should be grounded on no antient knowledge of the American continent, and prove to be true afterwards only by accident—all this would be more incredible than the matter reported, which, if the natural monuments of this great Earthquake, still subsisting, are taken into the account, has all the appearance of truth that can be desired.

The celebrated Abbé le Plusche, Author of the Spectacle de la Nature, tells us, it has been affirmed by many learned men, that there was formerly a communication between Africa and America: but he unfortunately supposes this opinion to have been wholly derived from a mistake in Ptolomy’s antient Chart of the then-known world, which stretches out the continent of Africa too far to the West; and observes withal, that the pretension is defeated by what Herodotus relates of the voyage that was frequently made from the Red Sea, round the Cape of Good Hope, to the Pillars of Hercules; which could not have been, had the continent of Africa been extended to the West-Indies. This Objection will not in the least affect any thing you have said upon the Subject: for Herodotus is speaking of what was done long after the Division of the continents had taken place; and even before that division, according to the Geography of Plato, there was a gulf, which afforded a passage round the western coast of Africa to the mouth of the Mediterranean Sea.

No reasonable Objection, therefore, can be made to your Solution of this difficulty. Every candid
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candid Inquirer into Antiquity and Physical Knowledge will hold himself obliged to you for the curious Observations you have thrown in by the way; and the piety of your design must recommend it to every sincere friend of Divine Revelation.

Before I conclude, it may not be impertinent to add, that although the more Southerly parts of the continent of America were originally peopled, in your way, from the countries that lie near the Mediterranean; it is by no means improbable, that the Northern parts may have received inhabitants from some other quarters of the Globe.

In a Natural History of Greenland, written so lately as the year 1741, by Hans Egidius, a Danish Missionary, we are informed, that it is yet undetermined whether Greenland does not join to America, on the North-west side, round Davis's Streights. The Historian himself inclines to the affirmative. He adds moreover, that the Norwegians, who discovered it in 982, were not the first inhabitants; for that they found wild people on the West-side of the country, whom he takes to have been Americans. Now the Country of Greenland, to the South-east, is not so far, either from Iceland, Lapland, or Norway, but that various accidents in former ages may have occasioned some communication between them. And thus much for the North-westely parts of America. If we go to the North-easterly parts, it is still more probable, that some colonies may have been transplanted thither from Tartary. Father AVRIL, a Jesuit-Missionary of France, who with some others
undertook the discovery of a new way by land into China, met with a famous Naturalist among the Muscovites, who gave him the following account:—"That in the extreme parts of Tartary, to the North-east, there is a great River, called Kawicina, at the mouth of which is a spacious Island well peopled. The Inhabitants go frequently, with their wives and families, upon the frozen Sea, to hunt the Beemowth, an amphibious animal, whose teeth are in great request. It happens many times that, being surprized by a sudden Thaw, they are cut off from all communication with the land, and carried away, nobody knows whither, on huge floating Islands of Ice. For my part (added this philosopher) I am persuaded, several of these Hunters have been carried to the most Northern parts of America, which are not far off: and what confirms me in this, the Americans of those parts have the same countenance and complexion with those unfortunate Islanders, whom a violent thirst after gain exposes in that manner to be transported into a foreign region." ¹ The Historian adds from his own Observation, that there are also, in that part of America, several of those creatures which are so common in Muscovy, and especially Beavers, which might have been conveyed by the same means. But to determine a matter of such importance, it should be inquired, whether there is any affinity between their languages; for if that should appear, there would remain no farther doubt.

² Afris's Travels, p. 176.
Part II. *On the Peopling of America.*

As to the Author you have undertaken to confute, he, it seems, would have *America* to have been exempt from that Deluge, by which the rest of the world was overflowed. This, as you justly observe, is confuted by a tradition among the *Americans* themselves concerning the Flood: and it is certainly put out of all dispute by the natural Evidence afforded by the country itself, in which the spoils of the Sea are found as plentifully as in other parts of the world. If I remember right, I once communicated to you some specimens of Fossil bodies that came from thence. Since that time, you must undoubtedly have enriched your Collection with a great many more from the *West-Indies.*

*I am, Sir,*

(Heartily wishing you all success in your laudable Undertaking.)

*Your very sincere Friend,*

WADENHO,  
*And obedient humble Servant,*

_June 20, 1761._

W. J.
AN EXTRACT FROM

L'Histoire de la Découverte et de la Conquête du Perou

Traduite de L'Espagnol D'Augustin de Zarate,

Par S. D. C.

A Amsterdam; Ann. 1700.

' MANY doubts and objections have been formed concerning the first people who some ages since dwelt in Peru, and it has been often asked, How could they get thither, seeing this country is (as it really is) parted by such an extent of ocean from that where the first inhabitants of this world lived? It seems to me that this difficulty may be solv'd by an account given by Plato in his Timæus or Dialogue on Nature, and which he sets down more fully in the following (the Atlantic) Dialogue.' There he relates, that "the Egyptians said in honour of the Athenians, that, after the defeat of some certain kings who came by sea with a numerous army, they had part of a vast island called Atlantique, just beyond the pillars of Hercules. That this island was larger than all Asia and Africa together, and that it was divided into ten kingdoms by Neptune, one of which he allotted to each of his ten sons, bestowing the largest and best on his eldest son Atlas." To this he adds divers particulars concerning the customs and the wealth of this isle, but above all about a sumptuous temple
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temple in the metropolis, the walls of which were entirely decked and covered with gold and silver, and the roof covered with copper, with many other particulars too long to enumerate here, and which may be seen in the original. It is certain that many of the customs and ceremonies, mentioned by this author, are yet to be seen in the provinces of Peru. From this isle one may pass to other large islands beyond, and which are not far from the firm land, near which is the true sea.

'But hear the words of Plato in the beginning of his Timaeus, where Socrates thus harangues the Athenians; 'It is looked on as a fact, that in times past your city resisted a great number of enemies who came from the Atlantic Sea, and had taken and possessed almost all Europe and Asia; for then this strait was navigable, and near it was an isle just beyond the pillars of Hercules, which they said was larger than Asia and Africa put together. From this isle was an easy passage to others that were near it, and opposite the Continent, or the main land bordering on the true sea; for one may justly call that sea the true sea or ocean, and the land I mentioned the Continent or main Land.' 'Just below Plato adds, 'Nine thousand years ago happened a great change, the sea surrounding this isle swelled so high by a prodigious increase of water, that in one day and night it covered the whole island, and swallowed and totally engulfed it; and that the sea in this place has been ever since so filled with mud and lands, that no one can sail over it.
or pass by it to those other islands on the firm land."

'Some deem this relation an allegory, as Mar-

silius Ficinus tells us in his notes on Timeus. 

Nevertheless most commentators on Plato, even 

Platinius and Ficinus himself look on this account 

not as a fiction but an historical Truth. Besides; 

one can by no means think that the nine thou-

sand years which he mentions is a proof of its 

being a fable, because, according to Eudoxus, one 

must count them after the Egyptian manner, not 

as solar but as lunar years, that is to say, nine 

thousand months, answering to seven hundred 

and fifty years. On this subject one may observe, 

that all historians and cosmographers, antient and 

modern, call that Sea, in which this island was 

engulphed, the Atlantic Ocean, retaining 

even the very Name the island bore; which seems 

a sufficient proof that there had been such an 

island.

'Admitting then the truth of this history, 

no one can deny this island (beginning near the 

strait of Gibraltar) to have been of that extent, 

from the north southward and from the east 

westward, as to be more than as large as Asia 

and Africa. By the other neighbouring islands 

are doubtless meant Hispaniola; Cuba, Jamaica, 

St. Johns, and those on the Coast. By the Con-

tinent or Firm-land, (opposite to those ifles) men-

tioned by Plato, is certainly meant That land 

which is even to this day called Terra Firma, 

with the other provinces, which from Magellam 

northward comprise Peru, Popayan, Cas-del-oro, 

Paraguay,
Part II. On the Peopling of America.

Paraguay, Nicaragua, Guatimatz, New-Spain, Seven-towns, Florida, the Bacallaos, and north up to Norway. Without doubt this vast tract of land is larger than the three quarters of the then known world. And one must not be surprized at this new world's not having been discovered by the Romans, or any of those other nations that at different times abode in Spain; because one may reasonably imagine that the fore-mentioned supposed difficulty of navigating this sea then remained. This indeed I have heard said, and can see no difficulty in believing that this should easily prevent the discovery of this new world mentioned by Plato. The authority of this philosopher is enough to convince me of the truth of this affair, and I make no question but our new-found world is the same as that main Land or Continent of which he speaks; as whatever he has said of it perfectly corresponds with our modern Discoveries; particularly in what he says of this land, that it is adjacent to the true sea, which is what we now call the Great South Sea; in comparison of the vast extent of which, the Mediterranean Sea and Northern Ocean are but as rivers. Having cleared up this difficulty thus far, it seems no way hard to suppose, that men could easily pass from the Atlantic and its neighbouring Isles to what we call the Continent or Terra Firma, and thence by land, or even by the South Sea, to Peru.

Thus I have declared what seems to me most probable on a subject so perplexed, on account of its antiquity, and also because one can get
get no intelligence from the inhabitants of Peru; who know not the use of letters or writing to preserve the memory of things past. In New Spain indeed they have certain pictures which serve them for letters and books; but in Peru they have nothing but knotted string of various colours: it is true, by means of these knots, and the distance they are set at from each other, they comprehend (though but confusedly) any thing, as I shall shew at large in this history of Peru. In regard to the discovery of these vast tracts of land, what Seneca says, as it were in a prophetic sense, in his Medea, seems to me to be not unapplicable,

"Venient annis Sæcula seris,
Quibus Oceanus vincula verum
Laxet, novoque Tiphsys detegat orbes,
Atque ingens pateat tellus,
Nec sit terris ultima Thule."

"In latest times our hardy sons shall brave
Stern Ocean's rage, and stem the distant wave,
In them reviv'd shall Tiphsys wond'ring see
The new-found world, emerging from the sea;
No more shall Thule be the utmost bound,
But earth from pole to pole be search'd round."
NATURAL PROOFS
OF THE
SCRIPTURE-ACCOUNT
OF THE
DE LUGE,
Deduced from a great Variety of Circumstances,
on and in the Terraqueous Globe.

PART III.

I am now come to lay before the reader what
natural proofs may be deduced from the
present situation of things in the earth,
in favour of the Mosaic description of the De-
luge.

And here, I shall select four Particulars, which
if I can evince, the truth of the whole will,
I believe, be readily admitted, viz. if I can
prove—

M 3

I. That
I. That there is a quantity of water in the earth abundantly sufficient for flooding it to the height represented in Scripture;

II. That this water did actually thus overflow it;

III. That, during this Flood, the solid structure or compages of the earth was dissolved, all the mineral and metallic matter reduced to its original corpuscles, and assumed up into the water; so that the whole constituted one fluid mass or collevies;

IV. That all this matter, together with the animal and vegetable bodies inclosed within it, subsided again, and formed the present solid strata of the earth.

If, I say, I can prove these four points, the truth of the Mosaic description of the Flood cannot, I think, well be disputed.

And I. to shew, That there is a sufficient quantity of water in the earth for covering all the high mountains under the whole heaven, or rather the whole surface of the Earth above the height of the highest mountains.

This has been thought the main and principal hinge on which the whole affair of the Deluge turns, the Causa sine quâ non of solving that grand catastrophe; for unless we can procure sufficient materials for the work, it would be idle to attempt the solution of the effect. And all nature, both from above and from below, has been ransacked by several writers on this subject to find out
out a place where there lies a quantity of water sufficient for flooding the earth; which, considering the light that writers in general have looked upon the deluge in, namely as a flood of waters barely overflowing the terrestrial parts of the globe, is a matter of some surprize that they should be at a loss to find a suitable quantity: for let any one but cast his eye over a map or globe of the earth, and he will at once perceive that the Ocean and Seas greatly exceed the terrestrial parts, and if he will take a nearer and more accurate survey, and add to the account the spaces occupied by all the rivers and lakes upon the earth, he will find, that the dry land comprehends not more than, if so much as, one third part of the earth's surface. And as it is well known, that the sea is unfathomable in many places, and that its depth is equal to the height of the mountains; so it is evident, and manifest to

See Varenius's Geography, by Shaw, Vol. I. p. 123, 195—8. As I shall have occasion to quote this Treatise hereafter, it may not be amiss to acquaint the reader with its authority and character. Sir Isaac Newton thought it so judicious and useful a work, that he reprinted an accurate Latin edition of it at Cambridge, for the use of the Students in that University. This edition meeting with a quick sale, and consequently soon becoming scarce, Dr. Bentley importuned Dr. jurin to print another edition, and to affix an appendix of later Discoveries. Mr. Dugdale published an English Translation from Jurin's edition, with several additional notes; which has since been revised, corrected, and re-published by Dr. Shaw. And I scarce know a more useful Book for a Student in Philosophy to begin with.

See also Histoire Physique de la Mer par Comte de Marxilli, p. 11. This also is a valuable Treatise, and the Author of it is well known for his indefatigable industry, judgment, and accuracy in making experiments and observations upon the tops of the highest mountains, the deepest caves, and even the bottom of the Sea, that I need only to mention his name to gain credit to his book.
to sense, that there is a quantity of water in the earth capable of covering all the high mountains under the whole heaven. But as this act of barely covering the mountains will not answer the description of the Flood as given in Scripture, nor suit with the effects of that Flood as they are now discernible upon and in the earth (of which hereafter) so we must find out a quantity even greater than this. But what I have said may serve to pave the way, and lessen the wonder the reader may conceive concerning the quantity of water requisite for such a grand transaction.

The Prelude to which mighty event was, according to Moses, The breaking up of the fountains of the Great Deep. What this Great Deep or Abyss is, has been shewn already, namely, that it is an immensely large Reservoir of water lying beneath the circular shell of the earth, communicating with all lesser Deeps or Seas, and affording supplies for the numerous rivers upon the earth. Such is the Scriptural account of this Abyss, see p. 43, &c.

Let us now see what reason there is to believe, from a view of the structure and parts of this globe, that there is such a subterraneous magazine of water.

1. The first argument which I shall bring in proof of this Abyss is (to speak in the words of Scripture wherever we can) That all the rivers run into the Sea, and yet the Sea is not full, or does not reach the height of or run over its shores. This is a fact as surprising as it is apparent; but, like other common truths, the obviousness of it lessens
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lessens the wonder, and takes off the weighty considerations deducible therefrom. But the Event in itself is truly wonderful, and deserves our particular notice on the present occasion.

To enumerate and describe all the rivers upon the earth would be endless and, impossible. I shall therefore mention some of the largest; in order that we may form a judgment of the quantity of water poured into the Sea by all of them.

The Danube, after it has run a course of above two thousand miles, and received by the way sixty rivers, (thirty of which are so large as to be navigable) throws itself, by five or six great streams, with such rapidity, into the Euxine Sea, that its water continues fresh and unmixed with the salt for twenty leagues. Its depth, in most places, is two hundred feet. [Collier's Historical, Geographical, &c. Dictionary.]

The Volga, after it has taken an irregular tour of two thousand nine hundred miles, and increased its stream by the addition of two hundred rivers and brooks, discharges itself by twenty-five mouths into the Caspian Sea, and makes that Sea less brackish for many leagues. [Atlas Geographus, Vol. I. p. 164. Varenius, p. 291.]

The Oby, a river in Siberia, in some places half a league, and in others a whole league broad, runs for about two thousand four hundred miles (without reckoning its windings) and then empties itself by six mouths into the Icy Sea. [Atlas Geog. p. 165. Varenius's Geography, Vol. I. p. 349.]

To which we may add the Jenisa, about ten weeks
weeks journey distant from the former river; and equal, if not superior to it, both in length and breadth.

The Croceus, or yellow river of China, after having flowed through several Provinces for more than two thousand miles, falls at length into the East-Sea. [Le Comte’s Observations made in a journey through the Empire of China, p. 108.]

Not far from this is the Kiam, remarkable for its depth, being unfathomable in several places, so that the Chinese have a proverb among them which says, The Sea hath no bounds, and the Kiam hath no bottom. This impetuous river (which is so very rapid when the torrents from the mountains increase its stream, that it frequently bears away the islands that lie in its channel, and buries them under its waves) after having ran a course of twelve hundred miles, disburthens itself into the East-Sea of China.

The Ganges, famous for its length, breadth, and depth, being near fifteen hundred miles long; and in its narrowest places eight miles broad, in the most open parts twenty; and seldom so shallow but that its depth measures an hundred feet. [Salmon’s modern Gazetteer; Heylyn’s Cosmography, p. 879.]

The Euphrates, after having ran a course of about a thousand miles, joins that remarkably rapid river the Tigris (after the Tigris had pasted a course of about five hundred miles) and both of them, about sixty miles beyond their union, exonerate themselves into the Persian Gulph.

The Nile takes its rise in 12 deg. of N. Lat., and
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and having flowed fifteen hundred miles, nearly from South to North, divides into two branches, and then falls into the Mediterranean Sea. [Sal- mon's present state of all nations, Vol. V. p. 10.]

The Niger, the longest river in Africa, after a course of two thousand four hundred miles, empties itself by six great streams into the Atlantic Ocean. [Varenius, p. 349. Collier's Dict.]

The Zaire, another river in Africa, which, though it does not equal any of the above in the length of its course, yet exceeds them all in its breadth, being at its mouth twenty-eight miles broad, and rushes into the Ethiopic Sea with so great a force, as to preserve its waters pure and fresh for ten miles commonly, for fifteen at other times. [Heylyn's Cosmog. p. 989, 995.]

But if we pass into America, we shall find rivers exceeding any yet mentioned. The river of St. Lawrence, after having run through and been fed by several great Lakes, and taken a course of one thousand five hundred miles (and its source yet unknown) discharges itself into the gulf of St. Lawrence; being at its mouth between seventy and eighty miles broad, and two hundred fathoms deep. [Collier's Dict.]

The Paria or Oronoque is navigable for a thousand miles by ships of burden, and two thousand by boats and pinnaces; and, having received into its channel an hundred rivers, openeth into the sea with sixteen mouths, which part the earth into so many islands. [Heylyn's Cosmography, p. 1056.]

Rio de la Plata, in length from its first fountain two thousand miles, in breadth at its fall into the
the Sea sixty miles, and of so violent a stream, that the Sea, for many leagues together, altereth not the taste of it. [Ibid.]

The River of the Amazons, esteemed the greatest in the world; Orellana is reported to have sailed in it five thousand miles, including the several turnings and windings he took; in many places it is so deep as to be unfathomable; and, at the time of its highest risings, the Current is an hundred and eighty miles broad, and rushes into the Sea with such impetuosity as to preserve its natural taste and colour for more than thirty miles. [Ibid. Cooke's Voyage to the South Sea, &c. p. 254.]

Now to the above let any one make an addition of all the remaining rivers upon the earth, and then conceive within himself what an immense profusion of water must be poured into the Ocean, I need not say, yearly, monthly, but daily, or even hourly.—It was the opinion of that accurate Geographer Varenius, [and to which, I believe, every one upon mature consideration will consent, as Bp. Stillingfleet, Dr. Plot, Stackhouse, and others have done] that each of the larger sort of rivers (and such, every one of those that I have mentioned above, may well be esteemed, and many others that are not mentioned) empties into the Sea, in one year's time, a quantity of water sufficient to cover the whole surface of the earth. And if several rivers, singly considered, throw in such a quantity, and some of them a

\[ a \text{ Gen. Geography, p. 299.} \]
far greater, what must all of them added together effund?

In order to see what a quantity this would amount to, and to what a height, if it was poured upon the earth, it would arise, let us suppose, that the mouths of all the rivers, or the places where they enter into the Sea, were stopped and dammed up so high, that their currents were diverted from rushing into the sea, and turned back upon the dry-land; and how soon would the highest mountains be covered?—For, if one river, in one year's time, produces a quantity sufficient to effect this, (or rather twice as much as would be sufficient, for the dry land occupies but one third part of the earth's surface) and there are many such rivers, and several much larger, and if all the lesser streams were united, they would exceed the larger already mentioned. How soon, I say, in this case, must the highest mountains be covered? Surely, not many days, if hours, would be requisite for such an inundation.

Now when we consider, that such an inconceivably great quantity of water is daily, or at least weekly, discharged into the Sea, and yet the Sea is not full, nor even any visible increase produced thereby, What an immensely large receptacle must there be beneath the Ocean and the Land for containing such an assemblage of water? Well might it be called in Scripture THE GREAT DEEP, as all lesser Deeps or Seas are nothing in comparison to it.

ALLOWANCE indeed must be made in the above
above calculation, for the quantity of water that is raised from the Ocean in vapour by the heat of the sun, &c. which some have been so extravagant as to imagine to be equal to that which is poured into the Ocean by all the rivers upon earth; and therefore they suppose, that what the Sea gets by the rivers it loses by evaporation; and so a mutual and equable interchange is preserved.

But surely this Hypothesis can never stand the examination of common sense or experiments.

For 1st. It is well known, that the vapours and rain fall upon the Sea, as well as upon the land; and the surface of the Ocean is full as large again as that of the dry land; so we may justly suppose that two thirds of what is raised in vapour returns from whence it came, without falling upon the dry land.

2dly. Besides, as, it has been observed "This is a Summer reason, and would pass very ill in winter, especially in our Northern climate, when the heat of the Sun is much less powerful;" and yet our Seas have no such sensible diminution in Summer, or overflow in winter, as might be expected, if their increase and decrease depended so much upon vapours. And,

3dly, I may add too, This is a day reason, and will not hold in the night; when the vapours frequently fall nearly as fast as they rose in the preceding day.

But, 4thly, Since the favourers of this Hypothesis suppose, That the supply of all the rivers upon earth is owing to the vapours that are raised from the Sea, carried from thence by wind, and condensed
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condensed against the sides of mountains, and so trickling down through the crannies of the rocks, enter into the hollow places thereof, form collections of water, &c. from whence they issue out at the first orifice they can find, and by this means constitute Springs and Rivers; since, I say, they hold this hypothesis as a consequence of the former, it should follow, That as the evaporations are greater in Summer time than in Winter, so the Springs and Rivers (which depend upon the quantity of these evaporations) ought to be higher and fuller in Summer than in Winter; the contrary to which is well known to be fact, at least in our Northern regions; unless when the vapours happen to be congealed and frozen into Snow, as soon as they fall; and then they of course (in their frozen and confined state) cannot afford any supply for the augmentation of rivers; and in this case, or in such places where this happens, the rivers generally remain of the same height in Winter as in Summer. Which last consideration will furnish another argument against the opinion of those who ascribe the origin of Springs and Rivers to the condensation of vapours against the sides of mountains, &c. for it is observed by Mr. Ray, (who himself travelled over the Alps) "That the tops of the Alps above the fountains of four of the greatest rivers in Europe, the Rhine, the Rhône, the Danube, and the Po, are for about six months in the year constantly covered with Snow to a great thickness; so that there are no vapours, all that while that can touch those mountains, and be by them condensed into water: there falls nothing
nothing there but Snow; and that, continuing all that while on the ground without dissolusion, hinders all access of vapours to the earth, if any rote, or were by winds carried so high in that form, as I am confident there are not. And yet for all that do not those Springs fail, but continue to run all winter, and it is likely too, without diminution."

But, Lastly, this Hypothesis—that the origin of Springs and Rivers is owing to vapours condensed into water and rain, and that the quantity of water which is evaporated from the Ocean is equal to that which is poured into it by all the rivers upon the earth—has been so fully examined and confuted by Dr. Gualtieri in an answer to Dr. Valisnieri (who maintained the above hypothesis) and this too, by making the most reasonable, or rather over-reasonable allowances to the favourers of this hypothesis, that I shall only transcribe part of what Dr. Gualtieri has said on this head, as it is abridged in the Memoirs of Literature for Aug. 1725. "After this, Dr. Gualtieri undertakes to prove the impossibility of ascribing the origin of Springs and Rivers to rain-water, &c.—To demonstrate this impossibility, it ought to be proved, that the quantity of rain-water is far from being sufficient to keep up the continual course of springs and rivers. And to set that proposition in its full light, one must determine by a calculation the quantity of rain-water, and the quantity of the water of those rivers that fall into the sea; and if one exceeds the other considerably, the question will be decided."

"It
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It results (says the Author) from the observations made by the Paris Academy, for the space of nineteen years, that the mean quantity of rain, that falls at Paris, is about eighteen or nineteen inches high every year. To find how much it rains in Italy during one year, the Author requires, that the whole surface of that country be reduced to an oblong rectangular parallelogram; the length whereof be of six hundred miles of Bologna, and the breadth of one hundred and twenty. In the next place, he supposes that all the water falling upon that extent of ground, in the space of one year, is kept in, without being able to run out; that water, in this supposition, will rise, according to the observations of the Academy, to the height of one foot and a half; and if the whole be calculated, it will appear to amount to the sum of two trillions, seven hundred billions of cubic feet of water, that fall in one year upon the surface of all Italy. Now, in order to know the quantity of water carried into the sea by all the rivers of that country in one year,

* It may be proper to make a few remarks here, 1st. That it has been now determined by a course of observations that have been successfully continued by the Professors of the Academy for no less than fifty-five years, that at a medium, or one year with another, there falls no more than sixteen inches and eight lines of rain; see Templeman’s Extracts from the Memoirs of the Academy at Paris, Vol. II. p. 327; just printed. 2dly. That under the term Rain is also included all the water that falls in snow, dew, vapours, &c. 3dly. That this quantity is measured almost as soon as it falls, and the sum total determined from these several lesser measurements; and no allowance made for what would otherwise have been carried off by winds, by exhalations, consumed in vegetation, imbibed by the earth, &c. which, if taken into the account, would greatly lessen the above estimate.
year, we must suppose a canal of a depth and breadth proportionable to the dimensions of those rivers, whereof those that fall into the sea are two hundred in number, without reckoning the other rivers, brooks, fountains, subterraneous canals, &c. Dr. Gualtieri, before he determines the length and breadth of such a canal, observes that the Po is near a mile broad at its entrance into the sea. If we add to the waters of the Po those of eighteen other great rivers, can we allow to a canal that should contain them all less than one mile or five thousand feet in breadth, and twenty feet in depth? If we add still the water of the small rivers, and of all the fountains and springs that fall into the sea, can any one believe that those waters collected can be contained in such a canal? [Doubtless not.]

"However, the Author is willing to reduce the breadth of that canal to that of one thousand two hundred and sixty feet, which is only the fourth part of five thousand, and its depth to that of fifteen feet." [This certainly is an over-reasonable allowance given to his adversary.] "After this reduction, the author, following the calculation of Dr. Guglielmini, finds that the quantity of water continually carried into the sea by a canal of that dimension, during three hundred and sixty-six days, would be equal to the sum of five trillions, five hundred twenty-two billions, three hundred ninety-one millions of cubic feet of water. But all the rain-water, that falls in Italy during one year, amounts only to the quantity of two trillions, seven hundred billions of cubic feet of water. Therefore
Therefore all the rivers in Italy carry into the sea two trillions, eight hundred twenty-two billions, three hundred ninety-one millions of cube feet of water above that which the rain affords in one year. From whence comes that overplus, if it be not from the sea itself [or rather from the Abyss that lieth within the earth]?

"The Author confirms this proof by another sort of supputation, viz. by that of the quantity of water which evaporates daily. 'Tis well known, (says he) by several experiments, that from a surface of water ten inches square a cube inch of water evaporates in twenty-four hours. A square mile of water contains twenty-five millions of square feet of water, which make three billions, six hundred millions of square inches: from whence it follows, that from a surface of a square mile three hundred sixty millions of cube inches of water evaporate in twenty-fours, which make two hundred and eight thousand, three hundred thirty-three cube feet. Allowing the Mediterranean Sea to be three thousand miles long and four hundred and twenty miles broad, its whole surface will be of one million, two hundred and sixty thousand square miles, which number being multiplied by that of two hundred and eight thousand, three hundred thirty-three cube feet, we shall have the number of two hundred and sixty-two billions, four hundred and ninety-nine millions, five hundred and eighty thousand cube feet of water, which in twenty-four hours evaporate from the whole surface of the Mediterranean sea; and multiplying again that number by that of three hundred and sixty-five days, there will be ninety-five trillions.
lions, eight hundred and twelve billions, three hundred and forty-six millions, seven hundred thousand cube feet of water, which evaporate from the same surface in the space of one year. Afterwards if we reduce all the rivers that fall into the Mediterranean to a canal six Italian miles broad, and fifteen feet deep (which is a very low supposition) such a canal will carry into that sea a hundred thirty-two trillions, five hundred thirty-seven billions, three hundred eighty-four millions of cube feet of water—a quantity very much exceeding that which evaporates from that sea in one year.

That Dr. Valisnieri may have no ground to complain, the Author is willing to grant him, against the testimony of all observations, that thirty inches of water fall in Italy every year. But he tells him at the same time, that all this water is not employed in keeping up the course of fountains and rivers. One must deduct out of it, 1. All the quantity necessary to moisten the ground to the depth of some fathoms, without which an excessive drought would reduce it to dust; and this quantity must needs be very considerable. 2. One must deduct that quantity which serves for the nourishment and growth of trees, and all the other plants of Italy, during the whole year; and in order to conceive how far this can go, it is sufficient to consider that, according to the experiments of Mr. de la Hire, one single fig-tree, furnished with an hundred and thirty leaves, absorbs two pounds and a half of water, in the space of five hours, and consequently three thousand one hundred
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hundred and ninety four pounds in one year. 3. One must deduct out of rain-water that which continually evaporates, the quantity whereof has been determined above. Now, how likely is it that thirty inches of water yearly may be sufficient for all those uses, and that there should remain enough still to keep up the course of fountains and rivers?

"Again; Dr. Gualtieri makes another impossible supposition in favour of his adversary, viz. that out of those thirty inches of water fifteen only are employed for the continual evaporation, and to supply the wants of the ground and plants; and that the other fifteen inches serve for the course of fountains and rivers. But notwithstanding all the endeavours of Dr. Gualtieri in favour of his antagonist, what shift can the latter make with fifteen inches of water, whilst the eighteen inches found by the Academy are, as has been shewn above, much beneath the quantity requisite to keep up that perpetual commerce between fresh and sea-water?"

II. Secondly, As the quantity of water that is poured into the Ocean from the mouths of all the rivers upon the earth proves the certainty of an Abyss beneath the Ocean and the Land, so the quantity that is thrown out at the heads of sources of all the rivers equally proves the same, and especially that this Abyss lyeth beneath the Earth as well as the sea.

In the above description of several of the larger rivers, I have mentioned the length of their courses as well as breadth of their mouths, in order that...
the reader may judge from thence what an immense quantity of water is requisite for preserving their channels full, and keeping their currents strong; and also that he may observe, that their Sources, or the Springs that supply them with water, lye high up in the inland countries, so that several of them are some hundred, nay thousands of miles distant from the Sea they at last fall into; and some of their Springs rise in the very middle or center of the largest Continents. So that since they are situated at such a vast distance from any sea, and take their rise generally in the highest mountains, the reservoir that supplies them with water must certainly be beneath those mountains.

And since, besides these larger rivers, there are a multitude of other rivers, rivulets, and springs, that indiscriminately arise in and pass through the different parts of any one of the larger Continents into which the world is usually divided; so that if a person would but take a view of the map of either of the Continents, and observe the heads of the several rivers that spring up in it, that Continent, and so the whole Earth, would appear as if it were bored through in innumerable places, through which a continual efflux of water proceeded; and from hence he will readily conclude, that the Earth is, as the Psalmist says, stretched out or expanded upon water, or established upon the Abyss that lieth beneath; see p. 43, &c.

To say, that the Origin of these springs and rivers is owing to rain and vapours condensed against the sides of mountains, is, as we have already seen,
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seen, false in fact as well as anti-scriptural. But as it is the present prevailing opinion, it may be expected that I should examine the chief of the arguments usually brought in favour of it; which I shall do, and endeavour to confute them; and then introduce an experiment or two, which ought for ever to silence this opinion, and which indeed might make those ashamed of it that have embraced it.

The *first and chief argument—that the quantity of water which falls in rain and vapours throughout the year is sufficient for the supply of all the rivers upon the earth*—has been already shewn to be an egregious mistake; there being no reason to think it sufficient for the supply of one of the larger rivers, much less for all, during that space of time.

Secondly, It has been said, *That since rivers increase and overflow their banks after any great rains, especially such as are periodical, and after the flowing or melting of the snow upon the mountains, it certainly follows, that their supplies are owing to rain, vapours, or snow.*—But this is so far from proving that the constant and regular flux of rivers and of perennial springs (which is the point in question) is derived from hence, that it rather proves the contrary; and only shews that the sudden increase or accidental inundations of such rivers and springs may be owing to these causes; but does not at all account for the water that continually issues forth from the springs or heads of rivers, and which affords them a constant and
equable supply, when no such rains fall, and no snow is melted.

The observations of the ingenious Dr. Derbam, in his Physico-Theology (Book II. chap. v.) on this head, are well worth reciting; "That springs have their origin from the sea [or subterranean waters, in the sense Dr. Plot understands it, in his Tentamen Philos. de origine Fontium, §. 51. as Dr. Derbam refers to that book for a farther discussion of the subject] and not from rain and vapours, among many other strong reasons, I conclude from the perennity of divers springs, which always afford the same quantity of water. Of this sort there are many to be found everywhere, [as may be seen in the above mentioned Treatise of Dr. Plot.] But I shall, for an instance, single out one in the parish of Upminster, where I live, as being very proper for my purpose, and one that I have had better opportunities of making remarks upon above twenty years. This in the greatest droughts is little, if at all diminished, that I could perceive by my eye, although the ponds all over the country, and an adjoining brook, have been dry for many months together; as particularly in the dry Summer months of the year 1705. And in the wettest seasons, such as the Summer and other months were preceding the violent storm in November, 1705. (vid. Philos. Trans. N° 289.) I say, in such wet seasons I have not observed any increment of its stream, excepting only for violent rains falling therein, or running down from the higher lands into it, which discolors the waters oftentimes, and makes an increase of only a day's,
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day's, or sometimes but a few hours continuance. But now, if this spring had its origin from rain and vapours, there would be an increase and decrease of the one, as there should happen to be of the other: as actually it is in such temporary springs, as have undoubtedly their source from rain and vapours.

"But besides this, another considerable thing in this Upminster spring (and thousands of others) is, that it breaks out of so inconsiderable an hillock or eminence of ground, that can have no more influence in the condensation of the vapours or stopping the clouds (which the Maintainers of this hypothesis suppose) than the lower lands about it have. By some critical observations I made with a very nice portable barometer, my house stands between eighty and ninety feet higher than the low-water mark in the river of Thames, nearest me, and that part of the river being scarce thirty miles from the sea, I guess (and am more confirmed from some later experiments) that we cannot be much above an hundred feet above the sea. The spring, I judge, is nearly level with or but little higher than where my house stands; and the lands from whence it immediately issued, I guess, about fifteen or twenty feet higher than the spring, and the lands above that of no very remarkable

* Of this kind was the Spring or Water that supplied the Brook Cherith, mentioned 1 Kings xvii. 7, which at the beginning of a great drought (consequent of a prophecy of Elijah, that there should be neither dew nor rain for some years) was dried up; And it came to pass after a while, that the Brook dried up, because there had been no rain in the land. But all this time there were other Springs and Fountains, as appears from what is said, 1 Kings xviii. 5.
markable height. And indeed, by actual measure, one of the highest hills I have met with in Essex is but three hundred and sixty-three feet high, (vid. Phil. Trans. No 313. p. 16.) and I guess, by some very late experiments I made, neither that, nor any other land in Essex, to be above four hundred feet above the sea. Now what is so inconsiderable a rise of land to a perennial condensation of vapours, fit to maintain even so inconsiderable a fountain as what I have mentioned is, or indeed the high-lands of the whole large county of Essex to the maintaining all its fountains and rivulets?"

Again; it has been said, That the rain that falls, and the snow that is melted, upon the mountains, sink through the earth, and are reserved there in large cavities or basins, from whence they are gradually dispensed for the supply of springs and rivers. —But the above argument destroys this, for we find that rivers swell and increase immediately after and in proportion to the rain that falls or the snow that is melted; and therefore, the water that proceeds from either is not detained within the mountains. And it is evident to sense that, after any sudden shower, or even a rain of long continuance, or the gradual melting of snow, the water which proceeds from either flows down from the mountains along upon the surface, almost as soon as it falls, and does not enter into the bowels of the earth [unless where there happen to be natural hollows, or pits dug for mining, &c. which lie open to the surface; and then some part of the rain that falls will of course pass thro' these;
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dese; but as this tinges the water of the spring with the colour of the soil it has passed through, so its continuance is easily distinguishable, and it seldom lasts above a few hours after the rain] but in general, I say, it is evident to sense, that the water which falls in rain, or from snow, flows down from the sides of the mountains in streams or torrents towards the lower grounds, and either unites with rivers and with them falls into the sea, or else settles at the bottom of hills (but not upon the tops or sides, from whence springs generally rise, and so can afford no supply for them); and even from thence is in a few days conveyed away, part of it being evaporated by the heat of the sun, part carried off by the winds, part spent in the nourishment of vegetables, and part imbibed by the earth.

But it has been farther asserted, That, since in the hotter seasons of the year and in great droughts, when no rain has fallen for some time, the springs and rivers sensibly fail or are diminished; therefore, as their deficiencies are owing to want of rain, their supplies must be owing to rain.—But this by no means follows, for the part that rain bears in the supply of rivers is only (as we have seen already) an accidental increase or swelling of their waters, but has no share in affording a regular and sufficient quantity of water for their, otherwise, equable and constant courses. And the reason why springs and rivers fail, or are lessened, in great droughts, and the hotter seasons of the year, is evident; for during such times the heat of the weather and the action of the Sun-beams upon the
the water at the Spring-head (where the quantity is generally small) and in the channels of rivers, will cause the water to be exhaled and evaporated in proportion to such heats and droughts, and therefore springs and rivers will proportionably fail. Besides; in such hot and dry weather, the usual moisture of the ground is exhaled, and the surface of the earth parched and cracked into chasms and openings, so that the moist vapours that arise from beneath or from within the earth, (of which more particularly hereafter) and which in a great measure afford supplies for springs and even for rain, are, when they come to the surface of the earth, attenuated, divided, and dispersed here and there (as our breath, or the fume emitted from our lungs, is in the summer-time) by the action of, the sun-beams or heat in the air, instead of being collected and condensed at and under the surface of the earth (as is the case during the colder and more moderate months) and so saturating the vegetable mould, and replenishing springs, &c. And hence it comes to pass (quite contrary to the hypothesis of springs being derived from rain, &c.) that though there falls in England and the adjacent countries a much greater quantity of rain in June and July than in December and January, yet the springs and rivers are much lower and the earth more dry in the two former months than in the two latter; and this certainly happens on account of the greater heat of the sun, and more copious exhalations from the earth

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earth and water; whereas in the two other months, the sun's power is less, and the surface of the earth closed and frozen; so that the inward or subterranean vapours are confined, condensed, and increased beneath the earth's surface; and hence springs and wells receive a surplusage of water, and the inward parts of the earth are quite fated or glutted with moisture, which collecting into drops falls more plentifully from the tops of caves, grottos, &c. during these colder months: and yet this is a time when Rain is not only less in quantity, but less able to send supplies to springs, on account of the close union or compaction of the upper parts of the earth; so that their sources must lie beneath the earth, and their supplies be inward, not outward.

I may here just observe, that as the reservoir for springs is internal, of vast extent, and situated at too great a distance from us to allow us to make immediate observations on, so many phenomena may happen at particular times, and in particular places, that may seem to contradict the general remarks I have above made; but no single instance or partial case ought to set aside a general rule. Thus, for instance, vast quantities of vapours that arise from the Abyss during the emersion of one or more water-spouts at sea, may have such an effect upon the common state of the air adjoining to such a sea, that though for the present, upon the breaking of the water-spout, much and heavy rain may fall, yet such a vent or free passage may be hereby given to the subterranean vapours, that it might be a long time before
before such a quantity of them might arise again from the Abyss, and be amassed together, as to cause a continued rain in such a country. The eruption of a volcano, or the opening of the earth during the time of an earthquake, may afford a similar exit to the vapours, and produce uncommon effects in any particular country. But the most usual cause of this kind is the change of the wind, which affects the sources of springs as much as any thing I know, and frequently produces phenomena very contrary to what one might expect from the season of the year, or the common course of nature. This, though not generally remarked, is noted by the prophet Hosea, ch. xiii. 15. Though he be fruitful among his brethren, an East-wind shall come, the wind of the Lord shall come up from the wilderness, and his spring shall become dry, and his fountain shall be dried up. One or more of the above causes may operate in a particular place, at a particular time, and produce variations from the commonly-observed state of things, and therefore are not to set aside general rules, but to be allowed for, or, when they act, to be included under them.

But I shall now produce an experiment of two of Mr. de la Hire, sufficient to overthrow this whole theory of the origin of springs being owing to rain and vapours. This gentleman was resolved to bring this hypothesis to the test of experiments, and to examine it in its most essential article, viz. by endeavouring to find to what depth rain or snow-water did really descend into the earth.
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earth. In order to know this, "He dug a hole in the lower terras of the Observatory at Paris, and placed therein, eight feet under ground, a large leaden basin, a little inclined towards one of its angles, to which was soldered a leaden pipe twelve feet long, which, after a considerable descent, reached into a cellar adjoining. And after having covered the head of the pipe in the basin with several flints of different sizes, to prevent the orifice from being stopped, he threw in a quantity of earth of a middle nature, between sand and loam, (and so easily permeable by water) to the depth of eight feet; and then judged, that if the rain and snow-water penetrated the earth to the depth that some springs are found at (which in digging wells and mines are discovered to be at all depths, from eight to eight hundred feet) or till they meet with the first clayey or compact stratum to stop them, that then the bottom of the basin would serve to stop and collect the water; and by this means there would soon be a spring bursting forth through the leaden pipe into the cellar. But on the contrary, after having kept the basin in this situation for no less than fifteen years, and the ground all the while exposed open to whatever rain, snow, or vapours that fell, he could not observe that a single drop of water had ever passed through the leaden pipe into the cellar."

"At the same time that he begun the above experiment, he placed another basin about eight inches

b See Memoirs de la Academ. of Martin's Abridgment, Vol. II. p. 52, &c.
inches under ground, and chose a place where the rain and vapours might fall, and yet the ground be screened from the heat of the sun and the action of the wind, and took care to pull up all the grass and herbs which grew over the basin, that all the water, which should fall on the ground, might pass uninterruptedly to the bottom of the basin, wherein was a little hole, with a tube to convey the water into another vessel. The effect was, that in all the space of time from the 12th of June to the 19th of February following (more than eight months) no water came by the tube from the basin; and though it began to run on the 19th of February, this was entirely owing to the great quantity of snow which had fallen, and was then melting. From that time the earth in the basin was always very moist, though the water would only run a few hours after raining, and it ceased running, when the quantity fallen was drained off.

"A year after, he repeated the same experiment, but buried the basin sixteen inches under ground. He took care also that there was no grass on the ground, and that it might be screened from the sun and wind, which would dry it too fast. The effect was much the same as in the former, excepting that when a considerable time passed without raining, the earth would grow a little dry; so that a moderate rain coming on, it would not moisten it sufficiently to make it run.

"Lastly, he planted herbs on the ground over the basin, but found, that when these were grown
grown up a little, the ground was so far from
fending any water after rain, that all that fell was
not sufficient to sustain them, but they would droop
and wither, unless re-sprinkled from time to time
with water."

This, I think, abundantly proves, not only
that the rain-water does not penetrate the earth,
so as to form the smallest collection of water,
above sixteen or eighteen inches, but that the
quantity that falls is not sufficient to furnish the
quota requisite for the growth of vegetables; so
that we must call in, as the above-mentioned
author remarks, "some foreign assistance to sup-
port them;" which also he found to be true from
"several experiments that he made upon the quan-
tity of water evaporated through the leaves of
plants."

And what he says concerning the rain-water
not sinking above sixteen or eighteen inches in a
soil of a middle nature, between sand and loam,
I have observed to be nearly true even in the most
lax and gravelly soil, such as that in the low lands
about Oxford, which consists of small round pebbles
and sand. I have examined it frequently
after the hardest rains, and those of long conti-
nuance, but could never perceive that the rain
had descended (though the ground was upon a
level, in a valley, and of a wide extent) above
twenty inches, or two feet at most; and at about
this depth I observed in several places where the
earth was opened, that the gravel was uncom-
monly hard and compact, the parts of it so inti-
mately united that it formed a kind of stratum,
which in tenacity equalled some kinds of strata of stone: and upon examining the reason of it, I found it to proceed from hence, that the rain-water had drained down as low as this, and here lodged; and as it descended, it had carried with it the smaller granules of sand and other finer matter, which, being reposited among and between the other pebbles, cemented them close together and consolidated the whole; and that this was the cause of their union was manifest from the finer matter being affixed to the sides and under-parts of most of the pebbles, just in the manner as the draining or last sediment of water would naturally leave it. But, I say, after repeated observations, I could never perceive that the rain-water had penetrated through this compact stratum of gravel; and unless the rain had been of long continuance, and the weather very moist and wet before, I could not find that it had penetrated even thus far; but saw plainly that all the rain that fell was not sufficient for the support and nourishment of the herbage and vegetables; which, unless they had been affisted by the foreign supply of the vapours that ascend from the inside of the earth, or which proceed from beneath upwards (not those that fall from the clouds, or from above, downwards) would soon have drooped and withered, as those planted by the above-mentioned gentleman did.

It appearing then thus evident, that the origin of Springs and Rivers is not owing to rain or any vapours that may fall from above, we must seek for an internal supply, for a magazine of water underneath
underneath the earth; and how immensely great this must be, I have given the reader reason to judge from what has been said at the beginning of this argument, p. 173: But it may be proper (in order to obviate all objections, and entirely to clear the subject I am upon) to explain how and by what means the water of this subterranean Abyss is conveyed to the tops of the highest mountains, and there breaks out in Springs, &c.

Now any one that has but just looked into the inside of the earth, and observed the structure of it, cannot but know that the strata or beds of stone, &c. of which it consists, have innumerable cracks or fissures in them, some perpendicular, others oblique, and others horizontal, or rather such as intersect and divide the strata at all angles, and in all directions whatever; and also that these fissures are of various sizes and capacities, from some that are several feet in breadth to a multitude of others that are not more than a line in width, or even invisible (till some force be applied to the stone, &c. and then the stone will break into small shatters or fragments; and discover where these cracks were, as every one knows); and it is also certain, that several of these fissures, or rather these divisions or partings of the regular strata, are filled with a rubbley-kind of matter, consisting of a mixture of small loose stones, clay, sludge and sand; and that others of them are quite open.  

O 2

1 Mr. Hutchinson's description of these fissures (Vol. XII. of his works, p. 309.) is well worth the reader's attention. "The cracks
It is also well known to those that are at all conversant in the subterranean world, that there is a moist vapour, or a kind of steam continually passing, from beneath upwards, through the shell or crust of the earth; and that this vapour pervades, not only the smaller and lesser fissures, but even the interstices and pores of most sorts of stone, &c. and that the deeper you descend, the more sensibly and forcibly this vapour acts or ascends.\(^k\)

Now

cracks in the strata, after their first settlement, would be proportioned to the intenfenefs of the caufe, the tenacity or cohesion of the matter of the strata, the quantity of water with which they were saturated, and the free reception it met with in the cracks. An oak, or other tree, felled, will have cracks in it, more or fewer, wider or fraighter, in proportion to the quantity of Sap in it, and to the intenfenesf of the heat of the Sun. [For which reason, to hinder their shrinking and cracking, they commonly cover the newly felled tree with boughs.] The cracks commence commonly at the heart of the timber, and tend in rays to the outside.—It has been already noted, that the fissures at the greatest depth are the largest, but the least frequent; ascending, they become gradually less, but more frequent and numerous. Infomuch that, were the globe divided into two, and these strata viewed in profile, the fissures would appear much in manner of a tree; at the bottom a large trunk; higher, this divided into great branches; higher still, into lesser branches; and at top, into twigs.” See also the explanation of Plate the second, under the letter F.

\(^k\) Of this Vapour Dr. Derham, in his Phys. Theol. Book II. chap. 5. speaks thus; “That there is such a thing as subterraneous heat (whether central, or from the meeting of mineral juices, or congenial or connatural to our Globe, I have not time to enquire, but, I say, that such a thing is,) is evident not only from the hot-baths, many fiery eruptions and explosions, &c. but also from the ordinary warmth of cellars, and places under ground, which are not barely comparatively warm, but of sufficient heat to raise vapours also; as is manifest from the finicking of perennial fountains in frosty weather, and water drawn out of pumps and open wells at such a time. Yea, even animals themselves are sensible of it, as particular moles, who dig before a thaw, and against some other alterations
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Now upon the certainty of these two facts (the reality of which any person may be convinced of by giving himself the trouble of looking into the inside of the earth) we shall be under no great difficulty in accounting for the ascent of the s ubterranean water to the tops and sides of mountains for the origin of springs, rivers, &c.

For, first, since the Earth is thus cracked and divided, from the bottom of its shell to the top, into an innumerable number of fissures of various shapes and various sizes, it cannot but be that the water of the Abyss pervades these cracks, and enters up into them to a level with the water of the Sea: for however irregular and winding these fissures may be, yet it is evident, from the common experiment of immersing several tubes that are of the most different shapes and sizes into a vessel of water, that the water will rise to an equal height in each, and be level with the surface of the water in the vessel; and so must the water of the Abyss stand with respect to the surface of the Ocean. So that if we were to suppose the Earth, or rather the mountainous Part of it, to be cut off to a level, or concentrically, with the surface of the Sea, it is certain that the fissures and chasms, which communicated with the Abyss beneath, would be full of water to their very tops, notwithstanding the Pressure of the outward Air upon them; for, neither this nor the irregularity of the

alterations of the weather; excited, no doubt, thereunto by the same warm vapours arising in the Earth, which animate them, as well as produce the succeeding changes of weather.” See also what is said, p. 70, note 6 with the references.
subterranean canals would prevent the water from rising in every one of these fissures to a level with the surface of the Ocean, as is evident from the above-mentioned well-known experiment. Nay, it will rise much higher, for (as Dr. Guadieri justly observes) "Two Liquids of an unequal weight, put in an equal quantity into two equal tubes raised perpendicularly upon the same plain, have a different height relatively to their weight. This being laid down, it is certain by many experiments, that Sea-water is heavier than fresh-water, and that the gravity of the first is to that of the second as one hundred and three to one hundred. And therefore if we suppose the Sea to be an hundred feet deep, and that the sea-water, being deprived of its salt by filtration, fills up the subterraneous passages through which it circulates, it may rise to the height of three feet above the level of the sea. Now, if we suppose the sea to have the depth of an Italian mile, which makes five thousand feet (measure of Bologna), fresh water may rise to the height of an hundred and fifty feet above the same level. That height of an hundred and fifty feet is already something considerable for a mountain. But because some are much higher, at the tops of which there are Springs of fresh water, we may observe, that in many places, Pilots have not been able to measure the depth of the sea, because they could not find the bottom of it; but though they should find it in such places, one may very well suppose that there are in them abysses, caverns, &c. which the plummet does not reach, and
and which, penetrating into the most internal parts of the earth, form a perpendicular column of salt-water of an immense height."

Now if, under these circumstances, we suppose the mountainous part of the earth, or that portion of its sphere which is higher than the surface of the Sea (and which we before supposed to have been taken off) to be re-placed in its first and original position, so that the fissures in the mountainous Part shall be directly over the fissures that are full of water to their tops (as is the real situation of them in the present structure of the earth) how soon, in this case, and to what a height would the water of the Abyss be pressed up through the fissures into the mountains? For now the perpendicular pressure of the outward Air upon the surface of the water in the fissures being taken off, or eluded, by the covering of the mountains, or their super-incumbent strata, the subterranean water, by the force and action of the outward Air upon the Seas, and the weight of the salt-water in the Seas (which communicate, or are one, with the Abyss), would be forced up through the fissures in the mountains vastly above the level of the Sea; in the same manner (to compare great things with small) as water is pressed up through the pores in a heap of sand, or through the cracks in a block of stone, whose bottom or under-part lies immersed in a pond of water, but whose upper part is much above it; for by this situation of the Sand or Stone, that part of either which is prominent, or above the water, receives the perpendicular pressure of the outward air upon its
its exterior surface, and so eludes or weakens the action of the Air upon the water that is under or in the pores of the stone; and also, comparatively speaking, increases the pressure and strength of the external Air upon the surface of the water in the pond, which therefore will force the water that is least pressed (viz. That which is under and in the pores of the stone) to that place where it can find easiest admittance, which will be up into the pores and cracks in the stone, as there is the thickest medium and freest passage.

Now if we carry this analogy farther, and consider that the whole surface of the earth is compressed by the strength of the Expanse, or the Fluid of the Heavens surrounding and binding it on all sides; and that this Pressure or Tension is so very great and so closely applied to every part, as to preserve the earth in its present solid state and circular form (though it be revolved so immensely swift upon its axis); and when we farther consider, that, while the external Air or grosser part of the Heavens (the Spirit) presses chiefly upon the surface, the finer, purer, or the ethereal Part (the Light) pervades and reaches the inmost recesses of the earth (for we find that no terrestrial body can deny it entrance) and penetrates even to the center; and as there is a new and successive stream of Light, almost instantaneously, moving or impelled from the Fire at the Sun, and continually pressing against and making its way into the orb of

1 See also what is said of the Pressure of the air, in the note, p. 66.
of the earth (chiefly at or under the torrid Zone), and, having passed through the shell or the waters of the Ocean, enters into the Abyss, and there agitates and expands the water: And as in order to gain itself admittance and occupy a space in the Abyss equivalent to its own bulk or quantity, a proportionable quantity of other matter must recede, give way, or pass out of the earth; so this receding

m To explain this somewhat farther. It is now, I think, universally allowed that Light is a body, or a material substance. And when we consider that its particles reflect from a concave speculum, act with such force as to divide and instantaneously split asunder the parts of a diamond or the closest body we know, it must be allowed to be a substance inconceivably hard and subtle; and its motion immensely swift and strong: which last article is farther evident from the almost infinite number of reverberations it will endure from specula to specula, and yet its angle of reflection be equal to its angle of incidence. Such being the Solidity, Subtlety, Activity, and Velocity of Light, no terrestrial bodies surely can prevent its passing through their pores, and when we consider that the Earth has been exposed to the action of this subtle penetrating Agent for several thousand years, there certainly can be no space in it, that can receive an atom of Light, but what has one; and therefore the Earth from center to circumference is a Pienum, or there is no one atom in it but what is in contact with another atom, of some kind or other, but chiefly with the particles of Light; as is evident not only from the tenacity of this body which will permeate the pores of any other, but since the far greater part of the terraqueous globe is in a state of fluidity or consists of water; and we know that the action, or comparative non-action of Light, Heat or Fire (for each are the same in sub stance, and differ only in degree or manner of motion) causes the Fluidity or Solidity of water (its fluid or frozen state); and as the earth is warmer, the deeper we descend; and there is an immensely large sphere of water in a state of fluidity and motion, or perpetual circulation underneath the earth (as will more evidently be shewn hereafter); so there must be a free admission and full penetration of the particles of Light through that mass of water in order to preserve it such, or keep it in a state susceptible of easy motion and brisk circulation. Such being the condition of the earth, and since it is impossible that any two bodies can subside together in one and the same place,
receding matter, as it is impelled upwards from the center to the surface, would take the easiest and readiest passages it could find, and therefore would endeavour to pass through the cracks and fissures of the earth; but as all the fissures that communicated with the Abyss beneath were before full of water, even to a level with or rather much higher than the surface of the Sea, so this receding matter in its ascent would certainly contribute towards forcing the water in the fissures still higher up or nearer to the tops of the mountains: and this its Effect must be judged of from the nature and force of this receding matter.

We must therefore next determine what this matter is. Now this can be no other than the above-mentioned subterranean moist vapour, it being certain, that this is incessantly passing thro’ (and we know of no other matter that is so) the shell of the earth from beneath upwards, or from the center to the circumference; and it answers in its nature and form what we might justly expect such receding matter to be. For it cannot but be allowed, that, as the Light penetrated into the Abyss, and protruded or pushed out other matter to gain itself admission, the matter thus driven out would be the finest and purest that was in the Abyss, which could be no other than the Light and fine Air that were there before (for it is certain that there is some, though very pure air, as well as Light, in the Abyss, else fishes could not live

place, it must follow, that wherever, in such a plenum as the above-mentioned, there is an intrusion of any other body or matter, there must be a protrusion of some other matter, quantity for quantity.
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live and breathe at the bottom of the Ocean; nor the water of the springs that are discovered at the lowest depth in the earth be so replete with air. Now as this Light and fine Air were pushed outward, they must of course pass through the water of the Abyss. And as this water had been before rarified and expanded by the coagulation of the atoms of Light between themselves (and it is not improbable, since the earth is of a spherical form, that the rays of light which pass through the Ocean and the Abyss, on each side of the equator, are refracted or converge towards one another till they meet in a focus near the center of the earth; and then the heat and agitation would be much greater) and also by their struggle to disposeless and drive out the subterranean light and air, so this light and air thus driven out would arise from the Abyss in form of steam or vapour; which we find actually to be the case.

Now this vapour, in its passage from the Abyss through the cracks and pores in the strata of the earth, would not only be a means of elevating the water in those cracks, but would itself be turned or condensed into water (as the streams that rise in an alembick are) as it struck against the tops, sides, and irregular hollows in the fissures; and by this repeated action be continually forming into drops, and trickling down the sides of the fissures; and thus, not only increase the water that was before passing through the fissures, but in some places, where there were natural basons or cavities in the rock, be amassed in considerable quantities.
quantities. And if such basins or fissures happen to
be higher than the ordinary surface of the earth or
than the lower grounds (as is the situation of them
all in mountains) the water thus collected, or rather
incessantly collecting, would break out, wherever it
could find vent, on the outside of the mountain, and
there form springs, rivulets, &c. But if the basin
or fissures in the inside of the mountain be not
higher than the mean surface of the earth, or there
happen to be any depressed or hollow place on
the outside of the mountain, the water that ouzed
out of the inside would then fall into them, and
there settle; and become either small pools or large
lakes, according to its extent or quantity.

And thus, by this inward supply, by the ascent
of the subterranean water and vapour, there will
be a constant Fund and sufficient Source of water
for the production of Springs, Rivers, Lakes, &c.
throughout the whole earth.

But there is a difficulty attending this ac-
count of the origin of Springs which may be
thought too material to be passed by without
a solution: and that is—That if Springs derive
their water from the Sea, or from the Abyss which
communicates with the sea, how comes it to pass, that
Spring-water is not salt and briny, like the source
from whence it proceeds; but on the contrary is
generally fresh and sweet, or insipid?

Now supposing the Abyss beneath the earth to
be salt like the Sea (which yet we can have no
absolute proof of; and I could give several reasons
to shew, that it may not be so; at least, not
equally salt with the Sea) yet we may solve the
difficulty
Part III. Natural Proofs of the Deluge. difficulty upon the following facts and observations.

First, Let it be remarked, that Sea-water may be divested of its saline particles, and is frequently rendered fresh in a natural way;—the vapours that are exhaled from the sea, and which fall again in fresh showers of rain, is one proof of this;—and the flesh of fish, which are caught, and which before lived and fed, in the Sea, being sweet, is another proof of it;—and from an experiment which Mr. Lister n made, it is certain, that the water, which is sucked up (as we commonly say) or rather impelled and strained through the tubes and vessels of the Alga marina or common Sea-weed, is fresh, sweet and potable; though the distillation be made from a basin full of salt-water. Or, what is more applicable to the present case, Monse. Marsilli, having filtrated a certain quantity of the saltiest and heaviest Sea-water he could procure through several vessels filled with sand, all which together made up a cylinder of sand of seventy-five inches in depth, found, that the water had lost near one half of its degree of saltiness; and concluded that, had it been strained again through twice the same quantity of sand, it would have been entirely deprived of its saline particles; or we may safely say, that had it passed through a cylinder of sand, consisting of as many feet as the above did of inches, it would have been as pure and fresh as the water of the wells of St. Mary's on the shore of Languedoc in France, which,

* De la Mer. p. 33.
which, Marsilius says, are not more than sixty feet distant from the nearest place where the Sea-water reaches. Here then are several strainers, or means, by which Sea-water may be percolated and rendered fresh, in an easy, natural, and expeditious way.

Now though the pores of the earth are larger or more open than the strainers here mentioned, yet when we consider the bulk of the earth or the thickness of its shell, the great variety of strata of which it consists, the many turnings and windings of the fissures (by means of which the subterranean water may pass through this variety of strata), the thick gross vapour that is continually passing through the whole body of the earth, and the great quantity of Sea-weed and other marine productions that are at the bottom of the Ocean, especially in such calm and quiet places as the cavities at the mouths of the fissures; I say, taking all these into consideration, which may be esteemed as so many percolators, and though more open and porous than the above-mentioned, yet, by the length of their courses and the variety of their substances, they will certainly answer the end of the afore-mentioned. And this appears to be fact from hence, that in such places where the Sea-water has admission into the earth, the Springs and Wells are more or less brackish, as they are nearer

p De la Mer. Ibid.

q When Jonah was in the fish's belly, he says, chap. ii. I went down to the bottoms [marg. cuttings off] of the mountains [these apertures in the shell of the Earth which open into the Abyss and are really the lowest parts or bottoms of the mountains]. The Depth [the Abyss] closed me round about; the weeds [the sea-weeds] were swapt about my head.
nearer to or farther from the Sea. Thus Mr. Norwood, speaking of the Bermuda islands, says, "We dig Wells of fresh water sometimes within twenty yards of the sea, or less; which rise and fall upon the Flood and Ebb, as the sea doth; as do most of the wells in the country, though farther up (as I am informed). Wheresoever they dig wells here, they dig 'till they come almost to a level with the superficies of the sea, and then they find either fresh water or salt. If it be fresh, yet if they dig two or three feet deeper, or often less, they come to salt water. If it be a sandy ground, or a sandy crumbling stone, that the water soaks gently through, they find usually fresh water; but if there be hard lime-stone rocks, which the water cannot soak through, but passeth in chinks or clefts between them, the water is salt or brackish." Varenius relates the same of several places, and observes, "that Springs near the Ocean are salt or brackish; and the nearer they are the sea, the more they are sated with salt, as on the shore of Africa, and in India, chiefly on the shore of Coromandel, where no vines grow, and all their wells taste salt. Near the town of Suez, at the end of the Red Sea, their springs are all salt and bitter; and even the water which is fetched two German miles from the shore tastes a little brackish. Also in several small islands there are no fresh springs but all salt (though something less sated than the Ocean) as in the island of St. Vincent, and others. In the low countries of Peru that border upon the Ocean, their Lakes are saltish, because of the vicinity

vicinity of the Sea." But farther up in the inland countries, it is well known, that the Springs and Lakes are fresh and sweet. Hence then we may fairly conclude, that the water of the Ocean and the Abys is, by a gradual filtration thro' the strata of the earth, so strained and purified as to leave behind all its saline or briny particles, and when it arrives at a due distance (either greater or less, according to the porosity or tenacity of the strata it passes through) from its original reservoir, there to become sweet and fresh, or at least divested of its primitive qualities.

A further proof, that the water of the Abys, in its passage through the strata of the earth, deposits its saline particles, may be drawn from the peculiar qualities of mineral Springs; of which there are almost an infinite number, differing from each other in the most distinguishable properties, according to the particular species of the mineral or metallic effluvia they are impregnated with; and though several of these have a saltish taste, yet it is well known, that even that proceeds from other salts than those which the Sea-water is replete with. Whence it must follow, that all mineral waters, before they arrive at their outlets, have not only deposited their saline particles, but even assumed others, very different and distinct therefrom. And since this is the case, we may fairly suppose, that where the subterranean water passes through strata that have no proper, or no great quantity of proper, matter for the production

* Varenius's Geography, Part I, ch. xvi, Proposition 5.*
duction of mineral waters, that there it will break out in springs of pure and fresh water.

It may not be amiss to observe in this place that, upon the supposition of Springs being owing to rain or vapours, that fall upon and make their way through the outsides of the mountains to the places from whence they rise, it is altogether absurd and impossible to conceive, that the small portion of the earth which lies above several mineral springs, especially such as break out near the tops of the highest mountains, can be sufficient for affording a constant and equal supply of mineral matter for the impregnation of them. Besides; it is well known, that in such places where mineral Springs are, and there happen to be any cavities open at the surface of the earth, or any chinks or crevices in the rock, through which the rain-water may descend and gleet down to the fissure through which the mineral water flows, that in such cases the rain-water is so far from increasing the virtues of the Spring, that it either destroys or lessens them for a time, and renders such as are hot and warm cold or cool, such as are acrid and bitter somewhat sweet or less acrid, and so of the rest; which plainly shews, as I observed before, that when rain-water permeates the earth, and reaches the water of Springs, it only makes an accidental or temporary increase; but does not afford the constant and regular flux; and is so far from being the Source of mineral water, or bringing down any matter proper for the production or continuance of such Springs, that, where it reaches them, it in part destroys their qualities;
qualities; which, I may observe, the Springs recover again when the rain is over; so that their supplies cannot be owing to rain: and we must seek deeper for their sources than that small portion of the earth which rain-water penetrates; and therefore must have recourse to a subterranean reservoir.

And upon the supposition of an Abyss of water beneath the earth, as the grand fund or promitory of all Springs, there is the whole thickness of the shell of the earth, consisting of a variety of different strata, filled with a variety of soluble mineral and metallic particles, and the fissures full of a gross watery vapour, that has passed through the neighbouring strata at every crack and cranny, replete with the mineral or metallic effluvia that it has brought out of these strata;—there is all this, I say, for the waters of the Abyss to make their way through, before they break out in springs on the surface of the earth. So that there is reason to believe, that some mineral waters may have lost their original properties, gained others, lost them, and have regained their original or others of the same kind, before they appear as Springs; and certain it is, that several of them come up endued or impregnated with a variety of mineral qualities, and thereby shew the large space they have ranged through for the acquisition of them.

And though the mouths or first passages of the fissures that reach from the Abyss to the surface of the earth are probably large, and so open as to admit freely to some distance the subterranean water,
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Water, endued with its peculiar properties, whether saline, or whatever they are; yet as these fissures gradually lessen as they tend towards the surface of the earth, and frequently break off, or run into other fissures that are of an horizontal or oblique situation, which again divert and branch off into others still less, and some so small as to be invisible; since many of these fissures are filled with a rubbley kind of matter, as sand, clay, sludge, small stones, &c. and so fit for straining and refining the water; since the subterranean vapour, by being condensed against the tops and trickling down the sides of the fissures, is continually adding fresh supplies of water that has been purified or deprived of its original properties by evaporation and distillation; and since there is a perpetual ouzing of water into the larger fissures through the cracks and crannies in their sides; to which "continual distilling alone, gleeting, or straining of the watery particles through the terrestrial strata" Varenius attributes the deprivation of the saline particles in the sea-water; and justly remarks, "that we observe this very thing in mines digged to a vast depth (and the deeper we descend, the more discernible it is), how that water on every side is continually dropping, and collecting itself into small guts, which are called veins of water; and if several such guts or runnels as these concur in one receptacle, they form a fountain, as they who make drains, to bring water into wells, very well know."—

Now all these circumstances being added to:

*General Geog.* p. 305.
gether, we certainly have a solution to the above-mentioned difficulty, and have reason enough to conclude, that the water of the Abyss, in its passage through the strata of the earth, is deprived several times of the different qualities it gains, and therefore, soon after its permeation, is entirely divested of its saline or original properties, whatever they be.

Thus, I hope, I have now cleared my way, and sufficiently answered every material objection, and plainly shewed, that the origin of Springs is owing to an internal supply; the water of which, —by the general action of the Air upon the Seas and (by their communication) upon the Abyss, and by the recess of the finer Air and Light from the center of the earth to the circumference—is impelled or pressed up through the cracks and fissures in the terrestrial strata to the tops of the highest mountains. And as there are Springs breaking out all over the surface of the earth, as well in the most inland as the maritime parts; and these Springs are the Heads or Sources, from whence that profusion of water proceeds which affords the constant, uninterrupted, and regular streams or courses of all the numerous rivers upon the earth, it must follow that there is an internal magazine or an Abyss of water beneath the earth; and that this Abyss is also equal in extent to the lower part of the shield of the earth.

So that as I before argued, that from the quantity of water poured into the Ocean from the mouths or at the ends of all the rivers upon the earth, there must be an immensely large Receptacle
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tackle beneath the Ocean for containing it, so from the quantity that is thrown out at the Heads or Sources of all the rivers, there must be a Reservoir beneath the earth for supplying this; and if these two Conservatories were not full and in union with each other, there must soon appear a great superfluity in one, or a great deficiency in the other; but as neither of these is observed, they must be in conjunction, and a mutual interchange and perpetual circulation be maintained between them. And hence is evident that two-fold scriptural argument Eccles. i. 7. the first part of which I have already quoted, proved, and shewn the reason of from Nature; and by now adding (since I have proved) the second, they will, when united, corroborate each other;—All the rivers run into the Sea; yet the Sea [the general collection of waters, including the Sea and the Abyss; see page 43, and p. 64.] is not full;—unto the place from whence the rivers come, thither they return again.

And, I hope, it now at last appears, from all that has been said, to be no more wonderful that there should be a circulation of waters throughout the earth, and that Springs should break out on the tops of the highest mountains, than that there should be a circulation of blood in the human body, and that a man should bleed, when pricked, in the veins or arteries of his forehead, as freely as in those of his feet. For the same Cause produces both these effects. The Blood—by the pressure of the outward Air or Atmosphere upon, and by the penetration of the finer Air and

P 3

Light
Light into, the human body—is impelled or ejected from the Heart (the Center) into the arteries to the extremities of the body, and from the arteries is forced into the veins, and by the veins is refunded back into the heart: so the subterranean or central Water, by the same Agents and after the same manner, is pressed up through the veins or fissures in the earth to its extreme or highest parts, and from thence is conveyed down, through the channels of rivers, into the Sea, and from the Sea is returned into the Abyss from whence it first came. And the ascent of these two Fluids (the Blood and the Water) is as natural as the descent; for neither of them having any innate Gravity or Levity, but, like all other matter, being indifferent and therefore subject to motion any way, they are moved either up or down, this way or that, just as they are impelled by the universal Agents Light and Air.

And however novel this account of the origin of Springs may seem to many at present, yet it is certain that it has the sanction of antiquity, both sacred and profane, on its side; as is evident from what has been said page 43 & seq. but more particularly may appear from the sentiments and reasonings of Pliny and Seneca on this head; which I shall insert as far exceeding those of many of our modern philosophers.

Pliny in his second Book of Natural History, chap. LXV. writes thus, "Ita formas artifex natura credi debet, ut cum terra arida & sicca conflare per se ac fine humore non potest, nec ruribus stare aqua, nisi sustinente terra, mutuo implexu jungerentur;
jungere rentur; hac finus pandente, illa vero permeant totam, intra, extra, supra, venis, ut vinculis, discurrentibus, atque etiam in summis jugis erumpente: quo spiritu acta & terrae pondere expressa, siphonum modo emicat: tantumque a periculo decidendi aebst, ut in summa quaeque & altissima exiliat. Qua rationale manifestum est, quare tot fluminum quotidiano accessu maria non crescant.” i.e. “This we must believe, that nature the work-mistreis framed and ordained so, to the end that the earth, which being dry could not by itself alone, without some moisture, keep any consistency; and the water likewise could not abide and stay, unless the earth upheld it, in which regard they were mutually to embrace each other, and so be united; the earth opening a bosom for the water, and the other permeating the whole by means of secret veins, within, without and above, which, like ligaments, were to clasp it, and so break out at last upon the utmost tops of hills: whither being driven by the Spirit [i.e. Air in motion], and partly pressed by the weight of the earth, it ascendeth as it were in a Siphon; and so far is it from falling down again, that it readily mounteth to the highest and most lofty places, Whence also is evident, why the Seas do not increase and swell, though they daily receive so many rivers.”

Seneca in his third Book of Natural Questions, chap. IV. argues thus, “Primum ergo quaeramus, quomodo ad continuandos fluminum curfus terra sufficat, unde tantum aquarum exeat. Miramur quod accessionem fluminum maria not tiant.
tiant. \(\text{Æque mirandum est quod detrimenta ex-}\)
\(\text{euntium terra non sentit, \\&c.}\) \(i.e.\) “Let us first 
enquire, how the earth can supply the continual 
courses of rivers, from whence proceed so great 
quantities of water. We wonder that the seas 
\(\text{shew no marks of the accession of rivers. And it is}
\) equally wonderful, that the earth discovers no signs 
of the loss of these rivers that issue from it. What 
is it that thus supplies it, that it can afford so much 
in secret and be replenished again?—What we 
have said concerning rivers, the same is to be 
understood of brooks and fountains.

“Some think that whatever water the earth 
emits the receives again; and for this reason the 
seas do not increase, because they convert not 
that which flows into them to their own use, but 
immediately send it out. For the sea penetrates 
the earth by a secret passage and discovers itself 
again, and then secretly returns and is purified in 
its course; for being squeezed and strained through 
the manifold turnings and windings in the earth, 
and the variety of soils it passeth through, it de-
posits its bitter and salt quality and becomes fresh 
water.”

“\(\text{Quidam existimant, quicquid ex imbrisus}
\) terra concipit, in flumina ruribus emitti, \\&c.\)” \(i.e.\)

“Some think, that whatsoever the earth receives 
from rain, is returned again into the rivers. And 
they build their opinion upon this argument, that 
there are few rivers in those countries where it 
feldom raineth. Therefore they say the deserts 
of \(\text{Æthiopia}\) are dry, and there are few Springs 
to be found in the inward parts of \(\text{Africa}\); be-
cause
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dause the nature of the climate is very hot, and it
is almost always Summer. These sandy deserts
therefore lie uncultivated, without trees or her-
bage, being seldom sprinkled with rain, and when
they are, it is immediately sucked up. But on
the contrary, it is well known that Germany,
Gaul, and Italy abound with brooks and rivers;
because the climate is moist, and even the Sum-
mer not without showers.

"Adversus hæc multa dici posse vides. Pri-
umm ego tibi, vinearum diligens fossor, affirmo,
nullam pluviam esse tam magnum, quà terram
ultra decem pedes in altitudinem madefaciatur, &c."
_i.e._ "Against this opinion many things, you see,
may be urged. For first, I, who have been a di-
ligent digger of vineyards, affirm, that there is no
rain so great that wetteth the earth more than ten
feet deep: all the humidity is consumed in the
upper crust and descendeth not into the lower
parts. How therefore can rain supply strength
and quantity of water to rivers, when it wetteth
only the upper surface of the ground? The greater
part thereof is carried by the channels of rivers
into the sea. It is but little that the earth absorbs,
and doth not preserve this, for it is either dry, and
then sucketh up what falls upon it; or glutted, and
then it refuseth to receive what is too lavishly pour-
ed upon it from the heavens. And therefore rivers
are not increafed upon the first rains, because the
dry earth absorbs them all. What shall we say
of those rivers which issue out of rocks and moun-
tains? What supply can they receive from rain
which quickly passeth over the naked rock, and
hath
hath no earth to stay upon?"—"Adjice, quod in
sicciissimis locis, putei in altum acti, per ducenum
aut tricenum pedum spatia, inveniunt aquarum
uberes venas, in ea altitudine, in quam aqua non
penetret, &c. i.e. "Add to this, that in the
driest places where wells are dug two or three hun-
dred feet deep, there are found plentiful veins of
water at a depth which rain or common water
could not have reached: so that you may know
that it was not from the heavens or accidentally
collected there, but was what we commonly call
living water. This opinion is farther confuted by
the consideration that there are springs upon the
very summits of mountains; whence it is apparent
that their waters were either carried up thither,
or produced originally there, since all rain-water
naturally falleth downwards. Some think, that
as upon the exterior part of the earth there are
vast marshes, even great and navigable lakes, and
that as the seas are extended over great part of
the earth, and even reach into the vallies, so the
inward parts of the earth abound with sweet wa-
ters, which ebb and flow like the ocean and its
arms; and are extended through the earth in
proportion to the height and quantity of land
above them. Therefore, from this profuse plenty
rivers are derived. Which, why wondrest thou, if
the earth shew no signs of their being taken from
her, when the seas discover no mark of their being
added to them?"

As a final proof of the possibility of the cir-
culation of water from the sea into the Abyss, and
from the Abyss, through the channels of springs
and rivers, into the sea again, I shall endeavour to give the reader a description of a glass tube that I have, invented by a foreigner, in order to represent this very thing. The tube is three feet three inches high, and fixed to a board (as barometers usually are) about a foot broad: near the top it is globular, and swells out sufficiently to hold a quart of water, from whence it is continued of a less size (about half an inch bore) to the bottom, where it is curved upwards, and swells out again into a globular form (of the same size with the upper globe) and from thence it is continued, about the dimension and bore of a goose-quill, in the most irregular meander-like manner to the top, where it is curved downward and meets the upper globe. In the inside of the lower globe, one part of the tube is so contracted as to form a fit passage for a spring or jet d'eau to arise from it. Upon pouring water into this tube (through a cavity made in the upper part for that purpose) and permitting it to rise so high as to fill the upper globe, a spring will immediately be formed in the inside of the lower globe by the bare weight or pressure of the water endeavouring to rise to its level, and by the spring's agitating the air in the inside of this lower globe, the water will be impelled upwards through the small irregular part of the tube, rise above its level, and fall into the upper globe; and thus cause a constant circulation as long as any water remains in the upper globe. In this tube (which is but a little more than three feet high) the water will rise fourteen inches above its level. Now if
we suppose the upper globe to represent the Sea, the lower globe the Abyss, and the jet d'eau rising in it to be a Spring breaking out from the Abyss into any hollow part of the earth, and from thence continued through the small winding fissures to the surface, and from the channels of the river into the sea again; the one may be allowed a proper representation of the other, or at least an experimental demonstration of the possibility of such a circulation. It may be proper to remark, that the air in the inside of the tube is in the same state as without, with regard to any preter-natural or artificial condensation or rarefaction thereof; and by an accident the top of the tube once received a fracture, and so large that the outward air had free entrance, and yet the circulation continued just the same.

III. Thirdly. Another Proof of a Subterranean Abyss of Water may be drawn from Whirlpools, Under-currents, and Gulpfs in the Ocean.

Of the first of these is that remarkable Whirlpool upon the coast of Norway, which is thus briefly described by Gordon in his Geographical Grammar, p. 76. "Upon the coast of Norway, near the isle of Hitteren in the latitude of sixty-eight, is that remarkable and dangerous whirlpool, commonly called Maelfroom, and by navigators the Navel of the Sea. Which whirlpool is, in all probability, occasioned by some mighty Subterranean Hiatus; and proves fatal to ships that approach too nigh, provided it be in the time of flood: for then the sea, upwards of two leagues round,
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round, makes such a terrible Vortex, that the force and in-draught of the water, together with the noise and tumbling of the waves upon one another, is rather to be admired than expressed. But, as in the time of flood, the water is drawn in with a mighty force, so during the tide of ebb does it throw out the sea with such a violence, that the heaviest bodies then cast into it cannot sink, but are tossed back again by the impetuous stream which rushes out with incredible force. And during that time is abundance of fishes caught by fishermen who watch the opportunity; for being forced up to the surface of the water, they cannot well dive again, so violent is the rising current.” Some have imagined from the circumstance of the bodies that are thrown into this Vortex being returned again, that therefore there is only a great Cavity with a confined bottom, but no Hollow or Passage through the shell of the earth. But were there not a free passage for the waters through the whole shell of the earth, I cannot see how they could return with such impetuosity as here described, and the reason, why the bodies thrown in do not totally disappear but are cast back again, is in all probability owing to the irregularity of the aperture or channel of this Vortex being in some places narrower, in others broader, as is the form of the natural cavities in the earth, and even of those in the Sea, where we can visit them, as witness those remarkable ones in the bottom of Zirchnitzer Sea in Carniola, described in the Phil. Trans. No 54, 109, 191.

Again;
Again; "The Caspian Sea (says Stackhouse in his History of the Bible, Vol. I. p. 122, citing for proof Moll's Geography, p. 67. Stillingfleet's Orig. Sacr. I. 3. c. 4. and Bedford's Scripture Chronology, c. 12.) is reckoned in length to be above an hundred and twenty German leagues, and in breadth from east to west about ninety of the same leagues. There is no visible way for the water to run out, and yet it receives in its bosom near an hundred large rivers, and particularly the river Volga, which of itself is like a Sea for largeness, and is supposed to empty so much water into it in a year's time, as might suffice to cover the whole earth [see p. 105.]; and yet it is never increased nor diminished, nor is observed to ebb or flow, which makes it evident, that it must necessarily have a subterraneous communication with other parts of the world. And accordingly, Father Avril, a modern traveller, tells us, that near the coast of Xylan there is in this Sea a mighty Whirlpool, which sucks in every thing that comes near it, and consequently has a Cavity in the earth, into which it descends."

Of a similar nature, and of the same name with the above Sea, is another in Hispaniola in the West-Indies, "which (as Peter Martyr in his History of the West-Indies, p. 135, informs us) consists of salt, sour, and bitter water, as we read of the Sea called Caspium, (lying in the firm land between Sarmatia and Hircania); we have therefore named it Caspium. It hath many swallowing Gulphs, by which both the water of the great Sea springeth into it, and also such as fall into it from the mountains
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mountains are swallowed up. The rivers which fall into this Lake or Sea are these; from the North, Guanicabon; from the South, Xaccoci; from the East, Guannabo; and from the West, Occoa: they say, that these rivers are great and continual, and that besides these there are twenty other small rivers which fall into this Capsium. This Lake is tossed with storms and tempests, and often drowneth small ships or fisher’s boats, and swalloweth them up with the mariners, insomuch that it hath not been heard of, that any man drowned by shipwreck was ever cast on the shore, as commonly chanceth of the dead bodies of such as are drowned in the Sea."

Of Under-Currents, Dr. Smith in the *Phil. Trans.* No. 158. writes thus, “In the Offing, between the North-foreland and South-foreland, it runs tide and half tide, that is, it is either ebbing water or flood upon the shore, in that part of the Downs, three hours, (which is, grossly speaking, the time of half a tide) before it is so off at sea. And it is a most certain observation, that where it flows tide and half tide, though the tide of flood runs aloft, yet the tide of ebb runs under foot, that is, close by the ground; and so at the tide of ebb it will flow under foot. There is a vast draught of water poured continually out of the Atlantic into the Mediterranean, the mouth or entrance of which between Cape Spartel or Sprat, as the seamen call it, and Cape Trafalgar, may be near 7 leagues wide, the current setting strong into it, and not losing its force till it runs as far as Malaga, which is about twenty leagues within the
the Streights. By the benefit of this current, though the wind be contrary, if it does not over-
blow, ships easily turn into the Gutt, as they term the narrow passage, which is about twenty
miles in length. At the end of which are two
towns, Gibraltar on the coast of Spain, which
gives denomination to the Streights, and Ceuta on
the Barbary coast; at which Hercules is supposed
to have set up his pillars. What becomes of this
great quantity of water poured in this way, and
of that which runs from the Euxine into the
Bosphorus and Propontis, and is carried at last
through the Hellespont in the Ægean or Archipe-
lago, is a curious speculation, and has exercised
the wit and understanding of philosophers and
 navigators. For there is no sensible rising of the
water all along the Barbary coast even down to
Alexandria; the land beyond Tripoli and that
of Egypt lying very low, and easily overflowable.
They observe indeed that the water rises three
feet, or three feet and a half, in the Gulf of Ve-
nice, and as much, or very near as much, all
along the Riviera of Genoa, as far as the river
Arno: but this rather adds to the wonder. My
conjecture is, that there is an Under-current,
whereby as great a quantity of water is carried
out as comes flowing in. To confirm which,
besides what I have said above, about the diffe-
rence of tides in the Offing, and at the shore in
the Downs, which necessarily supposes an Under-
current, I shall present you with an instance of
the like nature in the Baltic Sound, as I received
it from an able seaman, who was at the making
of the trial. He told me that, being there in one of the king's frigates, they went in their pinnace into the middle stream, and were carried violently by the current; that soon after they sunk a bucket with a very large cannon-bullet to a certain depth of water, which gave a check to the boat's motion; and sinking it still lower and lower, the boat was driven a-head to the windward against the upper-current; the current aloft, as he added, not being above four or five fathom deep, and that the lower the bucket was let fall, they found the under-current the stronger."

So also Marsili (as quoted by Mr. Ray in his three Physico-Theological Discourses, p. 81.) affirms, "That the lower water in the channel of the Thracian Bosphorus is driven Northward into the Euxine Sea, whilst the upper flows constantly from the Euxine Southward. And that that which flows from the South is saltier and heavier; which he found by letting down a vessel close shut up, fitted with a valve to open at pleasure and let in the lower water, which, being brought up and weighed, was observed to be ten grains heavier than the upper. That the upper and lower flow contrary ways, he found by the fishermen's nets, which, being let down deep from vessels that were fixed, were always, by the observation of the fishermen, by the force of the current driven towards the Black Sea: and by the letting down of a plummet, for if it were stopped and detained at about five or six feet depth, it did always decline towards the Marmora or Propontis, but if it descended lower, it was driven to the contrary part,
part, that is, the Euxine. And though Mr. Ray speaks of this (and also of the Under-current at the Streight's Mouth) as being, "the concurrent and unanimous vote and suffrage of mariners, voyagers, and philosophers," yet he seems to make a doubt of it, because, says he, "I do not understand how waters can run backward and forward in the same channel at the same time; for there being but one declivity, this is as much as to affirm that a heavy body should ascend." But surely Mr. Ray may easily conceive, how water may be made to run into a vessel or pond at one part, and be made to run out in a contrary direction at the bottom by means of a cavity beneath, and so two different currents be formed; which certainly is the case in the above-mentioned seas; there being a great cavity or aperture at the mouths of each leading into the Abyss beneath, which causes a current different from, and in a contrary direction to, that which appears upon the surface of the waters.

Varenius (in his System of Geography, Chap. iv. Sect. iv.) gives an account of the several principal Currents in the Ocean; some of which are certainly owing to subterranean gulphs or passages that lead under the earth, particularly the two that follow, (as he himself imagines) since they set in towards the Shore; 1. "The most extraordinary Current of the sea is that by which part of the Atlantic or African Ocean moves about Guinea, from Cape Verd towards the curvature or bay of Africa, which they call Fernando Poo, viz, from West to East, which is contrary to the general
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227 general motion. And such is the force of this current, that when ships approach too near the shore, it carries them violently towards that bay, and deceives the Mariners in their reckoning. This current affects not the whole *Ethiopic Ocean,* only that part which is adjacent to the shore of *Guinea,* to the end of the bay, and to about one degree of south latitude. It is observed not to exceed the distance of fourteen miles from the shore; therefore ships are very careful left they should approach so near, when they sail along these coasts; which would hinder their intended course, and drive them to a place they would not care to visit. 2. The second perpetual current is where the Ocean moves swiftly from about *Sumatra* into the bay of *Bengal,* from south to north [that is from the sea towards the shore]; so that it is probable this bay was made by the rapidity of the current. I do not know whether the cause may be owing to the many islands, and to cape *Mabo,* upon the south continent, whereby the ocean in its passage westward may be diverted northwards, or there may be a subterraneous Receptacle in the bay itself."

The reader may see descriptions of several other lesser Gulphs, Whirlpools, and Under-Currents in the Sea in *Kircher's Mundus Subter. Lib. ii. & iii.* and from viewing and considering the number and situation of them, we may reasonably conclude that there are few or no Seas without one or more of such Gulphs, and consequently that there is an immense quantity of water daily poured into
into the inside of the earth through the mouths of them all.

And here, by the way, I may just animadvert upon the inaccuracy of those writers who have endeavoured to prove, by exact mathematical calculation (which proves just nothing at all when founded on fallacious facts), that the quantity of water which is raised from the Ocean in vapour is equal to that which is poured into it by all the rivers upon the earth, without having taken notice of, or made any allowance for, these Under-currents and In-draughts, which must necessarily carry off a great quantity of the water. I have already had occasion to examine this opinion at large (page 176, &c.) and have shewn the falsity of it from facts and experiments; and this article may be brought as another argument against it.

IV. A fourth Proof of a subterranean Reservoir of water may be deduced from Lakes.

Or these there are several sorts, each tending to prove the point in question; as, first, Those which receive a great quantity of water, either from rivers or other means, but externally emit none; secondly, Those that send forth a great quantity of water, but outwardly receive none; thirdly, Those that neither increase nor decrease, notwithstanding the difference of seasons, or the quantity of water carried off by evaporation. In each of these cases there must be a subterraneous exit, or else an internal supply; and when it has been proved, that there are some of these Lakes in almost every part of the world, it must be
be allowed, that the reservoir which supplies them must be equally extensive with themselves, or that there is a collection of water which extends under the whole surface of the earth.

Of the first sort of Lakes are the following, reckoned up by Varenius, (System of Geog. p. 280.) "In the foregoing proposition we observed that the Lake Titicaca discharges a river into a smaller called Paria, which therefore may be referred to this class, viz. to such as receive rivers but emit none. The lake Alphaltites, which is also called the Dead Sea, receives the river Jordan, but emits none: its length, from north to south, is seventy German miles, and its breadth five, as some make it. There is one in the Lesser Aha. There is a small one in Macedonia, called Jana, which receives two little rivers. One in Persia near Calsistan. The lake Soran, in Muscovy, receives two small rivers. The river Ghir, in Africa, is reported by Leo Africanus to lose itself in a lake, and some maps to represent it, but others join it to Nubia." Peter Martyr, in his History of the West-Indies, p. 135, speaking of Hispaniola, says, "That about three score miles distant from the chief city of St. Dominick, there are certain high mountains, upon the tops whereof is a Lake or standing Pool of fresh water three miles in compass, and well replenished with divers kinds of fishes. Many small rivers and brooks fall into it. It hath no passage out, but is on every side enclosed with the tops of mountains." Under this head we may reckon a Lake mentioned by Du Halde, in his Description of the Empire of China.
Vol. I. p. 20. "This vast Lake [named Tong-ting-Hu, in the province of Hu-quang] is remarkable for the greatness of its circumference, which is above eighty French leagues, and the abundance of its waters, especially in certain seasons, when two of the largest rivers in the province, swelled with the rains, discharge themselves into it, and when it disembogues them, one can scarce perceive it to be diminished." To this article also may be referred what has been already said concerning the two lesser seas or lakes, called the Caspian, one in Asia, the other in America, p. 222, 223.

Of the second sort of Lakes, or, those which send forth a great quantity of water but outwardly receive none, take the following account from Varinius (System of Geog. p. 278). "There is an infinite number of these Lakes, and most large rivers flow from such, as out of cisterns;—of the smaller sort are the following, the Lake Wolga, at the head of the river Wolga; the Odoium, at the head of the Tanais; the Adac, from whence one of the branches of the river Tigris flows; the Oxero [or White Lake] in Muscovy, that gives source to the river Shaksua, which is poured into the Wolga, and many more little ones; we shall here only reckon some of the larger sort that are more remarkable. The great lake Chaumay, in the latitude of twenty-six degrees north, not far from India, to the eastward of the river Ganges; out of this lake flow four very large rivers, which water and fertilize the countries of Siam, Pegu, &c. viz. the Menaw, the Afa, the Caipomo, and
the Laquía. Some maps exhibit a small river that runs into this lake. The lake Singbay, upon the east border of China, sends out a great river southward, which, being joined to another, enters China. The lake Titicaca, in Los Charcas, a province in South America, is eighty leagues in circuit, and emits a large river, which is terminated in another small lake, and is no more seen. There are several towns and villages discovered about this lake. The lake Nicaragua, in a province of the same name, in America, is only fourteen German miles from the Pacific, or South Sea, and above one hundred from the Atlantic, into which it is discharged at broad flood-gates. The lake Frontena, in Canada, out of which issues the river of St. Lawrence. The lake Annibi, in Asia, in the latitude of sixty-one degrees.” And after, p. 282, where the Author gives an account of Lakes that both receive and emit rivers, it is evident that the quantity of water emitted by some is far superior to what is received; and in others the quantity received superior to what is emitted; so that there must be subterraneous supplies and exits.

The next quotation I shall cite may serve both for this second article and also for the last, viz. for those Lakes that neither increase nor decrease, notwithstanding the difference of seasons and the quantity of water carried off by evaporation: it is from Acosta’s History of the Indies, Book iii. chap. 16. “It is a question often asked, Why there are so many Lakes in the tops of these mountains, into which no river enters, but contrariwise many great
great streams issue forth, and yet do we scarce see these lakes to diminish any thing, at any season of the year. To imagine these lakes grow by the snow that melts, or rain from heaven, that doth not wholly satisfy me; for there are many that have not this abundance of snow, nor rain, and yet we see no decrease in them: which makes me to believe they are springs which rise there naturally; although it be not against reason to think that the snow and rain help somewhat in some seasons. These Lakes are so common in the highest tops of the mountains, that you shall hardly find any famous river that takes not its beginning from one of them. Their water is clear, and breeds little store of fish, and that little is very small, by reason of the cold which is there continually. Notwithstanding, some of these lakes be very hot, which is another wonder. At the end of the valley of Tarapaya near to Potosi, there is a lake in form round, which seems to have been made by a compass, whose water is extreamly hot, and yet the land is very cold: they are accustomed to bathe themselves near the bank, for else they cannot endure the heat being farther in. In the midst of this lake there is a boiling of above twenty feet square, which is the very spring, and yet (notwithstanding the great ness of this spring) it is never seen to increase in any sort: it seems that it exhales of itself, or that it hath some hidden or unknown issue: neither do they see it decrease, which is another wonder, although they have drawn from it a great stream, to make certain Engines for metal, considering the great quantity.
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quantity of water that issueth forth, by reason whereof it should decrease." But the greatest Lake of this kind in America, and indeed in the whole world, is the Lake Parime, lying directly under the Equator. "It is (as Varenius saies in his Syt. Geog. p. 278) in length from east to west, about an hundred and five German, miles, and in the broadest place an hundred miles over or thereabouts; so that it may be compared with, if it do not exceed, any lake in the world for magnitude; yet it neither receives nor emits any rivers." Gordon in his Geographical Grammar, speaking of Scotland, writeth thus, page 204, "Towards the north-west part of Murray is the famous Lough-Nefs, which never freezeth; but retaineth its natural heat, even in the extremeest cold of winter; and in many places this lake hath been founded with a line of five hundred fathoms, but no bottom found. Nigh to Lough-Nefs is a large round Mountain [called Meal-fuor-vouny] about two miles of perpendicular height from the surface of the Nefs; upon the very top of which mountain is a lake of cold fresh water, often founded with lines of many fathoms, but never could they reach the bottom. This lake, having no visible current running either to it or from it, is equally full all seasons of the year; and it never freezeth." Sir Robert Sibbald in his Scotia Illustrata, p. 22, says, "That there are various Lakes in Scotland, especially in the biggest places, which neither emit nor receive rivers, and yet are full of water;" and concludes "that such must be supplied by sources from beneath, at least with a quantity of water equiva-
lent to what is carried off by the heat of the Sun."

In Kircher's Mundus Subterraneus, Lib. v. ch. 4. there is an account of several other Lakes of each of the above-mentioned kinds, and full proof that they derive their origin from and are continued by subterranean sources. And though probably some of these Lakes are maintained by rivers that ran under-ground, or by springs that issue out at their bottoms, yet, as we have already shewn (p. 194, &c.) that the Springs and Rivers which appear above ground owe their supplies to an internal Reservoir, it must much more strongly follow that these covert Springs and Rivers are owing to the same, and therefore that the Lakes, which are supported by them, plainly shew that there must be a subterranean Reservoir of water.

V. A fifth Argument in proof of an Abyss of water beneath the earth may be drawn from the consideration of some phenomena attending Earthquakes.

An account of which I shall transcribe from Dr. Woodward's Nat. History of the Earth; the truth of which every person that is at all conversant in the history of Earthquakes cannot but know; and indeed the effects of the late dreadful shock of the earth at Lisbon, which extended themselves (through means of the agitation of the waters of the Sea and the Abyss) to the four quarters of the world, a being at present fresh in

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a See an Account of these effects, and how extensive they were in Phil. Trans. for the year 1756, Vol. XLIX. Part i. §. 2,
the memory of almost all now living, will bear ample testimony to the truth of what the Doctor asserts, *Nat. Hist.* p. 133, "That this subterraneous Heat or Fire, which thus elevates the water out of the Abyss, being in any part of the earth stopped, and so diverted from its ordinary course, by some accidental glut or obstruction in the pores or passages through which it used to ascend to the surface; and being by that means preternaturally assembled, in greater quantity than usual, into one place, it causeth a great rarefaction and intumescence of the water of the Abyss, putting it into very great commotions and disorders; and at the same time making the like effort upon the Earth, which is expanded upon the face of the Abyss, it occasions that agitation and concussion of it which we call an Earthquake.

"That this effort is in some earthquakes so vehement that it splits and tears the Earth, making cracks or chasms in it some miles in length, which open at the instants of the shocks, and close again in the intervals betwixt them: nay, it is sometimes so extremely violent, that it plainly forces the superincumbent Strata; breaks them all throughout, and thereby perfectly undermines and ruins the foundations of them; so that these failing, the whole Tract, as soon as ever the shock is over, sinks down to rights into the Abyss underneath, and is swallowed up by it, the water thereof immediately rising up, and forming a lake in the place where the said tract before was. That several considerable tracts of land, and some with cities and towns standing upon them; as also whole
whole mountains, many of them very large and of a great height, have been thus totally swallowed up.

"That this effort being made in all directions indifferently, upwards, downwards, and on every side, the fire dilating and expanding on all hands, and endeavouring, proportionably to the quantity and strength of it, to get room, and make its way through all obstacles, falls as soul upon the water of the Abyss beneath as upon the earth above, forcing it forth which way soever it can find vent or passage; as well through its ordinary exits, wells, springs, and the outlets of rivers, as through the chasms then newly opened; through the Camini or spiracles of Ætna, or other near Volcanoes, and those Hiatus's at the bottom of the sea, whereby the Abyss below opens into it and communicates with it.

"That as the water resident in the Abyss is, in all parts of it, stored with a considerable quantity of heat, and more especially in those where these extraordinary aggregations of this fire happen, so likewise is the water which is thus forced out of it; insomuch, that when thrown forth, and mixed with the waters of wells, of springs, of rivers, and the sea, it renders them very sensibly hot.

"That it is usually expelled forth in vast quantities and with great impetuosity, insomuch that it hath been seen to spout up out of the deep wells, and fly forth, at the tops of them, upon the face of the ground. With like rapidity comes it out of the sources of rivers, filling them so of a sudden as to make them run over their banks, and overflow
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overflow the neighbouring territories, without so much as one drop of rain falling into them, or any other concurrent water to rise and augment them. That it spues out of the chasms opened by the Earthquake in great abundance; mounting up, in mighty streams to an incredible height in the air, and this often-times at many miles distance from any sea. That it likewise flows forth of the Volcanoes in vast floods, and with wonderful violence. That it is forced through the Hiatus's at the bottom of the sea with such vehemence, that it puts the sea immediately into the most horrible disorder and perturbation imaginable, even when there is not the least breath of wind stirring, but all, 'till then, calm and still; making it rage and roar with a most hideous and amazing noise; raising its surface into prodigious waves, and tossing and rolling them about in a very strange and furious manner; oversetting ships in the harbours, and sinking them to the bottom; with many other like outrages. That it is refounded out of these Hiatus's in such quantity also, that it makes a vast addition to the water of the sea; raising it many fathoms higher than ever it flows in the highest tides, so as to pour it forth far beyond its usual bounds, and make it overwhelm the adjacent country; by this means ruining and destroying towns and cities; drowning both men and cattle; breaking the cables of ships, driving them from their anchors, bearing them along with the inundation several miles up into the country, and there running them aground; stranding
stranding whales likewise, and other great fishes, and leaving them, at its return, upon dry-land."

And again, *Nat. Hist. of the Earth Illust.* p. 104. "Now since there are, on record, earthquakes, and indeed not a few, by which the globe, for many hundred miles together, has been shaken at the very same moment of time, it thence follows, that the waters, which caused those concussions, were not only equal in extent to that space of the globe which was so shook, but one fluid body continued, and not divided into parts or distinguished into regions, so that particular portions thereof should be confined each to its proper cavern. Nay, there want not instances of such an universal concussion of the whole globe, as must needs imply an agitation of the whole abyss. For an effect of so vast an extent could never have proceeded but from a cause equally extensive, such as might affect the whole earth at once; which cannot be done without such an orb of water as I have described. We have had accounts from writers of the most unquestioned fidelity, and even from eye-witnesses, that there have been earthquakes, in our own times, wherein the motion, given to the earth at the several shocks, perfectly resembled that of the waves of the sea raised by a strong wind. Whoever shall rightly attend to this phenomenon in particular, he must, not only acknowledge that the earth contains in it an abyss of water, and is moved by the same; but must also readily agree with me that this terrestrial part of the globe is nothing but a thin shell.

*See Ray's Physico-Theological Discourses*, p. 13.
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Shell, which includes in it, closely on every side, an immense mass of waters, and whenever those waters happen to be put into any extraordinary motion, the earth is by them moved and agitated just in the same manner as the inclosed waters are moved and agitated."

VI. That there is an Abyss of waters beneath the earth, may be still farther shewn from the quantity of water that has been discovered in the inside of the earth, in opening the strata either for stone, coal, &c. in digging for wells, &c. in searching after minerals, ores, &c. from sudden and accidental eruptions of water out of the bowels of the earth; or from discoveries of subterranean waters that have been made by any other means, either accidental or designed, that do not properly come under the heads I have already discussed.

Mr. Hutchinson in his Observations on the earth (see Vol. XII. of his works, p. 331.) says, "It is hardly credible how great a quantity of water will be sometimes flung upon miners, when they come to break up strata of stone that have in them many of these cracks, that are so small that they are hardly discernible. These are indeed the natural conveyances of water; and, when once they are opened, it runs incessantly. I have observed such an irruption of water in vast quantity out of Stone, that, exempting those cracks, is much too dense and close to let any, the least, humidity pass."

The vast profusion of water that sometimes ensues the breaking up of the strata in Coal-pits is
is well known to all that are in the least conversant in that affair; and what amazing quantities are drawn off from deep mines, either by drains or levels, or raised by engines, is also well known: nay, in digging common wells and ponds, in places where there are no Springs above ground, it frequently happens, that such a glut of water issues forth as to endanger the lives of the workmen. Of this Dr. Shaw gives us a remarkable instance in his Travels, p. 135, "The Villages of Wadreagg [in the eastern province of Barbary] are built in a plain, without any river running by them, and are supplied in a particular manner with water. They have, properly speaking, neither fountains nor rivulets; but by digging wells to the depth of an hundred and sometimes two hundred fathoms, the inhabitants never fail of obtaining a plentiful stream. And to this purpose, they dig through different layers of sand and gravel, 'till they come to a stony kind of stone, like unto Slate, which is known to lie immediately above the [Babar taht el Erd] Sea below ground, as they seem to call the Abyss. This is easily broken through; and the flux of water which followeth the stroke riseth generally so suddenly and in such abundance, that the person let down to perform the operation hath sometimes been overtaken and suffocated by it, though raised up with the greatest dexterity."

Of sudden Eruptions of water from out of the bowels of the earth there are several accounts recorded in history, some that have overflowed whole countries, others large towns and cities, others
others villages: of these the reader may see several accounts in Kircher's Mundus Subterraneus; Ebrartus de Belemnitis Suevicis, Praefamen; Phil. Trans. &c. I shall cite one account from the last mentioned Treatise, in order to give the reader an idea of such Eruptions, No I. p. 9. "In the beginning of July 1678, after some gentle rainy days, which had not swelled the waters of the Garonne more than usual, one night this river swelled all at once so mightily that all the bridges and mills above Tolouse were carried away by it. In the plains which were below this town, the inhabitants, who had built in places which by long experience they had found safe enough from any former inundations, were by this surprized; some were drowned together with their cattle; others had not saved themselves but by climbing of trees, and getting to the tops of houses; and some others who were looking after their cattle in the field, warned by the noise which this horrible and furious torrent of water (rolling towards them with a swiftness like that of the sea) [in Britaigne he means] made at a distance, could not escape without being overtaken, though they fled with much precipitation: this nevertheless did not last many hours with this violence. At the same time exactly, the two rivers only of Adour and Gave, which fall from the Pyrenean hills, as well as the Garonne and some other little rivers of Gascoyne, which have their source in the plain, as the Gimone, the Saue, and the Rat, overflowed after the same manner, and caused the same devastations. But this accident happened
not at all to the Aude, the Ariège, or the Ariège, which come from the mountains of Foix, only that they had more of the same than those of the Confluent, the Comminge, and the Bigorre. M. Martell (by the order of M. Foucault) hath searched after the cause of this deluge, being assured that it must have had one very extraordinary: for all who had seen the circumstances agreed, that it had rained indeed, but that the rain was neither so great, nor lasted so long, as to swell the rivers to that excess, or to melt the snows of the mountains. But the nature of these waters, and the manner of their flowing from the mountains, confirmed him perfectly in his sentiments. For, 1. the inhabitants of the lower Pyreneans observed, that the water flowed with violence from the entrails of the mountains, about which there were opened several channels which, forming so many furious torrents, tore up the trees, the earth, and great rocks, in such narrow places where they found not a passage large enough. The water also which spouted from all the sides of the mountain in innumerable jets, which lasted all the time of the greatest overflowing, had the taste of Minerals. 2. In some of the passages the waters were slinking (as when one stirs the mud at the bottom of the mineral water) in such sort that the cattle refused to drink of it, which was more particularly taken notice of at Lombéz, in the overflowing of the Saue (which is one of the rivers) where the horses were eight hours thirsty before they would endure to drink it. 3. The Bishop of Lombéz having
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having a desire to cleanse his gardens, which the
Sea, passing through by many channels, by this
overflowing, had filled with sand and mud; those
which entered them felt an Itching, like to that
which one feels when one bathes in Salt-water,
or washes oneself with some strong Lixivial. This
Itching could not be produced by either rain or
snow water, but by some mineral Juice, either
Vitriolic or Aluminous, which the waters had
dissolved in the bowels of the mountains, and had
carried along with it in passing out through those
numerous crannies. For these reasons M. Mar-
tell believes the true cause of this Overflowing to
be nothing else but subterraneous Waters."

I might here add an account of the Rivers
that are known to run wholly under-ground, and
even of the Cataraëts that have been discovered
there (of which Herbinius in his *Dissertationes de
admirandis Mundi Cataraëtis, supra & subterraneis,*
&c. gives a description) but to avoid prolixity shall
conclude with observing, that the deeper we pene-
trate into the earth, the greater quantity of water
is met with, and that generally this water breaks
forth in such a manner as manifestly shew that
it is raised by a power from underneath, thereby
plainly indicating its subterranean origin.

Thus I have produced several arguments to
prove that there is an *Abys of water beneath the
earth*; and several others might be brought; but
these may more naturally be introduced under
some of the subsequent heads. For I would
observe here, once for all, that there is such a
close connection between the several parts of the
R 2 subject
subject I am treating of, or the Heads I have been obliged to divide it into, that very often one and the same argument (or at least with the help of a few additional sentences) will prove two or three of these Heads, but yet is more immediately applicable to one; I shall therefore dispose of it under its proper Head, and as far as it affords proof for other particulars, deduce them by way of corollaries or conclusions.

But before I quite finish the Article I am now upon, it may not be amiss to endeavour to shew what the Form and what the Size of this Abyss may be.

From what has been already said (p. 212.) it appears that the Abyss and the Ocean are in conjunction with each other, and therefore that the Abyss is not divided into separate parts or distinguished into large detached caverns (as some have imagined) but is one continued and united body of water, and equal in extent to the circumference of the lower part of the shell of the earth, and lying immediately under it; as is also evident from what is said page 238. And therefore as the Shell of the earth is of a round form, we may justly esteem the Abyss to be so likewise, as it is represented in Plate the Second by G. H.

And that the Abyss is really of this form we have better proof than any that can be deduced from natural evidence, for He who made it and the whole earth hath assured us that it is so, as I have shewn p. 43, 44; and in order to strengthen the comments there made upon Scripture, and to add authority to the justness of them, I shall cite the
the opinion of the celebrated Stackhouse in his History of the Bible, p. 125. I select this writer (out of several that might be brought) not only because he has determined the Form of the Abyss, but has spoken of the Size of it, and given a calculation by which the reader may judge of the quantity of water contained therein. "It is certainly (says he) more than probable (because a matter of divine Revelation) that there is an immense body of water enclosed in the earth, to which the Psalmist plainly alludes when he tells us, that (Psal. xxiv. 2.) God founded the earth upon the seas, and established it on the floods; that (Psal. cxxxvi. 6.) he stretched out the earth above the waters; that (Psal. xxxiii. 7.) he gathered up the waters as in a Bag (so the best translations have it) and laid up the Deep as in a Storehouse. Nay, there is a passage or two in the Proverbs of Solomon (where Wisdom declares her Antiquity, and pre-existence to all the works of the earth) which sets before our eyes, as it were, the very Form and Figure of this Abyss; (Prov. viii. 27, 28.) When he prepared the heavens, I was there, when he set a Compass upon the face of the Deep, and strengthened the Fountains of the Abyss. Here is mention made of the Abyss and of the Fountains of the Abyss; nor is there any question to be made, but that the Fountains of the Abyss here are the same with those which Moses mentions, and which, as he tells us, were broken up at the Deluge. And what is more observable in this Text, the word, which we render Compass, properly signifies a Circle or Circumference, or an Orb, or Sphere: so that ac-
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cording to the testimony of Wisdom, who was then present, there was in the beginning a Sphere, Orb, or Arch, set round the Abyss, by the means of which, the fountains thereof were strengthened; for we cannot conceive, how they could have been strengthened any other way, than by having a strong Cover or Arch made over them. If such then be the form of this Abyss, that it seems to be a vast mass or body of water, lying together in the womb of the earth, it will be no hard matter to compute what a plentiful supply might have been expected from thence, in order to effect an universal Deluge. For if the Circumference of the earth (according to the lowest computation) be twenty-one thousand miles, the diameter of it (according to that circumference) seven thousand miles, and consequent from the superficies to the center, three thousand five hundred miles; and if (according to the best account) the highest mountain in the world (taking its altitude from the plain it stands upon) does not exceed four perpendicular miles in height; then we cannot but conclude, that in this Abyss there would be infinitely more water than enough, when drawn out upon the surface of the earth, to drown the earth, to a far greater height than Moses relates.”
II.

I am now to prove that the whole Earth was covered to an immense height by this Subterranean Water, or that the Deluge, in the time of Noah, was universal; the Fountains of the Great Abyss having been broken up, and the water thereof elevated above all the high Hills under the whole heaven.

And, first, to begin with proofs deducible from the circumstances of things on or near the Surface of the Earth.

I. The Division of the surface of the earth into Mountains, Hills, Combs, Dales, Vallies, &c. is so obvious and striking, that few or none but must have observed it; though probably but few have seen how far this regularly irregular Division (as I may justly call it) was owing to and is a proof of an universal Flood, or that the surface of the earth has been covered to a great height by an inundation of water. I shall therefore enlarge on this article, and point out the evidence deducible therefrom.

Mountains and Hills have generally on all sides a regular descent or inclination from their tops, greater or less, longer or shorter. And when separately considered, and without attending to every little inequality, may be said to be of a conical or pyramidal shape; and when many lie close together, or are continued in a direct chain through whole countries, they may be said to be of a prismatical form.
The point therefore to be decided is, Whether this be their original shape, that which was necessarily produced by, and in which they have always remained since, the first situation of their materials in the places they now stand?—Or, Did they obtain their present form afterwards, i.e. were their original materials modelled, framed, or brought into this shape by the action of some outward Cause?—And what was that Cause?

That Mountains were not originally of this shape seems evident from the manner in which their materials or constituent parts subsided and at present lie, they being disposed in strata, beds, or layers (whether of stone, clay, chalk, &c.) of equal thickness throughout, and regularly lying upon each other in a flat, level, or horizontal position; which situation of all others seems the least proper for disposing such materials into a conical or prismatical figure. Did their strata or layers stand one against another in a sloping posture like the ridge of a house, or even perpendicularly upright, it might more probably have indicated their present shape to have been the original; but since they are posited in a flat, level situation, (which is the most different from any of the upright forms) it seems plainly to shew that their present shapes were not the original, but are owing to some external force. *

Which is farther evident from hence, that in mountainous countries, which consist of the same kind of strata, the strata in each mountain shall exactly answer or correspond together in every

* See Note x in page 153.
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every respect—in species, in colour, in depth, in thickness, in situation, and in their contents. So that suppose the first [under the vegetable mould] or uppermost stratum to be of a whitish coloured Sand-stone, one yard thick; the second a red Marl, two yards; the third a blue Lime-stone, containing shells, teeth, bones, &c. of particular kinds, one yard thick; the fourth a blue Clay, containing native fossils, such as selenitiæ, pyrita, &c. three yards thick; the fifth a grey Flag-stone, eight yards thick; the sixth a stratum of Coal, [with its usual attendant, a black clayey slate, replete with plants of all sorts] two yards thick; the seventh a Rag-stone, ten yards thick; the eighth a Free-stone, containing a great variety of shells, twelve yards thick; the ninth a red Sand-stone, sixteen yards thick; the tenth a stratum of grey Lime-stone, containing a great variety of corals, shells, &c. reaching to the bottom of the mountain.* Now in the same order and

* If any person should be desirous of examining the strata of the earth in a mountainous country, and should not find any great variety of strata, or even but one single stratum, yet upon strict inspection, or rather at first sight, he will perceive that this single stratum is divided into a great number of lesser strata or small layers, which will be easily distinguishable from each other, either by their colour, depth, thickness, or more remarkably by their contents, or the fossil bodies they contain, one layer abounding with one species of shells, another with a different; another layer containing bones and teeth of fishes; another corals of various kinds, &c. &c. &c. so as to afford him evident marks by which he may distinguish one layer from another, almost as readily as if there had been strata of different substances.

In the description of the above supposèd Mountain the Strata are not represented as lying according to their specific Gravities, for however commonly received the opinion is that they do so lie, yet I never
and in the same horizontal position you shall find similar strata in each mountain throughout such a country.—The question therefore is, whether they were not all once united, or the strata continued throughout in one entire body, without any of those Eminences we call Mountains, or those Hollows called Vallies? And if so, then the present mountainous form was not the original, or these mountains were not coeval with, or any ways owing to, the disposition of their materials or the settlement of their strata.

Now in order to shew that the strata in these mountains were once wholly continued, let a person first examine a single chain or ridge of them, running for ten, twenty, or thirty miles only, [and they sometimes continue for several hundred] in which chain particular mountains are distinguishable from each other only by the separation or vacant spaces between their tops, reaching to different depths and at various distances; and suppose, upon examination, he should find that the strata in each of the tops were of the same kind, colour, thickness, &c. (as above described) and lying in the same position, and only parted from each other by the vacant spaces between their summits, and that the strata underneath,

I never could find them in this situation in any place that I have seen. And the several experiments and observations that have been made upon the strata of the earth, when opened to the greatest depths, shew that they do not lie according to their specific gravity; see in particular Philosop. Trans. No. 336, Art. xi. No. 250, Art. ii. No. 360, Art. iv. No. 391, Art. i. Varenius's Geography, Lib. i. cap. vii. Propos. 7. Hauskbee's Experiments, p. 317, Experim. xx. Luidii Lythobii, p. 110,
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derneath, in the body of the mountain, were quite whole and entire, lying in the same direction or parallel with those in the tops,—would he not conclude that the uppermost strata were likewise once whole and united [which are now only discontinued by the comparatively small vacant spaces between the summits of the mountains] as well as those that are underneath? Especially, if he were to remark that, where the separation between the tops of some of the mountains was not so great or deep as in others, the strata that did not appear in the rest would appear in these; or suppose the depth of the space between some of the mountains to be no more than thirty yards, or to reach down to the stratum of Free-stone (in the above description) but that in other of the vacant spaces between the mountains even this stratum of Free-stone should not be found, or, as is frequently the case, only a part or half of it be wanting,—would he not conclude, that the other part was formerly subsisting in its due place and order? And if he would judge thus of this stratum, doubtless he would determine the same of the rest, and that the vacant spaces between the tops of the mountains throughout this chain were formerly filled up with their respective strata.

Judging then thus of this single Ridge of mountains, let him now extend his view on every side, and behold how exactly parallel the same kind of strata in the adjacent mountains lie with their similar ones in this chain, and he will as readily conclude that they were all once in conjunction
junction and the vallies between them filled up with corresponding strata, as those vacant spaces were between the tops of the first chain of mountains he examined. — In short, if a person was to see the broken walls of a palace or castle that had been in part demolished, he would certainly conclude that the breaches or vacant spaces in those walls were once filled up with similar substances, and in conjunction with the rest of the walls, and could easily with his eye see the lines in which the walls were carried, and in thought fill up the breaches and re-unite the whole: and in the same manner if a person was to view the naked ends or broken edges of the strata in a mountain on one side of a valley, and compare them with their correspondent ends in the mountain on the other side of the valley, he would manifestly perceive that the space between each was once filled up, and the strata continued from mountain to mountain. So that the present conical shape of mountains was not coeval with their substances or with their inward and original form; they being primarily of no outward form, if I may so say, or rather there were once none of those Eminences upon the earth which we now call Mountains; for when the strata of the earth were whole and entire, and in conjunction with one another, and the vacancies that now occasion vallies, dales, &c. filled up with their respective strata (which was during the height of the Deluge, before the waters began to retire) the Earth must have been of one spherical form without mountains, hills, dales, vales, &c. and all the strata must have lain originally
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Originally *horizontally* upon one another, or rather, to speak philosophically, *concentrically* with each other.

And what farther shews that mountains are only *Eminences* of the earth, caused by the excavation or scooping out of the substances or strata that formerly occupied those *Hollows* which we now call Vallies, Dales, Combs, &c. is this, that it may be demonstrated, that the origin of mountains cannot be owing to any *Elevation* or *Depressian* of their strata; though most writers have attributed it to this cause, and supposed them to have been produced by Disruptions *from within the earth*, occasioned by the breaking out of subterranean fires, earthquakes, &c. whereby the strata became elevated in some places, and depressed in others: but this could not have been the case. For the strata of Mountains in the inland countries (and such *mediterranean Eminences* are properly to be termed *Mountains*, Hills being less, and situated at a distance from mountains, and nearer the sea) are generally; and if the highest or most inland in the Continents or Islands on which they stand, are, I may venture to say, always poised in an *horizontal* direction, or but very little inclining therefrom, and even this inclination accountable from other causes than Disruptions, as will be seen in the process of this treatise. Now the strata of Mountains being thus

† Thus much I can say for certain, that the *Strata* in some of the highest ridges of Mountains in England and Wales are *horizontally poised*, which is a plain proof that Mountains in general
thus horizontally placed, which also appearing to have been their original position, (as will more clearly be shewn hereafter) is an undeniable proof, that they have not been displaced, and therefore that these eminent parts of the earth were not owing to any Elevations or Depressions of their strata; for had they been produced by either of these means, the strata must have been inclined in various angles, and placed in the most different directions from the horizontal.

Besides, had Mountains been owing to the Elevation or Depression of their strata, the outsides and forms of Mountains would have been shaped might have been, and that these in particular really were, formed without any elevation or depression of the strata: and hence also it appears that the horizontal position is the original and natural situation of the strata. And in such mountainous places where I have observed the strata to be somewhat inclined, it has generally been where there are large and deep vallies, steep precipices, naked rocks for a great extent of ground, and many other such like proofs that the Agent (the water, as will be seen hereafter) that tore out the hollows of the dales and vallies, passed off with great rapidity, and acted with great force upon the subjacent strata; in doing which it would naturally (in such places where there was a variety of strata) wash and carry away the more soft and brittle strata, and by this means undermine, and so incline, the superior beds of stone, &c. and in many places I have remarked, particularly upon the sides of steep mountains, that this inclination of the strata is but for the depth of some feet, or what I may call, superficial; and that the beds of stone upon the top of the mountain are but little, or not all, inclined; and in the body of the mountain are horizontally posited: which plainly shews, that the upper strata only have been moved, and moved too by some outward cause, and not the whole body of the mountain, either by elevation or depression of the strata.

Marsili (who spent his whole life almost in making observations on the Earth) says, that the general situation of the strata in the mountains, all over that part of Europe which he had travelled, was horizontal or nearly so. Histoire de la Mer, p. 7.
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shaped or in a great measure have answered the inward position of the strata; whereas this is seldom the case; and in Mountains where the strata are horizontal, never can be, provided those Eminences are of the common pyramidal or conical shape; but where such have large extensive plains or much level ground upon their tops, the outward shapes of these indeed usually answer or correspond with the inward level site of the strata; but such flat eminences as these are not what we generally understand by the term Mountains, and ought rather to be called, as they commonly are, high Plains or Downs. And in such mountains or rather Hills where the strata are inclined, I have seen the outward form very different from what one might expect from the inward inclination of the strata, nay, sometimes directly contrary to it.

It being then thus certain, that the present outward form of Mountains was not owing to either the inward disposition or present situation of the strata, and that the vacant Spaces between the tops and sides of mountains were once filled up, it must follow, That these high and eminent parts of the earth were caused by some external Agent, or Means, that acted upon the outward surface of the earth, and which, by tearing off and carrying away the matter or strata that formerly occupied those places we now call vallies, left those Eminences standing, which we now call Mountains.

And that this was really the case will yet more manifestly appear, in tracing out what that Agent was
was that effected this, which is the next thing to be considered.

That the outward form of Mountains was owing to the action of some Fluid, which by softening and mollifying the parts gradually wore and tore away the circumjacent strata, is evident from the conical shape, regular slope, or gradual descent of Mountains from their tops quite down their sides; and when we consider the bulk of a mountain, and the prodigious number of them upon the earth, there is no Fluid of a nature proper, and in quantity sufficient, for effecting this but Water.

And that Water was the Agent is farther evident from the general tendency or declination of the sides of mountains down towards the Sea, especially in islands and peninsulas, chiefly and more remarkably in such as are longer than they are broad; and in necks or promontories of land that jut out into the sea, and have water on both sides of them. So in the islands of Cuba, Hispaniola, California, Madagascar, Sumatra, Suconia, St. Christopher, and many others, there is a ridge or chain of mountains running directly through the middle, in a line with the length of those islands and peninsulas, gradually lessening with gentle declivities on each side, tending outward or falling away down towards the two seas [not inward towards the land], just in such a manner as Water descending from the tops of these ridges would naturally have torn and carried away the ground, and so have formed regular descents on both sides; which descents generally continue
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continue for several miles underneath the sea; for it is a common observation with mariners, that where the shore lies nearly level or upon a gentle descent, that there the sea gradually increases deeper and deeper the farther you proceed from land; so as plainly to shew, that the ground underneath or the bottom of the ocean was formed after the same manner, and is only a continuation of that at land: since then these Descents or Declivities are at present in part covered with water, there can be no reason to doubt that this was the Agent that formerly covered and formed the whole.

Thus also in Promontories or parts of land that project into the Sea, where such are long and narrow, there is commonly a ridge or several ridges of mountains passing through the middle with gentle declivities on each side. Thus in Italy the Apennine mountains are continued lengthways through the middle of that country; and divide it in two parts, just in the manner (as it has been represented) as the back-bone of an animal does his body; similar is the situation of the mountains in Norway, Malacca, Corea, Cambodia, India within the Ganges, the south part of Africa for several hundred miles, and far as many in the south part of America, &c. And what is farther remarkable in Promontories and such procurent parts of land, they generally, and especially where there is an open and free Sea, 

gradually lessen and terminate in a point like a Wedge; which is exactly the form that water, retreating from the upper lands and falling on each side, would naturally shape and reduce it into.

Whereas the effects of the water, descending from the surface of such extensive parts of the earth as large Continents are, would exhibit a different appearance of things from what they do upon islands and promontories; for in this case the water would take many and various courses, according to the greater number, distance, and irregular situation of the Passages or Inlets it had into the Abyss (which inlets we may suppose to be in such places where Seas and large Lakes are at present); and also according to the greater variety of the Strata it had to act upon (many of which strata would resist, and as many yield to, the force of the water; and some more, some less) so that under such manifold and different circumstances we might expect to find the Chains or Ridges of Mountains upon large Continents lying in many and various directions; and accordingly we do find them.

But yet, in some degree, the outward form or surface of Continents and Islands would resemble each other; for upon both, and even where there were no remarkably great mountains, we might reasonably imagine, that the inland parts would be the highest, or more eminent than the maritime; for the water would act more strongly and tear off a greater quantity of the earth near the sea-coasts than higher up within the
the land; and this, for two reasons; — because
the Passages into the Abyss lay nearer the sea-
coasts, and thither the whole force of the water
was directed; — and because all the water that
covered the inland parts of the earth would flow
over and act upon the maritime, and would bring
along with it large fragments of rocks and a great
quantity of rubbish, which by being driven upon,
would wear and tear away, the land near the sea-
coasts to a great degree; and therefore the medi-
terranean parts of Islands and Continents would be
left, or but little, torn; and on this account, after
the retreat of the water, be left standing highest.
And this also we find to be fact: as is evident
from the courses or falls of rivers; they generally,
or indeed almost universally, taking their rise in
or near the Middle of Continents and Islands, and
flowing down towards, at last empty themselves
into the Sea; and as it is certain that the fall of
water is always from the higher to the lower
grounds, so it is as certain that the inland parts
of the earth are higher than the maritime.

Besides, it is a common observation, that moun-
tains or inland Eminences are higher and their
descents or sides longer than those of Hills;
which are generally shorter, but their sides or
falls more sudden and precipitous; and that the
strata in Mountains are horizontal, but in Hills
(or lesser Eminences nearer the sea) are generally
oblique or inclined. All which is exactly con-
sonant to what a Flood of water, retreating from
the surface of the earth, would naturally pro-
duce; as is evident from what has been laid in

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the above paragraph: and the truth of the fact may be exemplified from the manner in which water moves when permitted to run out at an orifice at the bottom of a large and deep vessel; the chief action or motion of the water is at and near the orifice; while the surface is almost calm; and if the bottom of the vessel be made of any matter that will yield to the force of water, it will be most torn at and near the orifice, since the current will be there strongest: and so, as the water, that covered the earth, retreated from the surface towards the apertures in its shell, the chief motion and violence would be at the mouths of the orifices that led into the abyss, whither the whole body of the water tended, and its whole force was exerted; and near these apertures the currents of water would be very strong and rapid, and which, by washing away the more soft and brittle strata, would undermine whole ridges of mountains and lay their strata in a sloping posture, and by its continual action in passing over these ridges, would reduce and wear them less and less until they came to be of their present size or Hills. But higher up or at a greater distance from the sea, the force would be proportionably diminished, as the quantity of water would be less and the current weaker; so that the strata in mountains are but little or not at all disturbed from their original horizontal position; and as a less degree of force was exerted in forming them than in Hills, so their descents would of course be longer and more gradually declining than those of Hills.

And
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And from what has been just said, we may see the propriety of Mons. Buache's plan of the disposition of Mountains, as laid down and delineated in Histoire de L'Acad. des Scien. An. 1752; Nov. 15. according to which, the greater or most remarkable Ridges of Mountains upon the several Continents of the earth take their rise in or near the middle of large Tracts of land; and are stretched out, as radii, from some high and extensive Plains; one of which plains rises in Africa, another in Asia, two small ones in Europe, one in North and another in South America; and from each of these, respectively, issue out, like horizontal shoots from a flock, several long Ridges or Chains of Mountains.

In order to see the reason of this from Experiments, and how far it would favour our present hypothesis, I provided a large vessel of Glass, had several holes of different sizes bored in the sides about six inches from the bottom, and stopped each with cork: I then filled the vessel with water; and having pulverized before-hand certain portions of the various strata of which the earth consisfs, as Stone, Coal, Clay, Chalk, &c. I permitted these substances to subside one after another through the water, till the terrestrial mafs reached about two inches above the level of the holes: and the whole settled in regular layers one upon another, just according to the disposition of things in the earth. I then (with the assistance of another) pulled the corks out of each hole as nearly at the same time as possible. The water immediately began to drive the earthy parts through...
the holes, and scooped or tore the surface of the earthy mass in such a manner as that the deepest Hollows were near the Apertures, *i.e.* where the force was greatest, and the several furrows gradually less and less, towards the middle part; as the force of the water was proportionably diminished to its distance from the place where its most violent action was: so that at the greatest distance from the apertures, *i.e.* in the middle of the heap of the terrestrial mass there were no furrows at all, and that part remained the highest of all the rest, and answered to one of the above-mentioned high plains upon the surface of the earth: and from this middle-part there tended several ridges, between the furrows leading down towards the holes in the vessel, just in such form as the chains of mountains, which take their rise in or near the middle of some Continent upon the earth, and tend, like radii, from some high inland plain towards their respective apertures in the Seas next adjoining.—Besides, the strata in the middle-part of the terrestrial mass remained immoveable, and without the least alteration, but those near the apertures in the vessel were bent and inclined, and in some parts confusedly mixt together, agreeably to the disposition of things in the earth, with respect to inland and maritime Eminences, as I have observed already.

Thus do the phænomena on the surface of the earth, with regard to Mountains and Hills, higher and lower lands, both upon islands, peninsulas, promontories, and continents, exactly answer to, and manifestly shew forth, the effects of a Flood of Water
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Water which once covered the whole, and gradually retreated therefrom.

And this will be still more evident if we descend to a particular examination of the form, situation, and cause of Combs, Dales, Vallies, &c. It was necessary to speak somewhat of these before, but they deserve a separate and closer consideration than could hitherto have been conveniently bestowed upon them.

A Comb, a Glin, a Dingle, or a Gill, &c. (for it passes under different names in different parts of England) is a gradually increasing or gently declining Hollow upon the surface of the earth, the sides regularly sloping down towards the middle part. They are of various sizes; some being not more (or even less) than three or four hundred yards in length, fifty in breadth, and twenty in depth at their largest end; others there are that are three or four miles in length, a mile in breadth, and four or five hundred yards deep; and others of all intermediate sizes. They generally begin at a ridge of mountains or hills, and tend down their sides towards the lower lands; their beginnings or upper parts are very small, in some places scarcely perceptible; and they gradually open or increase to some of the above-mentioned lengths, breadths, and depths. The strata in most of them are bare and visible, if not throughout the whole Comb, yet in some part or other, or rather in several parts; and the broken ends or edges of the rocks that project from each side generally answer each other to a surprising exactness; and near the beginning or in the upper parts of the Comb they almost
almost touch and meet each other, and at the very beginning are united; and so leave no doubt to conclude but that the strata were once in contact, or continued in parallel lines from side to side throughout the whole Comb. And this mutual agreement between the strata on each side of Combs evidently shews, that these and such like Cavities were caused by some outward Agent that acted upon the surface of the earth, and which, by tearing off and carrying away the interjacent strata, left these Hollows, and were not owing to any inward disruption, or a force from beneath: for had this latter been the case, it could not be but that the strata on one side or other of Combs would always appear elevated or depressed, or some way or other altered. And it is farther demonstrable that Combs and Gills were not owing to any inward disruptions, since it is common to observe in such of them as have rapid rivers

2 Sometimes indeed the strata on one side of a Comb are different both in kind and situation from those on the other; but then the reason is evident upon the spot; as, first, either the Comb was formed in a place where the ends of different strata met, or in a deep fissure, or two or three Combs happened to be formed near together, and by the side of each other, and then the Agent that tore the largest has shelved off, or inclined the strata of the larger towards the lesser, there being no strata on the back part (on account of the cavity of the lesser Comb) to support it; or some such accident or other has made a difference, which will be at once manifest to a judicious spectator. And these accidents generally happen in hilly countries, or such as are near the sea, where the water of the deluge, in its retreat from the surface of the earth, descended with violence and acted with great force; whereas higher up in the inland countries, or near the mountains, the Combs and Gills are generally very regular and exact, and the broken edges of the strata on each side tally and correspond to the utmost nicety.
rivers or strong currents of water running through them, that the strata at their bottoms are whole and entire, and lie parallel with those above; nay, when miners have occasion, in tracing or pursuing a vein of ore, to dig under Combs, they find the strata beneath as regularly placed and in the same direction as those above, and where they are horizontal above they are horizontal below; which affords an undeniable argument that Combs were not formed by any Force from beneath, but by the operation of some outward Cause.

Now when we consider the general regularity, smoothness, gently-sloping sides, and the gradually-increasing length, breadth, and depth of Combs or Gills, we can attribute the Cause of their formation to no other Agent than Water, that formerly covered the tops and ridges of the Mountains and Hills where these sloping Hollows are now found, and which, by descending from thence, gradually tore and furrowed the earth into so many alvei or channels, just in the same manner as water, falling in a sudden and great thunder-shower, and retreating from the hills above towards the sea or any great river, tears and wears channels in the ouze or mud upon the shore.

Another mark—that Gills and Combs were formed by currents of water—is the serpentine shape or winding course of such as are long and large, and the apparent causes of such deflexions or curvatures. For water descending from the mountain-tops would of course be diverted from a rectilineal motion (especially if it ran for any considerable
considerable length) by reason of the different strata, or different constitution of the same strata it acted upon; some parts being hard, others soft, some having but few, others many and large cracks, &c. and according to the different circumstances of these accidents the course of the water would be varied, and the stream occasionally diverted from the parts that resisted most towards those that resisted less: and on the same account, there would be many and various streams rushing down the sides of the same mountain, and as these would be irregular and winding, two or more would frequently unite, particularly the lesser fall in with and join the larger; and of this there are manifest marks and the effects now remaining; for it is common to observe at such places where a long and large Comb begins to turn off, that there is a furrow or channel now visible upon the surface of the earth, and the Comb is deflected from its former course according to the angle in which this furrow meets it (allowing for the size of the furrow) and also is proportionably broader and deeper according to the size of this concurring channel; manifestly shewing, that where the stream that formed this lesser furrow met the larger, that there the deflexion would naturally begin, the Comb be turned off and enlarged, in proportion to the additional force of the Current that formed this lesser channel.

Many such observations as these might be made, if we were to consider particularly and minutely the form and situation of the mountain or hill in which the Comb lies, the constitution and
and position of the strata within, the course of the fissures, the shape of the valley beneath, the distance of the sea, or any great lake, &c. from each and all of which many and different proofs might be drawn, plainly indicating that Combs were formed by currents of water; but these are easier to be seen and discovered by a spectator than to be described to a reader; and they will be very evident to any one that has had but the hint given him, that Combs and Gills were channels torn in the earth by the descent of water from the upper lands.

And what has been said above in relation to Gills may in a great measure be applied to Dales; which begin at the end of two or more Gills, and gradually increase in length, breadth, and depth, in proportion to the number and size of the Gills that lead into them; just in the same manner, and as evidently by the same means, as the larger Combs were increased and opened by the streams of water that tore the lesser channels that enter into them.

As the Dales fall off from the mountains, and meet or unite at a greater or less distance, a still larger Hollow presents itself; which gradually opens and dilates as the former, and constitutes what we call a Valley; of greater or less extent and dimension according to the number and size of the Gills and Dales that descend into it.

At last, at a great distance from the mountains, two or more vallies unite, and open into a wide extensive low-land Plain, or rather a gently-declining Country, which adjoins to the Sea-shore; the
the bottom of which (especially if it is of a soft yielding nature, not rocky and stony) is of a similar form, continues the same declivity, or gradually grows deeper and deeper 'till it ends in an unfathomable Abyss.

And thus does the Whole clearly point out the effects of a Flood of water that formerly covered the mountain-tops, and retreated therefrom down to, and even beyond, the very depth of the ocean; forming (in its passage from the surface of the earth to the center) high up (where its force was weakest) the lesser channels or Gills and Combs; and where several streams united, the Dales; and where the currents, that made the dales, met and joined their forces, hollowing out the Vallyes; and where the torrents that scooped out vallyes opened and expanded themselves, there forming the wide low-land Plains—gradually declining Sea-shore and—the sloping bosom of the Ocean.

Having thus, safely and truly, I hope, conveyed the reader from the tops of the highest mountains down to the bottom of the deepest Seas, we will now take a review of the paths we have trod, and draw some suitable conclusions from the whole.

1. From what has been said, we may see the error of his Lordship's opinion concerning the origin of mountains, p. 88, viz. "That when the Fountains of the great Abyss were broken up, and an immense hollow was excavated out of the earth from pole to pole, as a bed for the sea to lie in; when the rocks, and the lands, and the shells,
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Shells, and the earth, that were taken thereout, were thrown upon the land, and raised in mountain upon mountain, so as to affall the skies and invade the region of the clouds; when Promontories, and Capes, and Head-lands started up in an irregular order, &c." or as it is elsewhere described, p. 118. "At the time of the breaking up the fountains of the Abyss, a great part of the materials, which were scooped out of the earth, as well as those which then lay on the surface of the sand and of the shore, would be loose, separate, and divided, and would float irregularly in that confusion of elements, which such a wonderful operation must have occasioned, not only when flowered down in cataracts from on high, but also when conveyed by the force of the waters of the Sea, which gushed forth, as out of a womb, to the place destined for their abode; where this heterogeneous mass would subside, and form itself into such Hills and Mountains, of such a mixed kind of materials, as we now find them to be, according to the wise designation of the great Author of Nature."

Such was the Manner, such the Means, according to his Lordship, by which Mountains and Hills were produced. From whence it should follow, that Mountains and Hills are no more than huge heaps of Rubbish, thrown out of the Sea, or the place where the sea now is, by the omnipotent Hand of God; — as his Lordship more clearly affirms, p. 108, and 115. But this referring to the first Cause; when the operation was manifestly performed by second Causes, is boldly cutting
cutting the Gordian knot which we cannot fairly untie, and shews neither the Philosopher nor the Divine in this case; for both the Word of God, and the whole face of the earth, declare the contrary, as I have already shewn at large, and shall conclude this section with the Testimony of another Author against this opinion. " We are to consider that a great many Mountains of the Earth are far distant from any seas, as the great in-land Mountains of Asia and of Africk, and the Sarmatic Mountains and others in Europe; how were these great bodies flung through the air from the respective seas, whence they are taken, to those places where they stand? What appearance is there in common reason or credibility, that these huge masses of earth and stone that stand in the middle of continents, were dug out of any seas? We think it Strange, and very deservedly, that a little chapel should be transported from Palestine to Italy over land and sea, much more the transportation of Mount Atlas or Taurus through the air, or of a range of mountains two or three thousand miles long, would surely upon all accounts appear incongruous and incredible: besides, neither the hollow form of mountains, nor the stony matter whereof they commonly consist, agrees with that supposition, that they were press'd or taken out of the channel of the sea.—Then too, we are to consider, that the mountains are not barely laid upon the earth, as a tomb-stone upon a grave, nor stand as statues do upon a pedestal, as this opinion seems to suppose; but they are one continued substance with the body of the earth,
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earth, and their roots reach into the abyss; as the rocks by the sea-side go as deep as the bottom of the sea in one continued mass: and 'tis a ridiculous thing to imagine the earth first a plain surface, then all the mountains set upon it, as haycocks in a Field, standing upon their flat bottoms. There is no such common surface in nature, nor consequently any such super-additions: it is all one frame or mass, only broken and disjointed in the parts of it."

2. From the above description of things appears also the absurdity of the opinion, that is at present so much in vogue in France, concerning the origin of mountains, viz.—That Mountains are only Heaps of Sand and Mud, formed by the agitation of the waters of the sea, which were chiefly put into motion by the flux and reflux of its waves in tides, or some strong currents that met and opposed each other, during the time when the whole surface of the earth was covered with water (for the maintainers of this system allow that it has been thus covered). The Sand and Mud having been thus collected and heaped up together, and the water subsiding and sinking to occupy the cavities at the bottom of the sea from whence the sand and mud were excavated, the dry-land by this means and mountains were raised upon the whole surface of the earth.

But surely the Authors of this hypothesis could never have observed the effects of the Agent, which they suppose to have been the Former of mountains, during any violent agitation of the sea, nor have observed the inward Constitution, or outward

—See Messrs. Le Cat’s, Buffon’s, De Maillet’s, &c. writings.
ward Form of Mountains. For with regard to the first of these articles, as his Lordship justly remarks (in his Answer to this System of the origin of Mountains, p. 11) "The Sea, in its greatest agitations, always levels every thing in its power, instead of raising it into Hills and Valleys. And if these Authors will but make the experiment of raising a Mound within the reach of the Tides, and let but a single Spring-tide get above their works, I believe, instead of finding their Mound increased into a Mountain, they will find their Mountain reduced into a Mole-hill, if not entirely carried off and levelled with the bottom of the Sea."

And, in opposition both to his Lordship's system and that of these Authors, it must be remarked, that the inward structure of Mountains undeniably disproves each of their opinions. For, mountains consist of a regular strata or beds, (whether of stone, coal, clay, &c.) orderly posited upon each other, and in an horizontal direction; and besides, each respective stratum is of equal thickness throughout, though they continue for several miles in extent;—all which clearly demonstrates that the whole settled in a regular and successive order, during a quiet and calm sea, or without the least perturbation of the water it subsided in. And since those parts, that now remain and are visible, of the Mafs that thus settled, viz. the Mountains and their tops, still retain their first and horizontal direction, it is evident that they have not been displaced or their position altered; and also that they have not received any new or fresh Matter to cover.
cover them (except the vegetable mould, and a few feet of loose stones and sludge; of which hereafter); neither were they formed by occasional or successive additions of Sand and Mud, or heaps of Rubbish; for had this been the case, there would have been no regular strata or layers of stone, coal, clay, &c. or if there had been such, they would have been inclined on all sides, or shaped according to the outward form of the mountain, and have covered these conical or prismatical Eminences like so many caps or arches laid one upon another; neither could the layers have been of the same thickness throughout even in a single mountain (much less in hundreds or thousands) but would have been much thicker at bottom than at top; at least those layers that settled last must have been formed thus; for when the Mountain had attained to any considerable size, and a new layer or sediment of loose matter subsided on it, the far greater quantity would fall down on each side, and settle most at and round the bottom, with thin edges towards or near the top; which is a form that, I believe, no mountain upon earth has.

But what farther shews, that Mountains are not Heaps of Rubbish thrown out of the sea, or quantities of Sand and Mud confusedly coacervated, is, the general uniformity of their shapes, their regularly-floping sides, the manner in which Chains or Ridges of Mountains are continued, being extended length-ways upon such islands and peninsulas as are longer than they are broad; and shooting out, like branches from a stock, from high
high extensive Plains upon the larger Continents of the earth: and then the Gills gradually falling off from the mountain-tops, and meeting the Dales down their sides, the Dales uniting with the Vallies, and the Vallies opening into extensive declining Countries, and these, adjoining to the shelving Bed of the Ocean—all manifestly shew, that the Agent that formed mountains did not act from the Sea upward, or towards the inland countries, and amassed together large heaps of sand and earth, but descended from the mountain-tops, or the most inland parts of the earth, and furrowed or made its way down towards the very bottom of the Ocean, carrying before it almost every thing that was moveable or opposed its passage.

3. From the above-mentioned uniformity in the shape and course of Mountains, and the apparent cause thereof, and from the regular manner in which Gills, Dales, and Vallies descend from the mountains and run into each other, gradually declining towards the Sea, it is also evident that Mountains were not owing either to any irregular Elevation or Depression of the strata of the earth: for had either of these been the Cause, this regularity could never have been preserved, and been visible over the whole face of the earth. So that neither Dr. Burnet's, nor Dr. Woodward's, and Mr. Whiston's System of the origin of Mountains is true or consistent with the face of Nature; the first of whom supposes them owing to a sudden depression or sinking in of the strata of the earth, and the other two to as sudden and violent a Depression of some of the strata and Elevation...
tion of others; for upon either of these schemes, the earth must have exhibited the most ghastly appearances of Rocks and Precipices, and the whole form of it would have resembled the ruins of a defoliated edifice, that had been thrown down by a Tempest, or blown up by a subterranean explosion: so that there would have been no traces of the operation of a Fluid Agent that descended from the mountain-tops, and gradually tore its way quite down to the Sea, and so formed the regularly-floping sides of Mountains, the easy and natural Cadence and Connexion of Gills with Dales, Dales with Valleys, &c. And,

4. This same regularity and uniformity in the risings and fallings of the higher and lower lands, and their mutual dependences on and inclinations with each other, remaining the same at this day in all countries, manifestly shews, that there have been no Mountains or Hills, Dales or Valleys, made since the Deluge, or the Inundation that caused the present; and therefore that Mountains are not continually a-forming, as some of the modern French philosophers assert; neither were they occasionally thrown up by earthquakes or subterranean eruptions, as some of the old philosophers imagined: indeed earthquakes, and such like explosions, instead of raising new mountains, rather tend to throw down the old, by shaking and dislocating the land, where the violence of the concussion prevails, and sinking it beneath the Ocean or into the Abyss; and besides, earthquakes generally happen near the sea, and affect not inland eminences or mountains.
5. Neither could the channels of Gills, Dales, and Vallies have proceeded from contractions or lateral shrinking of the strata of the earth (and so the parts of the earth above, or on each side of these cracks, be left eminent or in the form of mountains) in the same manner and by the same means as Chaps or Cracks are made in the mud, and ouze upon the sea-shore by the heat of the sun-beams and action of the wind, according to the opinion of some of the ancients. But had this been the case, as the tops of the mountains were dry soonest and most exposed to the influence of these two agents, the Combs and Dales would have been deepest near the summits of hills and mountains, and gradually have lessened, or been shallower and shallower as they proceeded down the sides, and terminated in a point at the bottom of mountains; but the direct contrary to this is their form; therefore This could not have been the Cause. Besides, such Contractions as these could never have made Eminences, nor would there have been any difference between Mountains and Hills, neither would the inland parts of Continents and large islands have been the highest, as I have plainly shewn they are; for when the mud upon the sea-shore, or when the ground in large flat and low marshes is dried and cracked in the summer-time, the parts or pieces of land between the cracks are equally high, and the whole surface level.

Though indeed thus much may be said for this opinion, that the Cracks and Fissures that were made in the shell of the earth (after it had settled,
settled, saturated with water, and the Expanse from above and from below had compressed and hardened, and so contracted the strata in some places, and thereby left gaps and fissures in others; (see p. 88.) gave room for the water that covered the

Or, to give an account of this Effect in the words of a modern writer, "First then these Fissures are no more, as they seem to me, than the necessary consequences of the first settlement of matter, when it was divided into wet and dry, solid and fluid. That we may the more clearly apprehend this, let us recollect what happens to small masses of matter, cleft by like fissures, whence we may infer what is probably the cause of those greater cliffs which we are now in search of. We all know that slime, diluted clay, and pulverized or dissolvent stone shall occupy more space in that state of moisture than when the same clay, slime, or stone becomes dry and hard; and from a parity of reason we may argue, that when solids and fluids formed, and from a state of chaos became divided into distinct bodies, the parts of the former being defeated by the latter, must needs grow closer together, and consequently leave chasms and crevices between them. But the masses of earth, stone, and clay were not at this time merely passive; they formed larger and more compact bodies everywhere, in proportion to the quantity and mutual attraction of their similar parts, within proper distance. Hence arose firmer combinations, and consequently greater openings between such masses. Farther, it must be observed, that as all similar particles struggled to come into contact with each other, so at the same time, they deflected, and repelled, and expressed all dissimilar and contending particles; consequently masses of differently-natured particles succeeded and filled from each other, every party (if I may use the expression) tending to form and stick close to its like: between such different substantias therefore, attracted here and there repelled, some chink or interval must needs happen. These causes then, viz. the deflection of moisture, the union of similar and the mutual repulse of dissimilar particles, must all have contributed to form the masses of our terraqueous globe into such separate portions as we now find them in; for that indeed it was not possible for bodies to grow hard and dry, unite and contract, without leaving some chasms and fissures between them. What ensued upon the hardening of particular and smaller masses ensued also in the larger portions of the whole earth, in proportion to the quantity of solids united at any one effort, whether a grain, a stratum, a county, or a region." **Borlase's Nat. History of Cornwall**, p. 144.
the earth during the deluge to descend through into the Abyss; and such as served for this purpose directed, in some measure, or were the cause of the direction of, the courses of the Vallies, Dales and Combs; but they neither did nor could have formed them for the reasons above given: besides, these Cracks are seldom above eight or ten feet broad (and generally much less) and several vallies are as many miles in breadth, and exceed them as much in length as they do in breadth; and what is more remarkable, the Cracks and Veins of ore in many places run directly across the vallies, and yet the vallies continue on in their usual courses; which plainly shews that they were neither formed, nor even altered, by these cracks. But, in short, the sea-shore itself (from whence the above hypothesis is brought) affords a manifest difference between the Cracks made by shrinking and the regularly-increasing Channels of Combs, Dales, and Vallies; for upon the sea-shore or the banks of a large river, especially where there is any quantity or depth of mud and ouze, the chinks caused by the action of the Sun-beams and Wind are nearly throughout of the same size, meet and interseet each other at almost all angles, chiefly at right, and so divide the parcels of ground or mud between into squares, pentagons, or some such figure, but never, or scarcely ever, into long ridges like the chains of mountains. And what is farther observable in the same place, the Channels or Gullies tore in the mud by the retreat of the seawater in ebbing, or by the descent of land-floods,
do really leave the interjacent land in prominent ridges just like those of Mountains; and those gullies or little furrows gradually increase in length, breadth, and depth, as they unite and fall in with each other, just in the same manner as Gills, Dales and Vallies do; which manifestly shews, that both kinds were formed by currents of descending water.

6. Since there are Mountains and Hills, Combs, Dales, and Vallies upon the whole surface of the earth, and these were caused by the retreat of Water from the surface, it is certain, that the Deluge that formed them was universal; and I have already proved that there never was but one universal Flood, which was that recorded by Moses.

7. Since Gills, Dales, and Vallies fall away from the Mountain-tops, and tend in their courses down towards the neighbouring seas, and are united to the shelving Bed of the Ocean, nay, since some of the chains of Mountains are continued under the sea, and appear again on the opposite land; or, what is more, since there are Mountains and Hills, Dales and Vallies, even entirely under the sea, it is evident, that the water that formed them descended not only down towards the sea, but even beyond it, into some great Cavity in the inside of the earth; for had it reached no farther than the present surface, or even any considerable way into the bed of the Ocean, its waves

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waves much have been reverberated or returned upon themselves, and so would soon have lost all their force; but since this force continued, and cut and tore the earth under the sea to unfathomable depths, we may justly suppose that the water descended far beyond, entered into, and filled up a large Concavity within the earth, and so constituted what Moses calls the Abyss.

8. Since the Water that scooped out the hollows of Combs, Dales, and Vallies descended into the Abyss, it must of course have carried with it all that quantity of the earth which it tore away for making these hollows; and as it descended from every part of the earth’s surface down towards the center, it would at last repose and settle the whole there, in form of a central or inner globe or nucleus of terrestrial matter, surrounded on all sides by the water of the Abyss. To which, or to a similar kind of nucleus, moveable in a fluid medium, Dr. Halley ascribes the Cause of the variation of the magnetic needle, and to which not only this, but many other and far greater effects, both in and on the earth, are to be attributed. And,

9. When we consider the great length, breadth and depth of the larger Vallies upon the earth, the multitude of the lesser, together with the numerous Combs and Dales that lead into them—the Height of the Mountains and inland Emissions above the lowland, their distance from the Sea, or rather, from the corresponding Chain of Mountains on the opposite Continent—the vast

\[\text{Philos. Trans. No. 148, 195}\]
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Bed of the Ocean, the cavities of all the Lakes, Rivers, &c. I say, when we consider all this, and reflect, that all these Hollows were once filled up with the solid strata or substance of the earth, from the top of one ridge of mountains to the opposite, and from that to the next beyond, and so on quite round the globe, (which therefore, during the height of the Deluge, before the waters began to retire, was entirely spherical, and without any inequalities, or the least rising and falling, of hill or dale, see p. 85, &c.) and that all this substance was scooped or hollowed out and carried down into the Abyss, we may suppose the central nucleus to be of some considerable bulk or size.

But the Agent that did all this, the Water that thus tore and swept away the solid rocks, and left such deep and wide marks of its power, must be great in quantity beyond conception, far exceeding what might be sufficient barely to fill all these Hollows, for it must have passed over and through the solid rocks, where these Hollows are, many times, before it could have made such gradually-worn channels, and have opened such extensive breaches; and therefore be far superior in quantity to the bulk of the whole Ocean itself, and all the water that fills every other Cavity upon the earth; for all these Cavities were made by the repeated actions of this descending Flood. And since the Tendency of these Hollows and Channels plainly shews, that the Water that harrowed them descended down towards the Ocean or the several Seas upon the earth, and since the water in them is not sufficient in quanti-
tity to have effected all this, there must be (from a consideration alone of the quantity of Water necessary to cause these effects) a large Reservoir or an Abyss of Water beneath the earth; which, during these Transactions, must have been elevated far above all the highest Mountains or Eminences upon the whole surface of the earth; and therefore the Deluge at that time universal, and caused not barely by an effusion of the waters of the Ocean, but principally by those of the Abyss, according to the description given by Mojes.

II. Another general argument (including, like the former, several particular ones, and deduced also from the circumstances of things upon the surface of the earth) in proof of an universal Flood, may be drawn from the consideration of the nature, form, and situation of several bodies or substances that at present lie loose upon the surface of the earth. For,

1. It is common to observe upon the sides, and even the summits, of the highest Hills, Mountains, and inland Eminences (especially such as consist of solid strata or hard rock within, and have long flats or any level ground at their tops) a prodigious number of Stones, of various sorts and sizes, but generally of one or nearly the same form; being either perfectly spherical or oval, or some way or other tending to a round figure; their surfaces or outsides being quite smooth, without any projections or angles.

I have observed multitudes of such stones, of all sizes—from some that were eight or ten feet in circumference to others that were but two or three
three inches in circuit—lying upon the tops and sides of some of the highest hills and eminences in England and Wales; particularly upon the long chain of Mountains that run through the middle of South Wales, and upon the high lands in the northern parts of Worcestershire, Warwickshire, Shropshire, and Staffordshire: and those large stones that lie upon the western side of Shotover hill, near Oxford, and which, on account of their Roundness, are called by Dr. Plot, Lapides Testiculares, are of this sort. So also upon Marlborough Downs, in Wiltshire, are an inconceivable number of large stones, which, from their shape and situation, are called the Grey-Weathers, as resembling a flock of sheep lying down; and many of these, especially such as lie at a distance from the center or middle of these stones, are quite round and smooth, though vastly large.

Mr. Hutchinson says, that he observed, “many such round smooth stones, of various sizes, from the bigness of a melon to an hundred weight, lying, not only upon the sides, but upon the tops and ridges of the high hills in the North of England, particularly in Kendale, and in many other places; and also in Cornwall, and in Devonshire, upon Dartmoor.” Dr. Lister, in Phil. Trans. N° 164, remarks, “That all the high mountains and Wolds in the North of England are covered, more or less, with a quantity of Sand, mixt with white pebbles of a greater size.”

Langius

¹ Nat. Hist. of Oxfordshire, p. 129.
² Vol. XII. of his Works, p. 294.
Langius in his Preface to his \textit{Historia Lapidum figuratorum Helvetiae, \\ &c. or, History of the figured Stones in Switzerland}, starts the following question (but leaves it undecided); "Also it has often been inquired, Whether the smooth round bones and flints that are now found upon the tops of the highest mountains, even of the Alps, where no river can possibly pass, were thus smooth and round by nature, or whether they were at first and originally rough and unequal, and then afterwards smoothed and rounded by currents of water, during the Deluge, and carried to the highest mountains?"

Dr. Balthasar Ehrhart, in the account he gives of his Journey from Memingen over the Tyroldfian Alps (see \textit{Phil. Trans. No. 458}, for 1740) makes

\footnote{\textit{Caterum de Silicibus subrotundis \\ & levibus, \\ &c. It may be proper to remark here, with Dr. Woodward, (see his \textit{Cat. of Eng-lish Fossils}, p. 83.) "That the Danish, German, and other writers of Fossils do not refrain the name Silix, to what we in England call Flint, but apply that name to very various bodies;" and also that the Romans (as the Doctor proves at large, p. 22.) did the same; understanding by it any very hard Stone that would strike fire, as indeed most hard Stones will. I mention this, because the bodies which we in England call Flints are sometimes found, and were so formed, naturally of a round shape; and it might be objected to the above quotation that the Flints therein spoken of might have been naturally of a round form, and so not have been worn by any agitation in water. But, first, I would observe that round flints are very few in comparison of the number of others that are found in all kinds of shapes; and Langius himself, in the description he afterwards gives of a Flint, or rather of the body he applies the the word Silix to (p. 13.), does not mention it as being naturally, or even accidentally, of a round form; and whatever he understands by the word Silix, it is certain that the bodies he speaks of in the above quotation carried in themselves evident marks of having been worn, ground down, and even rounded, by water; otherwise he would never have thought of putting the above question.}
makes the following observations, "The mountains of Memingen, which are higher than the middle of the highest mountains in these parts, have upon their very summits vast quantities of stones about three or four inches in circumference, that have been plainly worn round, and just after the same manner as those that are thus formed by the stream and attrition of rivers. But it is manifestly evident that this immensely large heap of stones, which lie, as it were, in a separate and detached manner upon these mountains, where no river flows, could never have been formed by currents of this kind. Another remarkable circumstance is, that these stones are found to increase in bulk or diameter from Memingen towards the Alps, so as at last to equal masles or trunks three or four feet thick, but from Memingen towards the opposite country and more remote from the Alps they proportionably decrease less and less, so as at last to be reduced to a species of grofs sand. This remarkable phenomenon, which may serve to explain the theory of the earth, may be accounted for from the following observations and reflections. I have observed among the Tyrolean Alps, whole and entire summits of Mountains, that have in one continued rock the very same kind of stone with that which is now found in separate and worn parts, and placed at a distance in the country between the Alps and the Danube. There are also just as great a variety of these worn stones as there are of Rocks in the Alps. The cause which broke the Alpine rocks, and covered all this part of Germany with fragments torn from thence
thence (and which were afterwards rounded by the mutual attrition between themselves and the waves), could be no other than the great deluge. —

The fragments of stone which were torn from the shattered Alps (which were as high again as they are at present before the deluge) the farther they were carried and the more they were rolled, the more were they worn and lefthened. Hence the places the nearest the Alps were covered with the largest fragments, those that were more remote with the smallest. The exact agreement between the most broken pieces of these stones, and the larger and entire rocks in the Alps, demonstrate to the eye the place from whence they came, and that the former are no other than the dispersed ruins of the latter."

Swedenborg in his Miscellanea Observata, &c. p. 11, speaks of Mountains in Sweden, "Qui lapides habent admodum tritos, & quasi politos, & mixtos cum arenis;" i.e. which have stones upon them that are much worn, and as it were polished, mixed with sand." Bishop Pontoppidan in his History of Norway, p. 56, speaking of the effects or consequences of the Deluge, writes thus, "This [i.e. the Deluge] is likewise the origin of most of those Pebbles, which are found scattered in all parts of the globe."

And indeed, I think, we may fairly conclude from the instances I have brought, that, if all parts of the globe were examined by proper and judicious persons, some such round or smooth Stones as the above mentioned, lying at greater or less distances,
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distances, in greater or smaller numbers, would
be found upon them.

The Point therefore to be decided is, How
came these Stones to be of this round shape?—Were
they originally thus?—Or, formed so afterwards?
—And by what means?

That these Stones were not originally and at
first of their present figure, is evident from many
particulars; as,

1. From some of them having on their out-
sides the bafes of hexagonal shoots of spar and
chrysalis, which are now of a round or circular
form at their tops, whereas it is well known that
these naturally terminate or end in sharp pointed
angles, wherever there is room or space for them
to shoot, and such there must have been here,
if these Stones had always been of the same shape
and size: so that as these shoots of spar were once
longer, and also pointed at top, and being now
round or hemispherical, it is manifest, that they
have been worn and ground down to this form
by some regular attrition.

2. From several of these Stones, having now,
lying immersed in them and united with their
substance, the shells, teeth, and bones of various
animals, pieces of wood, coral, &c. all of which
bodies are naturally of some determinate figure,
and greatly differing from each other, and yet
such parts of these shells, bones, corals, &c. as
appear on the outsides of these Stones shall be
round or circular, or answerable to the outward
shape of the stone; and yet the parts which lie
immersed within the stone shall be of the true,
usual,
usual, and natural form of these bodies; nay, when the stone is broken, there shall frequently be found in the inside the same species of shells, corals, &c. quite whole and entire, as those on the outside, which are now shaped to the figure of the stone; and therefore these on the outside were formerly of the same shape as those in the inside; and of course both Shells, Corals and Stone must have been rounded or brought to this unnatural, spherical, figure by some external force or agency.

The same is manifest from the Contrast between the manner in which the constituent parts of these Stones originally settled and their present outward form; it being evident to sight, particularly in the larger ones, and especially in such as are of a fissile nature, that they settled in a flat regular manner, or in lines, layer upon layer, each of equal length, breadth, and thickness in all its parts; which could not possibly form a body of a spherical shape; but as these are now of an orbicular form, they must have been reduced and rounded by some outward force. But

4. Where these Stones occur, the far greater number of them are generally of the same kind, contain the same species of shells, corals, &c. and apparently settled in strata of the same size and order, as the Stone or Rocks in the adjacent Mountains; and so afford an undeniable proof that they are only fragments or pieces torn off from the adjoining mountains; and therefore were not originally of the same size and form as they are now.
now; but have been, since their separation, much lessened and worn into a round figure.

And their shape and smoothness manifestly shew, that they obtained their form in, and by the motion of, a wet Fluid, such as Water; for had they been subjected to the action of a dry Fluid, such as the Air, in a violent wind or tempest, &c. it could not be but that they would have been of the most irregular forms, and their outsides jagged and pointed with angles or embossed with protuberances in every direction; but since they are so regularly rounded and their surfaces so extremely smooth, they must have procured their shapes from being agitated in and by a moist Fluid, such as could penetrate and mollify their outward parts, and so permit them to be worn away, granule after granule, or by a gradual attrition.

And when we consider the great size and weight of some of these Stones, their immense number, and the vast extent of ground that in some places they are spread over, (nay that there is reason to suppose that they are in some measure scattered over the whole face of the earth) it may fairly be concluded, that there is no moist Fluid, in or upon the earth, in a quantity sufficient for effecting this, but Water; which therefore must have been the Medium in which, and the Agent by which, this wonderful phenomenon was transacted.

As is moreover evident from the manner in which these Stones lie. Those that are upon the long tops and flats of Mountains, or upon high level ground, are situated for the most part at a little distance
distance from each other, or lie in a separate detached form [not heaped together or in trains]; for as upon such even land there could be no inclination in the ground to determine them to one place more than another, and as the currents of water, that formed the Combs that descend on all sides of such high land, set different ways, so these Stones, that were shuffled and rolled about upon the top, would be left in the most irregular, loose, detached or straggling manner possible; and accordingly we so find them.

But those that are upon the sides of hills, especially such as are somewhat steep, and particularly at some considerable distance from the top, lie thick and close, and heaped upon one another: those that are in the Combs, Daies, and Vallies (that fall off from the Mountains) lie still thicker and closer, and chiefly in the bottoms of such cavities, there being few or none upon their steep sides; and also tend in a train from the tops of these Cavities, and gradually increase in number and quantity, as the gills, dales, and vallies open and enlarge by receiving other gills, dales, and vallies into them; in which lateral gills and dales are also a few, the greater part having been carried down into the large vallies, where they lie in inconceivable numbers; and particularly in the curving parts of the vallies, just before their turnings; or where any rock, that withstand the force of the Flood, or large fragment of a rock, that the waters could carry no farther, stands in the middle or any part of a valley, there these round Stones
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Stones are found in still greater plenty for the depth of many feet under the ground.

And what is farther remarkable (and yet a general rule in this case) is this, that such Stones of the above kind as lie near the beginnings of the Combs are least worn, those that lie farther down in the dales more worn, those that lie in the valleys and in the low flat countries most of all worn and perfectly rounded, as having been carried farthest, and agitated most. — So that all of them manifestly bear the appearance of having been not only formed or rounded by water, but also of having been placed just in such manner, as water alone, retreating from the mountain-tops down thro' the valleys, would naturally dispose them.

U 2

Many

1 It is not uncommon to find among the Stones, that were thus apparently worn round by accident, some that were always or naturally of a round shape; and it may be proper to inform the reader how to distinguish between the one and the other; and also to shew how far even these last are serviceable in proving the point in debate. The Stones that are naturally of a round shape, and which are commonly called Nodules, have generally an outward coat or crust, differing from the internal part of the body, either in sub stance, colour, or hardness; or else consist of several coats; and are usually very hard: those that are of the same sub stance throughout (as flinty, alabauster nodules, &c. commonly are) when broken, split or fall apart in all kinds of directions; those that consist of several coats of different matter open or separate in pieces, that are convex on the outside and concave in the inside according to the several coats. On the contrary, Stones that are worn to a roundness, which was not natural to them, such as Pebbles found upon the sea shore, and those that are now found upon the highest mountains, have never any coat or investent crust, break regularly, or according to the grain of the stone, and frequently into a number of thin flat plates, like the stone that lies in strata in the adjoining hills; and are generally either soft or hard, according to such stone; and carry in themselves evident marks (of which I have already recited at large the particulars) that they are
Many other circumstances there are (which will readily be perceived by an observer, though they are not so easily to be described to a reader) depending either upon the nature of those Stones, the constitution of the strata in the adjoining land, or the situation of the ground, &c. that afford ocular

are pieces or fragments of the adjacent rocks, worn round by being rubbed against one another in such a fluid as Water. And even the Nodules themselves, that are sometimes found among the Pebbles, exhibit manifest proofs of having been broken out of regular strata, carried from their natural and original place, and of having endured the outward force or action of Water. For, first, in such places where we find Nodules of flint, crystal, alabaster, &c. lying loose upon the surface of the earth, it is common to find the very same kind of Nodules imbedded in their natural beds in the strata of the rocks adjoining, and very distinct and easily separable from the substance of the rock (which is another mark by which Nodules may be known from rounded pieces of the rock): it is therefore reasonable to believe that the Nodules, that are now loose and detached upon the surface of the earth, formerly lay in, and were beaten out of, the adjacent rocks, by the same means or by the same flood of water, that parts of the rocks themselves were broken off and worn round; among which these Nodules now lie. This also is evident from a circumstance attending many of them, viz. that their outward coats have apparently been much rubbed and worn, especially in the more prominent parts, and in some of them quite worn off. I have observed too that several of them have had parts or pieces of the rock, from whence they were originally torn, affixed to their outsides, which, though at first certainly of no determinate shape, have been, since their separation, regularly rounded to the shape of the Nodules: nay, I have observed large Masses of the rock, containing several Nodules in them, thus worn and rounded; which manifestly shews, that even these Nodules are Fragments, or at least were beaten out of the rock. Then, lastly, Nodules, being found lying together with, and exactly in the same manner as, the mountain-pebbles and other worn fragments of stone, undeniably proves that they were pointed upon the places and in the manner they are now found by the same means that the inland-pebbles were, and though they do not shew such strong and clear signs of having endured the force or action of water as the pebbles (chiefly on account of their superior hardnes and original roundness) yet they exhibit sufficient marks, as I have described above, of having been subject to its
ocular demonstrations, that these *round* Stones are only *Fragments*, which were beaten off from the neighbouring rocks, and worn into their present figures, by the agitation of *Water*;—which fluid must therefore once have filled all the deep valleys, and have covered all the high hills and mountains where these Stones are now found.

But besides this larger sort of *round* or *Bowler Stones*, (as they are called in some parts of *England*, their very form indicating to the most superificial observer that they have been rolled or *bowled* about) there is another kind of a less size, from some that are two or three inches in circuit to others that are as small as pease, commonly known under the name of *Gravel*. This consists of a variety of substances, not only of hard round and smoothed Stones of different kinds, but of parts of Bones, pieces of Shells, Coral, &c. that have been also rounded or worn †, so as evidently to demonstrate that the whole has been in agitation, and that such a fluid as *Water* was the Agent.

Which is farther apparent from the manner in which, and the places on which, *Gravel* lies. It being always posited in a loose irregular form, not in a close compact state, or in uniform strata of equal thickness in all parts, as the regular beds of

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† It may not be amiss to observe here, that in some parts of *England* the inhabitants very improperly call any small, loose, rubble Stones, though they are flat, pointed with angles, or of all shapes, provided they lie near the surface of the earth, by the name of *Gravel*; but unless they are answerable to the above description, and apparently worn, or a great part of them worn and rounded, they ought not properly to be, neither indeed are they generally and commonly, so called.
of stone, &c. are; no, this is thrown or pitched, as it were, in streaks or unequal seams, and in all directions, generally in an oblique, sometimes in a wave-like form, just in such manner as the undulating motion of departing Water would naturally cast it. Besides, it is usually found free and void of all lighter, earthly, ochreous, clayey, or such like matter, which, being soluble in water, would, when once assumed up therein, be contained longer and carried farther than (and so seldom subsided together with) the heavier and harder parts of Gravel; which therefore would be left clear and divested of all such lighter matter; and indeed at present it appears to the eye to have been washed and cleansed by Water. Then too Gravel is commonly found over unMOVED and horizontal beds of stone, chalk, &c. and being of a nature different from these, and lying in a manner different from that in which the strata of the earth originally settled, it is manifest that this has been moved, agitated, and brought from other places. And since great part of this mixture, Gravel, is of the same nature with, and consists of the same kind of shells, corals, &c. as those which are found in the higher lands or in the grounds above, it is an evident proof that it was brought from these lands.

And when we consider the places where Gravel is commonly found, viz. either upon extensive flats just under mountains or higher ground, or in the bottoms of large vallies, or else spread over low-land gently-declining countries, but seldom or never (or but in very small quantity) upon the tops
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tops or even sides of sharp-pointed and steep mountains, it affords an additional and undeniable evidence, that it was brought from the upper lands; and being disposed or posited just in such manner and just upon those places where water, retreating from the higher grounds, would naturally throw or leave it, it evidently shews, that Water was not only the Cause of the form or roundness of the various parts of Gravel, but of the Disposition or Settlement of the whole.

Such is the form and situation of Gravel in England; and no doubt is to be made but that it is the same or similar in every part of the earth where it is found; and since there is scarce a country over the whole globe but what has it, more or less, so it is certain that all these countries, or the whole face of the earth, have been over-spread by Water.

Under this article may also be reckoned a still lesser species of round stones than any of the above-mentioned, viz. those which constitute what we commonly call Sand; this substance "being really no other (as Dr. Woodward justly observes, *Nat. Hist.* p. 188) than very small pebbles; as may appear to any one who shall carefully examine it, especially with a good microscope." And when thus viewed and magnified, the various bodies of which it consists as manifestly exhibit marks of having been worn or ground down to their present size and form by the agitation of water, as the parts of Gravel do. Sand too, lying in a similar irregular manner, and being posited upon such places as Gravel, equally points out the action
action of water, retreating from the higher grounds, to have been the Cause of its situation and position. What adds confirmation to this is, that where the upper lands consist of a lax friable stone, there the sand lies in the vallies beneath in a greater plenty than usual; or where the country is an extensive low-land plain, and the mountains at a great distance, there also is generally a vast quantity of sand; as is the case with those immensely large sandy Deserts in the lower or remote parts of Africa, bordering upon the Mediterranean sea; for the water, that formed the mountains in the in-land or higher part of that great Continent, must have passed over such spacious tracts of land in its retreat towards the sea, that in all probability it would meet, in many places, with strata of a loose friable kind of stone, which it would soon separate, tear asunder, shatter to pieces, and at last grind down to sand, and when thus reduced, this matter would be easily carried and hurried away by the torrents of descending waters to a great

1 In some places indeed what is properly, and ought so to be called, Sand-stone, lies in such a loose lax manner, even upon the tops of the highest mountains, (where their upper parts happen to consist of sand-stone) and in some places sand itself lies thus, as at first sight greatly to resemble the sand found in the vallies and in the low campaign countries; but there is always a manifest difference between them; for the Sand or Sand-stone of Mountains is more coarse than the other, and generally adheres in lumps, and is found in vast large strata or beds of equal thickness in every part, and regularly divided by horizontal and perpendicular fissures, as the solid unmoved beds of stone, &c. are; whereas the sand found in the vallies is small and fine, easily separates when touched, and is always pitched in unequal streaks, that are commonly thicker in one part than another, and gradually terminate in points towards either end, and is posited in all the variety of directions that water, flowing over uneven ground, could possibly throw it into.
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great distance from the mountains, and at last be naturally left expanded over the low flat countries, or posited in the bottoms of large and deep valleys; and such from the maps appears to be the situation of most of the sandy Deserts upon the earth.

And I cannot but think that the far greater quantity of what is called *Sea-sand* was not formed upon the shores, where it is now found, but was originally *Land-sand,* and brought down even from the in-land countries. Thus much is certain, that the rains that fall upon the higher grounds generally come down replete with sand, and deposit it in rivers; and rivers, by washing away their banks, still receive more sand; which being carried down by the currents is at last discharged into the Ocean. And it is very remarkable, that upon a sandy shore there is generally a great load or bar of sand at the mouths of the rivers, the very place where the sand, brought down by the river, would naturally subside, not only on account of the stream being there broadest and least strong, but chiefly by reason of the opposition the river-water would meet with from the waves of the sea, which would beat back the current of the river, weaken its force, and oblige it to lay down its burthens. So also with regard to those immense *Sand-Banks* that are found upon some shores, even where there are no very large rivers immediately adjoining (though they are generally where there are such rivers) it is certainly very reasonable to conclude, that they are in a great measure the product of the diluvian waters;
waters; and had the Sea, after the deluge, retreated farther within its bed, they would have been left upon the low-lands and now found in the form of sandy deserts; for as the waters of the deluge retreated from the higher lands, tore out and carried away such vast quantities of terrestrial matter (as the hollows of the Combs, Dales, and Vallies over the whole surface of the earth abundantly demonstrate) they would naturally deposit a great portion of that mixt substance they were loaded with, especially of the finer and lighter sort, upon those parts or places where their force first began to abate, or the land was of a proper form for receiving and retaining it, and such certainly are those low flat Shores where the principal Sand-banks are found.

Some persons indeed have imagined that there is a difference between Sea-sand and Land-sand; but the strictest inspection can discover none: and Dr. Woodward observes, that "The Sand upon the shores of Sheppey consist of extremely small pebbles of the very same kind with those commonly found in sand-pits at land, in various parts of England, particularly in several parts of Kent" (in which County the isle of Sheppey lies). Dr. Lister too remarks (Phil. Trans. No 164.) "That the in-land Sand-hills above Bulloigne in Picardy in France is of the very same kind with that on the sea-shore at Calais."

So that, upon the whole, we may as fairly conclude, that the granules of Sand were caused by a friction of the parts among themselves in agitated water, as that the pebbles, of which Gravel
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vel consists, were; and also that the far greater quantity of the Sand now lying upon the sea-shore was not owing to the agitation of the waters of the Sea, but that the origin of this and of all the Land-sand is to be attributed to the action of other waters: and when we consider the vast extent of the several Sandy Deserts upon the earth, and the largeness of many of the Sand-banks upon the sea-shore, and the distance of these from one another, and how in a manner they are scattered over the whole face of the earth, we must infer that the Cause was as universal as the Effects, and therefore that a flood of waters has covered the whole surface of the earth.

II. But besides these Stones that have been thus apparently rounded by water, there are others that have plainly endured the force of this fluid, though not in so great a degree as the above, either on account of their size, hardness, or the short time they were subject to its force, but yet they manifestly exhibit marks of its power; and their size, number, and situation sufficiently demonstrate that the action of the water, to which they were subject, was universal or extended over the whole surface of the earth. For,

There is abundant reason for believing, that there are very few hills or mountains, at least such as consist of solid strata or hard rock within, but what have separate masses of stone, some of an immense bulk, together with smaller pieces, lying upon their tops or sides, and also that there are such stones in the vallies beneath; and both the
the larger and smaller masses, of all kinds of shapes, and lying in all kinds of postures, though generally in such a direction, and so situated, as plainly to indicate that a flood of waters, retreating from higher grounds, was the cause of their position.

What Mr. Lhwyd says of Wales (Phil. Trans. No 334.) I have observed to be true, not only in that Country, but in various parts of England: "What seemed to me most strange, were vast confused Stones, and, to appearance, Fragments of Rocks, standing on the surface of the earth, not only in wide plains, but on the summits also of the highest mountains;" to which he subjoins this remark, "There is no Brim-stone or Pumice-stones on the tops of our mountains, nor any thing else that I suspect to have been the effects of Volcanoes" [so these stones not to be attributed to such causes].

Again; Dr. Stukeley (after having cited the above quotation from Mr. Lhwyd in his Abury restored, &c. p. 17.) writes thus: "So [in the same manner as the above Stones] lie the Moor-stones on the wastes and hill tops of Cornwall, Derbyshire, Devonshire, Yorkshire, and other places, of a harder nature than these [i.e. the Grey-Weather-stones on the Marlborough downs, of which the Doctor is first speaking] and much the same as the Egyptian Granate." But the Grey-Weather-stones themselves (of which I have spoken in part before, p. 283.) are probably as remarkable as any, and as they lie in a part of England that is much frequented on account of the great roads that
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that are near them, principally one that leads from the second to the first City of the kingdom, and are well known to most travellers in these parts, I shall give a particular account of them, to save the trouble of being circumstantial in other relations. These Stones are of a bastard kind of lightest grey marble: and are of various sizes; some of them fifty, sixty, or even seventy ton weight; others so small as to weigh but a few pounds. They are spread over an irregular space of ground for forty miles in circuit, as I have observed myself; and have been informed that they extend much farther. They begin at, or those

m "But our Grey-Weather-stone is of so hard a texture, that Mr. Ayliffe of Wotton-Baffet hewed one of them to make a rape-mill stone, and employed twenty yoke of oxen to carry it off; yet so great was its weight, that it repeatedly broke all his tackle, and he was forced to leave it. Ld. Pembroke caused several of these stones to be dug under, and found them loose and detached. My Lord computed the general weight of our stones at above fifty ton, and that it required an hundred yoke of oxen to draw one. Dr. Stephen Hales makes the larger kind of them seventy ton." Dr. Stukeley's Stonehenge, p. 6. Some of the largest of these Stones lie in the bottom of a Comb or Valley called Grey-weather-bottom, and are in a great measure covered with coppice wood, which must be removed, and the Stones carefully surveyed on all sides, in order to see their due size.

n It is certain that these Stones were formerly far more numerous than they are at present, for many of the Houses and most of the Walls for gardens and enclosures of all the Villages on and near these Downs are built of them; and for several years past full liberty has been given to all, that might want them, to take them away (in order that the ground might be ploughed) and vast numbers have accordingly been taken off. Then too, the huge Stones of which the two Druidical Temples of Abury and Stonehenge (the former situated on, the other at about the distance of sixteen miles from, the Downs) consist, were brought from these Hills and once made a part of the Grey-Weathers, as cannot be doubted when we consider, that there is no stone of the kind of which these Temples are
those that are highest lie upon, the tops of the greatest Eminences on these Downs, and tend on each side in incredible Numbers for several miles down towards the two nearly opposite Seas, the English Channel and the Bristol Channel, and many of them lie in long trains, just in such a manner and direction, as water retreating from these ridges would naturally have thrown or placed them, as the courses of the rivers adjoining evidently demonstrate, they tending these two ways; nay, even the rain, that falls perpendicularly upon the earth, parts on the tops of several of these hills, and retreats towards the two above-mentioned seas; one portion, falling into a branch of the river Avon, descends to Bristol; and another, entering into the river Kennet, (which at some distance joins with the Thames) goes to London, and empties itself near the East end of the English Channel; but on the South side of these downs, the rain that falls retreats into another river called the Avon, and runs directly into the very

are built nearer than these Downs; nay, that there is no stone, that I know of, in all England of the same kind but those that lie on these Downs; which also by being separate and detached from any rock, and lying loose upon the surface of the earth, were most fit for use and ready for carriage: besides, in the Valley where the biggest of these Stones lie are now to be seen several great Holes or Cavities in the ground with slopes on each side, which have been plainly dug, and the chief substance carried away; and in two or three of these Cavities I observed a large Grey-Weather-stone lying, but broken in the middle; and it was very evident, that the earth had been dug away from such Stones, that they might the more easily be carried off; but probably, by some accident (as the machinery not being strong enough), the Stone in raising fell and split asunder, and then was too small to answer the end designed, and therefore was left, as not being worth the carriage,
very middle of the English Channel: so that these Hills are manifestly the highest land in the South part of England, and from them there lies a gentle declination on each side towards the nearest seas: which declination (as I have above shewn) was caused by, or was the natural consequence of, a flood of waters that formerly covered these lands, and retreated from the in-land parts down towards the sea-coasts; and as the Stones I am speaking of tend in a course answerable to the effects of such a flood, we may justly suppose that their present position and situation were owing thereunto. Which will be farther apparent from a more particular consideration of them. On the tops, and near the ridges of the Hills, there are few, and those separate from each other; but as the distance increases, they increase in number, lying thicker and closer, and chiefly in the bottoms of the Combs; and besides, shape and wind their course according to the direction of the Combs and Vallies; which clearly shews that the Agent that formed the one (the Combs), placed also the other (the Stones): and when we lose sight of them above ground, they are still to be found underneath, lying among broken flints and gravel, and such as I discovered here were much less than those that lay upon the surface of the earth and higher up in the Vallies, and also much more worn, and many of them fairly rounded: all which evidently denotes, that water descending from the highest eminences on these Downs was the cause of the position, situation, and direction of these Stones.

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I have observed too such masses of stone, as the above, lying not only in in-land countries, but also on the sea- coasts, and many of them so large as to constitute rocks and small islands; and that they were really no more than fragments broken off, and brought down from the mountains or hills above, was sufficiently manifest, not only from the strata in them being in a different position, and of a different kind from the un- moved strata on the sea-coasts, but that the nearest place, where there were any strata of the same kind with the fragments, was in the mountains or hills above; and from them there lay separate masses of the same kind of stone, some more, some less worn, in the combs, dales, and valleys, quite down to the sea-coasts; where the larger frag- ments lay, and rested, as it were, upon the lowest ground.

And what is thus observable in England is to be seen also in other parts of the world. Mr. Innes in his Miscellaneous Letters, &c. (p. 6.) speaking of the parish of Magilligan in the County of Londonderry in Ireland, says thus, "The De- luge hath left us other marks of its fury, for more than half of our Mountain is one con- tinued Heap of Stones and Rocks tumbled down, and in particular one Rock left standing upon the side of the precipice: it is about twenty-eight feet in height, about six yards about, with natural seams in it, not very well cemented; no art of the Irish could place it there."

So also Mr. Smith in his Antient and Present State of the County of Kerry in that kingdom, p. 82.

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"The most considerable natural curiosities in this [the Southern] part of the Country are two Rocks, on either side of the river Roughty, [which in this place is about a mile broad] which seem to have exchanged their situation: one of them the Country-folks name Clough-Bearadh, i.e. the stone slice. This river divides a lime-stone soil from one of common grit, a thing very frequent in Ireland, though but little noticed because of its being very common. Except the above-mentioned rocks, all the stone on one side of this river is lime-stone, and that on the other is coarse grit, or common mountain-stone: but opposite to each other, on different sides of the river, a large rock, too heavy for human force to remove, of lime-stone, hath seated itself on the grit-stone side of the stream; and a large rock of grit hath occupied the place from whence the other seemed to be detached, and is seated among the rocks of lime-stone: which is a species of Fusius Nature, or sporting of nature, not very incurious; and which must have been effected by some prodigious flood, or shock of the earth; but earthquakes have been hitherto, till of late, quite unknown to this kingdom."

Bishop Pontoppidan in his History of Norway, p. 56. writes thus, "Hence [i.e. from the Deluge, as he rightly concludes], likewise remain on the surface of the earth the many detached blocks and fragments, like lumps of mortar, scattered not only in the valleys and creeks, but also on the tops of the highest mountains; many such being found here of the bulk of a common house, con-

X frequently
sequently too ponderous to have been raised to such a height by the hands of men; and besides, of no visible use." Again, p. 177, "The highest crest of the mountain of Svuuku in Oeserdalen, a province of Norway, lies, according to a survey taken by the barometer, about two thousand ells higher than the lake of Famund, a water betwixt the mountains. This mountain consists of one solid hard sand-stone; on the top of the mountain stands a solid huge mass of the same stone, which bears on it many marks of a dissolution and disruption, which can be attributed to nothing but water."

Swedenborg in Acta Literaria Sueciae (translated in the Literary Memoirs of Germany, Vol. I. p. 66.) observes thus, "That the Ocean once stood high above the Earth seems to be more evidently concluded from the face of the Northern parts, than from that of countries more Southerly. Here [in Sweden] we find entire tracts filled, as it were paved, with Stones of a huge weight and bulk; and the higher the country lies from the sea, these Stones are larger and more numerous;—as in Orebo, which lies high and between two Seas, larger and more numerous Fragments are observed than any where else."

Langius in his Preface to his Historia Lapidum, &c. or History of the figured Stones in Switzerland, remarks thus, "Then concerning Stones this truly wonderful occurs, that the tops of rocks and summits of the highest mountains are sometimes divided by joints into separate pieces; and moreover that certain Fragments or large pieces of
of Stone of some cubits in height and breadth are found lying upon Plains, and even upon Hills which are at a great distance from higher grounds, or separated from them by vallies: now by what means the aforesaid Divisions or Separations were produced in the hardest Rocks, and how the above-mentioned Fragments of rocks were brought down to the places where they are now found, deserves, in my opinion, a diligent inquiry: for I can scarceley think that they were naturally generated in these places, since they carry in themselves evident marks of being really the Fragments of Rocks, cum verissima rupium Fragmenta praeserant."

A person, who attended Sir Martin Frobisher in his second voyage to the Streights that pass under his name, observed upon the adjoining land, "Huge and monstrous mountains, whose great substance were Stones, and these Stones so shaken by some extraordinary means that one is separated from another, and discordant from all other quarries." Hakluyt's 3d. Vol. of Voyages, p. 38.

Mr. Ellis in his Voyage to Hudson's-Bay, &c. p. 147, speaking of an island (called Marble-Island) near the Coast of New North-Wales, says, "The tops of the hills are prodigiously rent and shattered, numbers of huge Rocks are confusedly huddled together, as if by an irruption."

Ludolphus, in his History of Ethiopia, p. 28, describing the Mountains and Rocks in Habissinia, writes thus, "Amongst these Mountains, and frequently in the Plain itself, and in the middle of the fields, rise up Rocks every way steep, yet varying

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varying their shape; some looking afar off like towers, some like pyramids, some like four-square towers built by art, and so even on the sides as if the workman's hand had done it: so that there is no way to get to the top but by the help of ladders and ropes."

Under this head may probably be reckoned those two remarkable Rocks or Stones, which front each other, near Blankemburgh in Germany, and which are called Monks Craigs, on account of their resembling at a distance the appearance of two monks in their proper habits. *Atlas Geographi*, p. 544.

So also I may here mention that large and curious Mafs or Mountain (as it is called) of Iron Ore at Taberg in Smalandia, in Sweden, for it can really be no other than an enormous Fragment, torn from the mountains above, as is evident from Dr. Ascanius's description of it, *which is as follows, "This Mountain is situated in a sandy tract of land, of which the sand is extremely fine. Opposite to it is a valley, through which a small river flows. It's perpendicular height is above four hundred feet; it's circumference half a Swedish league, or three English miles. The whole mountain is one mass of rich iron ore, and even in some parts is mixed with particles of native iron.—There are many perpendicular as also horizontal fissures all over the mountain, which are filled with the same sand, reduced to a kind of fine mud-like paste, and in no part whatever is it impregnated with the least particle of the iron ore.*

ore of the mountain, but is of the same purity and nature as is found on the sea-beaches. — No ore is found beyond the foot of the mountain, nor on the neighbouring plain; so that it appears as if the mountain had been artificially laid on the land, for it has no roots, or, like other mountains, its substance does not penetrate the ground. — It is situated near forty Swedish leagues distant from the sea.

Another Hill or Eminence, that may come under the denomination of a Fragment, is that called the inaccessible or Needle-mountain in Dauphiny in France, as the form and situation of it plainly denote. "The position of this Hill is such, that it appears to have been inverted or turned upside down, for it is no more than a thousand paces in circumference at the bottom, and is two thousand at top; from whence it is called the inaccessible Mountain. — At the top upon the plain of this hill there is a narrow and steep Rising or a sharp-pointed Elevation; which gave this hill the name of the Needle-mountain (see Histoire de l'Acad. des Sciences; for the year 1700, p. 4.)" and which probably was the cause, why it did not settle upon its larger basis, or the plain at the top.

The famous Rock in Horeb, anciently called Maffab or Meribah, and at present the Stone of Moses and the Stone of the Fountains (being that which Moses struck with his rod, in order to give water to the children of Israel in the Wilderness, Exod. xvii.) is preferred to this day without the least injury from time or accidents, and is cer-
tainly a Fragment from mount Sinai, as appears from Dr. Shaw’s description of it: “It is a Block of Granate marble, about six yards square, lying tottering, as it were, and loose in the middle of the valley [of Rephidim], and seems to have formerly belonged to mount Sinai, which hangs, in a variety of precipices, all over this plain.”

**Thus**

P Shaw’s *Travels*, p. 352. It may not be unacceptable to the reader, nor altogether foreign to our present purpose, to continue the Doctor’s description of this Rock, which is as follows, “The waters which gushed out, and the Stream which flowed whithal (Psalm lixviii. 20.) have hollowed across one corner of this rock a Channel about two inches deep, and twenty wide, appearing to be incrusted all over, like the inside of a tea-kettle that hath been long in use. Besides several mossy productions, that are still preserved by the dew, we see all over this channel a great number of Holes, some of them four or five inches deep and one or two in diameter, the lively and demonstrative Tokens of their having been formerly so many Fountains. It likewise may be farther observed, that Art or Chance could by no means be concerned in the contrivance; for every circumstance points out to us a Miracle, and, in the same manner with the Rent in the Rock of Mount Calvary at Jerusalem, never fails to produce a religious surprize in all who see it.” Similar to which is Dr. Pococke’s Account of this Rock, and also that of the Prefetto of Egypt; each of which the reader may see inserted in the Bishop of Clogher’s *Translation of a MS. Journal from Grand Cairo to Mount Sinai*, &c. p. 34, 2d. Edit.

I may here observe too, that, in considering this Rock as a Fragment, the Miracle of the water’s flowing out of it will appear much greater than if it had been in its natural bed or united to the solid orb of the earth; for it is not uncommon, in breaking up or only boring through the regular strata of the earth, to enter into a natural fissure, which, communicating with the Abyss, is always full of water, and when such is broken into, a stream of water will immediately issue out and continue flowing: but as this Rock was separate and detached from the regular and undisturbed strata, and lying loose upon the surface of the earth, it cannot be supposed to have had any communication with the natural fissures, and therefore the water that proceeded from it must have been owing to a supernatural Cause; which is agreeable to what an ancient Traveler
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Thus I have given instances of large masses of Stone or Rocks lying loose upon the ground in various parts of the earth, and no doubt is to be made but that similar masses are to be found in every part, where there is any considerable extent of land, though such only are taken notice of by travellers as have something remarkable in their appearance. And that these are really no other than Fragments torn off, and carried down from higher grounds, every circumstance in the above descriptions tends to point out, as the reader will be a sufficient judge for himself from what has been already said on the subject.

I shall

veller (M. Baumgarten, a German Nobleman, who travelled into Arabia in the year 1507; see his Travels in Churchill's Collection of Voyages, &c. Vol. I. p. 337.) remarks: "Which Miracle (of the water's flowing out of the above-mentioned Rock) was the more wonderful, because this Stone, though it is separated from the rest of the rock, and is almost of a square figure, yet is fixed in the ground by only one pointed corner [see Dr. Smaw's Draught of it in his Travels, p. 350.] and consequently not so fit a posture to extract any moisture from the earth; and therefore it's sending forth such abundance of water must have been the work of an Almighty Hand."

I may here add too, that this Stone was so small, exposed in such a manner, and situated in such a tottering condition, that it might easily be viewed on all sides, and even turned upside down, had the people that attended Moses suspected any cheat or imposture in this affair; and in order to take off all suspicion of this kind might be one reason why God made choice of such a Stone as this for the operation of this miracle, which was so extraordinary and attended with such indubitable proof, that the persons, who had just before murmured and questioned the divine Mission of Moses, now entirely acquiesced in it; and if such persons as Corab, Dathan, Abiram, and their companies (who were ready on every occasion to find fault with Moses and dispute his Authority) were satisfied, surely our present unbelievers (who lay claim to great modesty and reason) ought to be so, since the Miracle was examined by their own set of people, and they may have ocular demonstration of the truth of it at this day.
I shall therefore in this place only enlarge a little on the afore-cited passage of Langius, (p. 306.) "That the tops of rocks and summits of the highest mountains are sometimes divided by joints into separate pieces;" for though this may seem a trifling and insignificant observation, yet the opening or widening of these kind of joints was the immediately preceding effect to the tearing off and carrying down of the Fragments, and one was the consequence of the other, as will be evident from the following particulars. These joints or openings between the stones in the upper parts of rocks ought to be distinguished from the natural fissures in the body of the rock, and are distinguishable there-from by various marks—being generally far more numerous than the others, commonly filled with sludge or an earth-like matter, but principally are to be known from the others on account of their greater width in proportion to their length, and because their edges or terminations are much worn and rounded, and also the extraneous bodies, such as shells, corals, &c. that project from the edges, much worn and rubbed. All which clearly shew that these edges have been subject to some gradual attrition, and that these joints or openings have been a passage for some such fluid as water; which also must have passed through them with some force or violence, else these edges (which doubtless at first, like the ends or terminations of other cracks in stone, were sharp, jagged, or pointed with acute angles) could not have been worn to such a degree; which last consideration farther shews, that this
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this effect is not to be ascribed to the flow and gentle gleanings of rain through the earth; nor even where the rock is naked and exposed to all the violence and beating of the wind and rain, are these openings to be attributed to them (though probably they may enlarge them a little), for they are found almost equal in number and size, and have as manifest marks of the force of running water, where the rocks are covered with mould and rubble for the depth of several feet, as where the rocks are exposed to the weather. And I believe that there are few or no rocks but what have these joints or openings made by the action of water, in greater or less degree, even under the turf; which is a proof that this effect was produced before the earth was covered with vegetable mould: and since these marks of the force of water are to be seen upon the summits of the highest mountains and rocks throughout the whole world (for we may reasonably suppose, that what is common to the rocks and mountains in *England* and *Switzerland* is common also to all other) we must conclude, that the water, that opened or enlarged and passed through these cracks, was equally universal with its effects, or spread over the whole surface of the earth; and therefore the Deluge, in which these accidents happened, universal.

And as the water made its way through these cracks, it would not only wear and widen them, but by continuing and repeating its action would at last separate and disjoin large pieces of the rock, and remove them from their places: and accordingly it
it is common to see, in a country that is exposed and the rocks laid bare, large masses of stone, some displaced but two or three inches from their original beds, others two or three feet (and there remaining pendulous at the tops of precipices and brows of hills), others carried down the sides of mountains and hills for several yards; but none of them removed to such a distance, or so much injured in the carriage, but that a judicious person may find the very place they formerly occupied in the natural rock, and have as convincing a proof that they are disjecta membra or the dismembered parts of the adjacent rocks, as if he had seen them torn from thence. And if he would judge thus of those that lie upon the tops and sides of mountains, he would certainly determine the fame of those that lie farther down in vallies; for the former are only the beginning; the latter the end of the same train: and as the former were pushed down or removed out of their places by the force of descending water, so also we must conclude of the latter; and that both are proofs that a flood of waters formerly covered, and retreated from, the surface of the whole earth.

II. But besides these larger Stones, there are others that are less; which also are to be found loose upon the surface of the earth, or else but a little way beneath it; and are of such a nature themselves, and lie in such a manner, as clearly to point out that they are Fragments torn from the strata above, and placed in the form they now lie, by
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by currents of water descending from the higher grounds.

Of these lesser fragments there is a great variety, and no country whatever without them. And as it would be endless to speak of every different species, trace out the accidents that have happened to them, and particularize the arguments deductible from each, I shall therefore treat only of one species, which, on account of its usefulness in leading to the discoveries of veins of ore, &c. has been accurately searched into, and carefully examined, by most miners. The species I mean, are those stones which are commonly called Sboad-stones. An account of which I shall take from Mr. Borraste's Natural History of Cornwall, p. 149; as that Author has illustrated his meaning by some copper-plate cuts, which the reader, if not conversant in the affair, would do well to consult.

But first it will be necessary to explain a few terms. A vein of ore, or a fissure containing ore, is called in Cornwall a Lode or rather Load; and I suppose for this reason, because that is the place where the ore lies, as if it had been loaded up or laded in, as goods are in a ship. The top-part of the Vein or that which is nearest to the surface of the earth, and which generally consists of a mixture of ore, loose stones and rubble, is called the Broil. When this Broil, or rather that which was once the Broil, is found dispersed or lying at any distance from the Load, these dispersed or separated parts are called Shodes or Sboad-stones, because, I suppose, they lie in such a manner as manifestly
manifestly to shew that they were spread abroad, shot, or detached from the main Vein or Load; and that this detachment or separation was made by the force of water will appear from the following phenomena, as extracted from the above-mentioned Author.

1. "The Broil is found in greater quantity in the valleys than on the tops or sides of hills; in the level grounds it is but just moved from its first station, and spread on each side the vein in an equable manner; but if the lode has any declivity near it, then many of the loose stones of the broil are found strewn down the hill. 2. The longer the declivity, the farther are these stones removed; but the shorter and steeper the sides of the hill are, the less distant they are found.
3. The smaller stones are carried farthest; on the contrary, the largest stones are nearest to the lode.
4. The smaller are also nearer to the surface of the ground, but the larger ones deeper, and still deeper as you approach the lode, till the last are found contiguous to the lode itself. 5. The farther distant these stones are from the lode, the fewer they are in number; but they multiply as you come nearer, and are always in greatest plenty next the lode.
6. These stones are known from all others by their being of a different colour and structure from the shelf, rubble, and other common stones of the ground where they lie, but more particularly by their angles being worn off; and the farther distant they are from the lode, the smoother they are; and the nearer, the less
are their angles blunted. In Cornwall we call these dispersed parts of the broil Shodes.

From daily observing the grounds they search, and the different substances they there meet with, the tanners can readily distinguish between what has been removed from what has perpetually kept one and the same station; the karn, that is the firm solid rock, seldom affords us any instances of alteration or movement, but every loose un-connected part of the earth has been moved and shifted; and forasmuch as the transferred bodies are found to be moved more or less, farther or less distant from their former beds, according to their own specific weight, and the declination of the plane they moved on, it is the general persuasion of every intelligent tanner, that this change of situation can be owing to nothing but the Force of Water, and of no other water so likely as that of the universal deluge: neither are we to think this less the voice of truth, because it is so common an opinion; for indeed the cause speaks so much for itself, that in order to confirm the justness of this reasoning, there remains nothing more to do, than to point out the correspondence and circumstantial agreement betwixt this assigned cause and each particular effect and property mentioned before.

First then, in low and level grounds the Broil is greater in quantity, and less disturbed, than on the tops or sides of hills, as being but just moved from its first settlement by the vacillating waters of the deluge on a plane surface; whereas on a declivity, and a more exposed situation, the
waters had more power to agitate and disperse, and consequently the original covering of the lode is much lessened in quantity. 2. The gravitation of these stones (usually impregnated with metal) will, when moved with water, make them descend a steep hill quicker than down a more easy descent, in the same proportion as bodies moved on inclined planes, their velocity being in proportion to their own weight, the declivity on which they move, and the impediments they meet with there; but the quicker they descend, the sooner they get at rest, and fix by immerging themselves in the stiff clay and rubble, and vice versa. 3. The smaller Shodes were moved to and fro easily and frequently, and consequently much dispersed; whereas the greater and weightier the shodes were, the more they resisted the agitation of the waters, and were less removed. 4. The smaller shodes are usually found in and near the surface, being washed downwards, till, by the resistance of the ground on which they are spread, they are forced out like the rills of brooks into open day, whilst the larger by their superior weight rest deeper interred, and nearer the lode. 5. The more distant Shodes are found from the lode, the more they were dispersed by the water, and consequently became fewer in number in any equal space, like diverging rays; and the nearer to the lode, the thicker and more frequent they remain for the same reason. 6. That the angles of these stones are blunted, proceeds evidently from the agitation of water, and they are smoothed in proportion to the distance they have been rolled; and
and had the force continued a sufficient while, these stones would have been as round as the pebbles on the sea-shore; but the farther we find them from the lode, the more trituration they have undergone, and vice versa."

III. Together with the above-mentioned Fragments of Stone, both those of the larger as well as those of the smaller kind, both those that are round as well as those of the most irregular shapes, there is also found a variety of other substances, lying in such a manner, both with respect to themselves and also with regard to the ground they lie upon, as plainly to shew that their situation and direction were owing to the effects of a flood of water that once covered, and retreated from, the surface of the whole earth.

For, first, it is common to observe upon the tops of the highest mountains a small thin covering of a kind of blackish bituminous earth, commonly known in England by the name of Peat-earth or Turf; and this upon examination appears to be no other than a mass of rotten and perished vegetables. And where the mountains happen to have any extensive flats or large spacious cavities, in form of basins, at or between their tops, there is generally a still greater quantity of these substances, lying in a moosy or mossy kind of ground, with a vast number of trees, of all sorts and sizes, buried under them: and many of the trees and vegetables of such species are not now known.

known to be growing near these places, nay, some of them of such kinds as the barrenness of the soil or the bleakness of the air will not permit to grow there: consequently, they must have been brought from other, far more distant, regions; and no Agent or Medium can be thought upon to proper for effecting this as Water, a Medium upon which these bodies would naturally swim and float, and therefore be easily conveyed from place to place. And the parts they are now found upon plainly shew, that their present situation was owing to a flood of waters that covered the whole surface of the earth; for they are left upon such places where such a flood, in its retreat to the lower land, would most naturally deposit a great portion of its floating wealth, viz. upon the highest and more eminent parts, or those places which it first receded from; in the same manner as the water upon the sea-shore in retiring, after an high tide, throws, and by the unequally reciprocal or gradually decreasing repercussive motion of its waves, leaves, upon the parts it first recedes from, all lighter bodies or the substances that swam upon its surface: and in a similar manner as the same water, in retiring from the channels of rivers, bays, &c. leaves upon the banks and shores the finer parts of the mud and flitch that it was pregnant with; so when the flood that drowned the whole earth retreated to its appointed place, it left the surface in a manner covered with the finest, lightest, and purest of terrestrial matter, Vegetable Mould.

SECONDLY,

1 Woodward's Nat. Hist. illus. p. 60.
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Secondly, Under the vegetable mould there lies a vast variety of substances, of all sorts, shapes, and sizes, but each and all of them placed in such a direction as manifestly to indicate, that their position and situation were the effects of a flood of water retreating from the higher grounds. Thus, for instance, where the higher and more inland countries abound with free-stone, and chalk, interlined with layers of flint; in the lower lands you will find for the depth of several feet the two former substances intimately blended together or washed and worn down to a gritty kind of maum, and the nodules of flint broken into innumerable pieces, and confusedly mixed with the aforementioned matter. In such places where the upper strata of mountains consist of Lime-stone, with interjacent layers of clay, and of iron-stone, replete with yellow and red oker, or ruddle; in the vallies beneath you may discover both large and small, round and irregular, fragments of the iron and lime-stone, with unequal and uneven streaks or seams of clays, of all colours that the above-mentioned substances could tinge them with. Where the upper strata consist of a loose sand-stone, and a brittle flakey slate, with beds of clay intervening; in the lower lands you will find for a considerable depth a gritty marly rubble, filled with immensely small pieces of sharp flakey stone, thrown in a variety of postures. And the same may be observed respectively and proportionably of all kinds of strata in such places. If we descend from the in-land and mountainous countries to the hills and the vallies beneath them,
and examine the manner in which things lie under the vegetable mould, we shall find them placed much in the same form as those already described, only a greater quantity and a greater variety of them (according to the different species of strata that lay between the hills and the mountains) and these also in general much more worn and much smaller, especially those parts that came from the mountains. If we go farther down, and visit the low-lands and marshes near the sea-shore, a still greater variety and greater quantity of rubble will present itself to our view; and the fragments of stone much more worn, and in many places ground down to a fine sand or slitch.

Now that this Rubby-matter was placed in the manner above-described by the action of water, retreating from the highest in-land eminences down towards the sea-shore, is evident—from the multitude of stones that are found in it which have been apparently worn round by agitation of water;—from the number of fragments of stone that lie in trains, tending from the higher towards the lower grounds, just in such form and direction as water in its retreat would naturally cast them (as I have already shewn with respect to those stones and fragments that lie above ground);—from the irregular and unequal streaks and seams into which it is cast; and what is very remarkable, that in such places where there is any eminent projection in the ground or rock underneath, or large fragments of stone which the waters could carry no farther, there these streaks and
and seams of different matter are thrown over it in various concentric arches, and the whole terminated in such a form as plainly to indicate that the force of a descending flood placed them thus;—and also from the manner in which this rubble lies all over the earth; as for instance, upon the highest in-land eminences, especially such as are sharp-pointed and steep, there is but a small portion of this rubble, seldom exceeding a few inches in depth; in the bottoms of the combs that descend from these eminences you will find the quantity somewhat increased; in the dales still more; in the vallies a much larger portion; and in the low-land marshes near the sea-shore a still greater quantity, for two or three hundred feet in depth, and in many places even unfathomable. All which would be the natural result of a flood of water, that formerly covered, and retreated from, the surface of the whole earth, and descended into the sea, or rather the Abyss beneath the sea. For as the in-land parts of the earth were at the greatest distance from those places (the apertures into the Abyss) where the most violent force and strongest action of the water was, so they would be least torn, and of course least covered with fragments and rubbish; and the wear and tear by the water would be in proportion greater and greater, and the load of loose rubble gradually and continually increased, till it approached the sea-shore; and by the time that the latter waters arrived thither, the ocean would be full or nearly so, and therefore these waters would be repelled back again, and the loose clay, mud,
flutch, &c. with which they were filled, be caused to settle upon or near the sea-shore, and so constitute what we call a Marsh or Moor, being a loose clayey ground, consisting of a variety of terrestrial substances worn extremely small, and placed, in all kinds of direction, as the reciprocal and undulating motion of water would naturally cast them.

Thus I have shewn, from the consideration of that vast variety of bodies or substances that are now found loose upon the surface of the earth, (each particular species carrying its particular proof) that this terrestrial globe has been covered by an inundation of water.

I am now to deduce some Corollaries from what has been advanced.

1. Then, from the quantity of matter that is now found loose at the bottoms of Combs, Dales, and Vallies, and from this matter being principally of the same kind with the strata in the sides of these Cavities, we may reasonably infer that it once made a part of the strata, and so, that the strata were once continued from side to side, and of course that the Hollows of Combs, Dales, and Vallies were once filled up with strata similar to those, which now appear in their sides or in the bodies of the mountains or hills, in which these superficial Cavities are: and as mountains and hills are no more than Eminences caused by the formation of the Hollows of Combs, Dales, and Vallies, so it is certain that the earth was once of one uniform spherical surface, and that the present irregular mountainous form was not the original,
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original, but owing to some after-cause, as I have already endeavoured to prove, p. 248, &c.

2. From that vast quantity of Rubble which in a manner covers the whole surface of the earth, chiefly from that which is posited in Combs, Dales, and Vallies, it is manifest that the Hollows of combs and vallies were not caused by any contraction or lateral shrinking of the strata (see p. 276). For had these cavities been owing to such a cause, there would have been but little or no loose matter found in them; for in such a case the parts of the strata (when the whole earth began to be consolidated after it's dissolution) by being contracted within themselves, atom to atom, would be so closely united together, that the Cavities caused by these Contractions would contain little or no loose matter in them, as is the case with the covered Fissures, or those Chasms in the body of the earth which terminate in themselves and have no Communication with other cracks; in these we never find any such loose matter or rubble as that which lies in the bottoms of dales and vallies: had therefore one sort of these Cavities, as well as the other, been formed by Contractions, there would have been like matter found in each and respectively placed.

3. From the regular and gradually increasing proportion of the rubble that is found in Combs, Dales, and Vallies, it is manifest that these Channels were not caused by any elevation and depression of the strata; for had this been the case, this rubble would have been placed in the most confused and irregular manner possible.

4. From
4. From this same increase and apparent tendency of this rubble from combs to dales, from dales to vallies, from vallies to the shelving bed of the ocean, we may determine the place, whether the other part of this rubble (viz. that which formerly filled up all the Hollows and Channels upon the earth and in the sea) was carried to, namely, the Center of the Earth. For had it been carried no farther than the bed of the ocean, and deposited there, it would more than have filled that; because the matter that was torn out for making that cavity would equally have filled it when in the form of rubble, as when it remained in whole and unbroken strata; and then there was the additional substance of all that matter, that before filled up the hollows of the Combs, Dales, and Vallies over the whole surface of the earth; and had all this been placed in the basin of the sea, it must more than have filled it. Now since it is certain that all this rubble was carried down into the bed of the Ocean, and as that did not retain it, it must therefore have passed through, and been carried into some place beyond the bottom of the sea, and that could be no other than the center of the earth, the last place it could be driven to; and there it would remain in form of a nucleus or inner globe, as described p. 97, 280, and delineated by I. in Plate the second.

5. If this load of rubble and fragments of stone were carried down to the center of the earth, it will certainly follow, that the Agent that did this, that the water (as it is of a more subtle and penetrating nature than this matter) accompanied it in
in its passage and descended together with it; and as this loose matter occupied the center, the water would naturally settle around it, as denoted by G. H. in the above Plate; and so constitute the Mosaic Abyss.

6. As in tracing the fragments of stone that lie in trains from the mountains, it is common to observe where the descents are gradual (where they are irregular and attended with sudden falls and precipices, great irregularity must naturally be expected) that those stones that are largest and least worn lie nearest the tops, and those that are less and most worn at the greatest distance, and also that these Stones are of the same kind with the strata in the mountains above, and not of the kind with the strata in the valleys beneath (unless where they both happen to be of the same species); so it is certain that the currents of water which removed these stones from their original beds, and placed them in the manner we now find them, came from the mountain-tops and drove towards the sea, and therefore that these Stones were not thus placed by partial deluges, owing to high tides or accidental inundations of the sea, as some have imagined; for had either of these latter been the cause, the larger stones would have been left nearest the lower grounds, and the lesser necessarily thrown higher up; and if the water of such a flood, in its return to the sea, had force enough to bring back any of these bodies, it would naturally leave them in the greatest irregularity, the lesser would be brought to the larger, and the stones of the valleys be mixed with those of the moun-
mountains; which is not the case: and therefore these stones were not thus placed by such partial floods.

7. From the consideration of some other circumstances attending these fragments of stone, especially those that have been worn round by water, we may see the falsity of another hypothesis, calculated to solve these phenomena, without reference to the universal Deluge in the time of Noah; viz. that these stones were thus rounded, and the fragments of rocks torn from their original beds and scattered over the surface of the earth, at the first formation of things, when the earth was totally covered with water, at which time the highest mountains constituted part of the bottom of the sea; therefore it is no wonder, since the retreat of those waters, that we now find pebbles and rocks in the most inland countries.

But the grand question to be solved, is, How came these waters to retire? in which principal particular the Authors of this hypothesis are not agreed, some imagining that the water was rarified and changed into air; others that the Sea by the violent motion of its flux and reflux threw up vast quantities of sand and mud, and thereby left the spaces between them as Vallies, which the water occupying, the eminent parts became dry and habitable; with several such groundless and unphilosophical assertions.

But it required, and these Authors suppose it did require, a great length of time, even that of ages, before these transactions were completed, and therefore that the parts of the earth, which at
at present bear marks of the Sea, constituted for a long time the bottom of it, and thereby gave room for the waters to separate the rocks from their natural places, and form the fragments of stone into pebbles, and place them in the manner we now find them in the most distant countries from the sea.

But then there is a very material difference between the in-land pebbles and rocks and those formed and found at sea. It is common to observe vast numbers of pebbles and stones upon the sea-shore which have several extraneous bodies, such as shells, corals, and corallines, affixed to their outsides, and many of these so closely adhering that it is almost impossible to disengage one from the other without breaking both; and it is also certain that these grow and are formed at this day, especially in calm and quiet places. But now, after the strictest examination I could make upon immense multitudes of Rocks and rounded stones that I have seen at land, I never could observe any such extraneous bodies adhering to them, nay, not upon such as were but a few miles

\* I have seen indeed one or two instances of Nodules having a small shell or a plant sticking to their outsides; but then these are a very different species of Stones from in-land pebbles (though they resemble them in their outward shape) as I have shewn p. 291. Nodules were formed during the dissolved state of the earth and the great confusion of things at that time, and many of them have apparently passed through several strata that abounded with shells and plants, and at last settled in strata that were replete with these extraneous bodies, so that it is no wonder that we sometimes find one or two of these bodies adhering to their outsides: but in-land pebbles were formed at a different time, in a different place, and in a different manner, as may be seen in the above cited page.
miles from the sea, when the pebbles upon the sea-shore abounded with them; which must plainly shew, that the places where these pebbles are now found were never the bottom of the sea, nor the pebbles themselves formed at sea, but that they were made at some particular time, or in some general deluge, the waters of which must have been in such constant agitation and perpetual fluctuation, as not to permit such things to settle and grow; which is agreeable to the Mosaic account of the Flood in the time of Noah, see p. 93.

And what farther shews that the places where these Stones are now found were never the bottom of the sea, nor the Stones themselves formed at sea, is, that we never find (what is very common to find at sea and upon the sea-shore) any artificial things, such as regularly-shaped pieces of wood, stone-instruments, iron-tools, pots, herds, &c. naturally lying among them, but only such as were placed there by design or accidentally dropped, as is evident from the prior disturbance of the earth, where such have been taken up at any depth, and their being generally found in such places where old Cities, Castles, Camps, or Lakes have been. And indeed had these artificial things ever

* I have read indeed of Boats, small Barques, Anchors of Ships, &c. being found at land in countries far distant from the sea, but then it has generally been in authors of no great credit, and the facts asserted upon no good testimony; but even allowing them to have been true, it is certainly much more reasonable to suppose, that the places where these things were found were formerly the bottoms of large Lakes, which by design or accident had been drained, rather than the ancient bed of the Sea; in the same
ever been coeval with these fragments of stones, or subject to the agitation of water as they have been, they would certainly have been worn and rounded in the same manner as they are. Besides, the artificial things that are taken up at sea have indiscriminately shells and corals growing on them, as well as the stones and pebbles on the shore; but the artificial things, even those that bear the marks of the greatest antiquity, which are taken up in the inland countries, have no such bodies adhering to them; which is a plain and undeniable proof, that neither they, nor the places where they are now found, were ever covered by the sea.

And here, by the way, we have an easy and certain method of discovering what parts of the earth the sea might formerly have encroached upon, and covered for any length of time, and after the same manner as in draining the famous Lake of Martin-mere in Lancashire, which was eighteen miles in circumference, there were found in the ditch at the bottom no less than eight boats, shaped somewhat like the Canoes made use of in America, as Dr. Leigh, in his History of that County, assures us of his own knowledge, p. 18, and 181. Or else these things might be attributed to violent tempests or accidental overflowings of the Sea; and besides, whatever things of this nature may be now found at land in Europe, some allowance must be made for the event recorded (p 132) of this treatise, when numbers of persons procured Ships and other conveniences, under apprehension of a general Deluge, and probably many of these were made at land in countries far distant from the Sea, as it was supposed that the devastation would reach all over Europe; which therefore, as the event did not happen, would be left in the places where they were first made, and in the future ages might be imagined to have been wrecks of ships lost at sea, though the sea never reached these parts; and what parts of the earth the sea has really covered will be best determined by the marks given in the text, in the subsequent pages.
after have retreated there-from, and what not, viz. by observing whether the rocks and stones, especially the artificial things, found at land, have any marine productions adhering to them or not; if they have none, we may depend upon it the Sea never reached these parts; if they have some, especially if they are of the same kind with the shells and corals upon the nearest sea-shore, we may conclude it has. But upon the strictest researches I could make with regard to these particulars, I could never find that the Sea had receded above a few miles in length, or a few yards in depth, from its original and first known boundaries; and that only in places where the land was low and flat, and these recees or retreats chiefly owing to banks thrown up, or canals cut, by the art and labour of man.

All Hypotheses therefore to account for these in-land rocks and pebbles (which so apparently carry marks of having been moved, shuffled, or worn round by water) upon supposition that the places where they are now found were formerly the bottom of the sea, must fail, and recourse can only be had for the explication of these phenomena, to the one Universal Deluge in the time of Noah.

Some indeed have questioned, whether the Power of Water could possibly have caused effects so great and extensive as the above-mentioned; but such must be very ignorant of the nature and force of that Fluid in its common operations.
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Mr. Hutchinson (Vol. XII. p. 285.) speaking of the effects of the water retiring at the end of the Deluge, says, "The miners antiently were wont to imitate this way of clearing off the earth by water. They collected great quantities of rain-water: and, breaking the dams, let fall that water at once, to bear off the earth, stone, &c. and uncover the veins. The miners call these Hysbes. —Of these there is a larger account in the Observations about the Ores of Metals. —About the year 1702, being upon Molds, a mountain in Arkendale, I observed a cloud, blacker and deeper than I ever saw before, over Grinton Liberty. It broke, tore up the plain ground, to five or six feet deep in several places: and channelled the brows and sides of hills to a vastly greater depth; bearing away stones of many ton weight, and carrying some very large several hundred yards, unto the plains; bearing down several little houses, and making great havock. There was little wind attended this shower. Indeed, we seldom observe much wind with a sudden great fall of rain." [So the whole devastation was owing to the force of water.] Many such instances will readily occur to the memory of any one that has been conversant in Philosophical Histories.

But Swedenborg has brought this affair to a mathematical exactness, *Literary Memoirs of Germany*, Vol. I. p. 66, &c. "That the ocean stood high above our earth, seems to be more evidently concluded from the face of the Northern parts [he is speaking of Sweden] than from that of countries more Southerly. Here we find entire tracts
tracts filled, and, as it were, paved with stones of a huge bulk and weight: and the higher the country lies from the sea, these stones are larger and more numerous. That stones of a great weight may be rolled and carried to a great distance, appears from the following Hydrostatical Considerations. 1. The weight of stone to water, bulk for bulk, is no more than two and an half to one, and to salt-water still less. 2. Besides, it almost loses half its weight in water; and there remains but one and a half. 3. Whence the weight of stone is not so sensible in the sea as in the air, seeing water is so heavy as almost to equal part of the remaining weight, that is, the weight of stone in water is to water as one and a half to one. 4. If, therefore, the waves agitate the sea at its bottom, as tempests do the atmosphere in its lower parts where we live; and if a column of sea-water be some hundred yards high, the motion and force of the fluctuating water at the bottom will be increased in the ratio of the height and of the bases: so that a wave of the sea, continued towards the bottom, has a greater force from it's height than the same wave on the surface. 5. And consequently, the primæval sea could have carried along with it stones of a huge bulk, loosened spontaneously from mountains, and strewed the earth up and down with them, and even move its whole bottom." This last supposition, that the bottom of the ocean is equally agitated in a storm with the surface is a mistake. Mr. Boyle in his *Philosophical Works*, (Vol. III. p. 239.) has shewn,
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It is shown, that the bottom parts of the sea are quite calm; and instances in particular in the case of a diver, who could stay several hours under water at the depth of fifteen fathoms, and when there, could not feel any motion of the water, though a storm tossed the waves at the surface six or seven feet high. So that this recourse to the waters of the primæval sea (in the sense of this and many other authors, as before observed) for producing the above phenomena can never avail, and reference can only be had to the waters of the Deluge, when the Earth was broken through or perforated in many parts, especially at the bottom of the Ocean, for the descent of these waters: and then every effect that Swedenborg has mentioned would naturally follow, but upon no other supposition.

III.

From the consideration of things upon the surface of the earth let us now descend into the inside, and see what proofs we can educe from thence of an Universal Flood.

And here let us enter the subterranean Kingdom by those easy and convenient passages,—the natural Caves and Holes of the Earth: and in the first place collect what evidence we can for the point in question from these Caves themselves.

All the natural Caverns that I have seen myself, or those that I have read descriptions of, appear to me to be no other than what in the North of England are called Swallows, and in the West Swallets—
Swallet-holes. These Holes or Caves are generally nearly circular at top, and from twenty to two hundred yards or more in circumference. Many of them have a direct perpendicular descent, like the Hollow of a Well, for the depth of several fathoms; in others the descent is somewhat winding and crooked; and generally, at a greater or less distance, there is a large spacious Opening, into which enter several lesser Caves or Conduits; some gently declining from the top, others lying in an horizontal line, and some descending perpendicularly downright to unfathomable depths. The Entrance or Mouth leading into many of these Caverns is at present horizontal and very small; and hence Naturalists have been greatly puzzled about the vast Spaces within, and how it came to pass that such small orifices should lead to such spacious Openings; whereas in fact the larger Cavities were made first, and the lesser that proceed from them after; and the true entrance into such Caverns is at top, upon the surface of the earth, and only covered with rubble and mould; and indeed the large Spaces within, in most of these Caverns, reach near to the surface and form part of the true and original entrance; so that they all may be looked upon as Swallets, or in-land gulps that swallowed down the waters of the deluge.

Having thus far explained myself, I shall now shew in what various parts of the earth, and how distant from each other, these Caverns are to be found.
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The first that I shall mention, and the most noted in *England*, is that called *Elden-hole*, in *Derbyshire*. This is a direct perpendicular Chasm, of an oblong form, as far as the eye can discern it’s depth; the mouth of it is about *twenty yards* over one way, and *eight* the other. Mr. *Cotton* endeavoured to find the bottom by plumbing it with a line *eight hundred and eighty-four yards* long, but could not reach it: and upon examining the lower end of the line, he found that *eighty yards* of it had sunk through Water. Another gentleman let down a line *nine hundred and thirty-three yards*, without meeting with the bottom. The Earl of *Leiceter*, in Queen *Elizabeth’s* days, caused a man to be let down with a basket of stones tied to his middle, in order that by letting some of them occasionally fall he might judge of the depth of the Cave, and after he had remained at the length of a rope of *two hundred ells* for some time, was pulled up, in expectation of some great discoveries: but when he came up he was senseless, and died of a phrensy in *eight days*. When I was upon the spot, I found, upon enquiry, that two men had lately ventured down this cavity, upon supposition that some cattle, that had been missing, might have fallen into it: and when they had descended to the depth of *seventy yards*, they found the carcases of several oxen and sheep; but could get no farther; these carcases, together with the stones that had been thrown in by the curious.

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* See *The Wonders of the Peak*, p. 401.
* Philos. Transf. No. 2.
* Hobbes de *Mirabilibus Patri*. 
ous in endeavouring to discover it's depth, having probably covered and stopped up the leading Cavity. They said also, that after they had been let down about half way, the cavern opens and widens into a spacious vault, and that there appeared to be another great cavity, besides that of Elden-hole, leading to the surface of the earth. And upon examination, I observed that, at about the distance of two hundred yards from Elden-hole, there was a gradual, nearly circular, Sinking in the earth, near three hundred yards in circumference, and from it's utmost summit about twenty yards deep; and this appeared to me to be undeniably the true mouth of this Swallow, and that Elden-hole is no more than a lateral conduit leading into it.

Three miles Northward of Elder is another famous Cavity, called Peak-hole, situated almost in the Village of Castleton, and at the foot of a semi-circular or rather semi-cylindrical Rock, (the hollow side facing you as you enter) above two hundred feet high, and the diameter of the cylinder about sixty feet; at the bottom of this perpendicularly-hollowed rock, this Cavern opens it's mouth in form of an arch at least forty feet high, and sixty broad at the bottom; the top part, and the sides of this arch, as also the whole semi-cylindrical rock above, are very smooth, and apparently worn away by the gradual attrition of some such Agent as water; and had not one side of

\[\text{If the reader has not seen the place, he may have a just idea of it from No. VIII. of Mr. Smith's Prints of the prospects in the mountainous parts of Derbyshire, &c.}\]
of this tubular Hollow been broken down and carried away by the Agent that first formed this perpendicular Channel, it had resembled at the top and in the inside a common well, and at first sight would have been esteemed a Swallet-hole; and the not attending to this particular has caused great perplexity in accounting for the origin of this Cave. From the mouth of this Hole to the distance of one hundred yards the roof gradually declines, till you are obliged to bend and creep in order to proceed forward, and after you have crept a little way, you enter into a spacious wide apartment; which continues for about thirty yards, when the rock almost closes again, and after you have passed (in a little boat) a river that runs through the Cave, the rock widens again into a still greater Opening, till you come to a second stream of water, where it again contracts itself; but as soon as you have passed this Current, another spacious Opening presents itself, which continues in some places higher, in others wider, till the roof of the rock lies upon the very surface of a third Current of water, and puts an end to the traveller’s journey; but by agitating this water with our feet, we heard a rumbling undulating noise in some great cavern beyond. From the entrance to the end of this Cave is about seven hundred yards. Where the larger Openings were, there were several lesser lateral Cavities or rather Conduits, and some that descended perpendicularly down from the top, and the sides of all, both large and small, are worn as smooth and as round, or rather tubular, as a constant passage of water.
water could possibly wear them: and as this Agent would exert itself stronger and make more room for itself where the greater number of streams met, hence it is that, where the Conduits for the water appear to be larger and more numerous, there the Openings within are wider and more spacious; and where there appear to have been but one or two passages for the water, and those small, there the Cavities are proportionably less. Not that I would suppose that the water tore these passages through the solid rock without any prior opening or fissure: no; there were proper cracks and chasms made for it's descent before, as I have shewn, p. 89, 276, &c. But where these cracks were larger than in other places, there the water would descend in a fuller body and with greater impetuosity, and would work and wind it's way through lesser cracks to get into the greater Cavities, and by it's frequent passages through both sorts of these Channels would wear and tear away the rock to a great degree, and so vastly widen the original openings. And as these original Cracks would naturally be irregular, according to the grain or different constitution of the stone or strata in which they were formed, so these irregularities, when opened and widened by the passage of the water, would produce the risings and fallings in this and such-like Caverns.

I have been longer in describing and accounting for the origin of this Cave than I need be with respect to any other, for though there are scarcely two that are exactly alike in every thing, yet
yet there are none, that I have seen, but what agree in the chief and principal particulars. Thus, at about the distance of eight miles South-West from Peak-hole, there is another similar Cavity known by the name of Poole’s-hole (not far from the village of Buxton) about six hundred yards in length. In this also there are several risings and fallings, several lesser and larger Openings, with collateral conduits, and the sides of the rock in all much worn, and in many places greatly torn, as appears from the large fragments that lie loose at the bottom. The three above described Caverns are indeed justly esteemed the principal in this County, but there are many that are less, and equally demonstrative of the opinion I have advanced; and there are still a greater number that are, in a manner, undiscovered; for though they cannot be entered and examined, yet these entrances or orifices are very visible, and are easily distinguishable from the mouths of the pits from whence they dig ore; for these latter have generally a heap of rubbish thrown out all around them, and descend perpendicularly downright, whereas the Swallet-holes have no such matter round them, but the rubbish lies in the bottom, and there is commonly a gradual inclination or seeming sinking in of the earth that leads to them. It is not unusual for miners in tracing veins of ore to open some of these concealed Cavities, and when they do so, they generally find as large Caverns within them as either of the above described. This Country indeed abounds with these covered Swallows (as they are called) especially upon
upon the moor-lands, and I have seen some of the extensive flats there so perforated with them, that the face of the earth resembled, (comparatively speaking) a Sieve.

I have also seen several such upon the Mountains in Wales, especially upon those above Tenby in Pembrokeshire, and vast numbers of them upon Mendip-hills in Somersetshire, particularly in Charterhouse-liberty and near Green-ore Farm; and Ookey-hole, which is about four miles distant from the last mentioned place (of which and of some other Caverns near it there is a particular account in Philos. Trans. No. 2,) is evidently no other than a Swallet itself; as also are the Caves lately discovered at Lockston and Barwell, about twelve miles to the North-West of Ookey; all these being in every material circumstance exactly similar to those I have already described.

There are also a few of these Swallet-holes in and near St. Vincent’s Rocks, about two miles distant from Bristol; and Penpark-hole (of which the reader may see a description, and a cut representing the inside of it, in No. 143, of Philos. Trans.) which is about four miles Northward from the aforesaid Rocks, is manifestly no other.

Of the same kind is the Cavern mentioned by Sir Robert Atkyns, in his Ancient and present State of Gloucestershire, p. 230, to have been discovered at Cold-Ashton, ten miles to the East of Penpark (which upon enquiry, I found has been since stopped up), the description of which is so natural that it is worth reciting; “As a person was plowing with oxen, one of the oxen faltered in a hole,
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a hole, which, when the earth was removed from it, appeared like to the Tunnel of a Chimney; through which several persons have been let down; where they found a Cavity, in which one might walk *above half a mile* one way, and it is not known how far the other: and as they walked with candles, they observed several such Tunnels ascending towards the surface of the earth."

An ingenious gentleman, in giving an account of his Journey over *Croft-fell* Mountain in *Cumberland* (which is part of that immense ridge of mountains that reach from *Derbyshire* to *Scotland*, and are called the *British Alps*) writes thus: "The Swallows, those incontestable remains of Noah's Deluge, begin here [on Roderic heights] to be very frequent. Some of these are *thirty or forty yards* in diameter, and near as much deep, perfectly circular, but contain no water at any season, the ground having gradually fallen in at the sinking of the waters; but where they happened amid rocks, the holes are left open to incredible depths." The same Author says, "That on the top of the same [Roderic] heights is a pretty large Lake, called *Greencastle-loch*, which receives no visible feeder, but emits a small stream Northward to the said burn;" and this in all probability is no other than the mouth of a large Swallet.

Another gentleman gives the following description of *Ingleborough* Mountain in the West-riding of *Yorkshire*;* which as it contains, not only

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* Gent. Mag. for August, 1747.
* Gent. Mag. for March, 1761. This Mountain is reckoned to be
an account of Swallet-holes, but also some other particulars relative to the subject I have been treating of, I shall insert it at large. "This mountain is singularly eminent, whether you regard its height, or the immense base upon which it stands. It is near twenty miles in circumference. In this mountain rise considerable streams, which at length fall into the Irish Sea. The land round the bottom is fine fruitful pasture, interspersed with many acres of lime-stone rocks. As you ascend the mountain, the land is more barren, and under the surface is peat-moss, in many places two or three yards deep, which the country people cut up, and dry for burning, instead of coal. As the mountain rises, it becomes more rugged and perpendicular, and is at length so steep that it cannot be ascended without great difficulty, and in some places not at all. In many parts there are fine quarries of slate, which the neighbouring inhabitants use to cover their houses; there are also many loose stones, but no lime-stones; yet, near the base no stones but lime-stones are to be found. The loose stones near the summit the people call greet-stone. The foot of the mountain abounds with fine springs on every side, and on the west-side there is a very remarkable spring near the summit. The top is very level, but so dry and barren that it affords little grass, the rock being but barely covered with earth.

be one of the highest in England, according to an old saying in the North,

Pendle-hill, Penigens, and Ingleborough
Are the highest Hills all England thorough.
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earth. It is said to be about a mile in circumference. There are likewise discoverable a great many other mountains in *Westmoreland* and *Cumberland*, as also the town of *Lancaster*, from which it is distant about twenty miles. The west and north sides are most steep and rocky; there is one part to the south, where you may ascend on horseback; but whether the work of nature or of art, I cannot say. A part of the said mountain juts out to the north-east near a mile, but somewhat below the summit; this part is called *Park-fell*; another part juts out in the same manner, near a mile, towards the east, and is called *Simon-fell*; there is likewise another part towards the south, called *Little Ingleborough*; the summits of all which are much lower than the top of the mountain itself. Near the base there are holes or chasms, called *Swallows*, supposed to be the remains of *Noah’s deluge*; they are among the lime-stone rocks, and are open to an incredible depth. The springs towards the east all come together, and fall into one of these swallows, or holes, called *Allan Pott*; and after passing under the earth about a mile, they burst out again, and flow into the river *Ribble*, whose head or spring is but a little farther up the valley. The depth of this swallow, or hole, could never be ascertained; it is about twenty poles in circumference, not perfectly circular, but rather oval. In wet foggy weather, it sends out a smok or mist, which may be seen a considerable distance. Not far from this hole, nearly north, is another hole, which may be easily descended. In some places
places the roof is four or five yards high, and it’s
width is the same; in other places not above a
yard; and was it not for the run of water, it is
not to be known how far you might walk, by the
help of a candle or other light. There is like-
wise another hole, or chasm, a little west from
the other two, which cannot be descended with-
out difficulty: you are no sooner entered than
you have a subterraneous passage, sometimes wide
and spacious, sometimes so narrow you are obliged
to make use of both hands as well as feet to
crawl a considerable way; and as I was informed,
some persons have gone several hundred yards,
and might have gone much farther, durst they
have ventured. There are a great many more
holes, or caverns, well worth the notice of a
traveller: some dry, some having a continual run
of water; such as Blackside Cove, Sir William’s
Cove, Atkinson’s Chamber, &c. all whose curiosities
are more than I can describe. There is likewise,
partly south-east, a small rivulet, which falls into
a place considerably deep, called Long-Kin; there
is likewise another swallow, or hole, called John-
son’s Jacket-hole, a place resembling a funnel in
shape, but vastly deep; a stone being thrown into
it makes a rumbling noise, and may be heard a
considerable time; there is also another, called
Gaper-Gill, into which a good many springs fall
in one stream, and, after a subterraneous passage
of upwards of a mile, break out again, and wind
through Clapham; then, after a winding course
of several miles, this stream joins the river Lom
or Lune; and, passing by the town of Lancaster,
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it falls into the *Irish Sea*: there are likewise, both on the west and north sides, a great many springs, which all fall into such cavities, and bursting out again, towards the base of the said mountain, fall likewise into the *Irish Sea*, by the town of *Lancaster*; and what seemed very remarkable to me, there was not one rivulet running from the base of the mountain, that had not a considerable subterraneous passage. All the springs arose towards the summit, amongst the *green-stones*, and sunk or fell into some hole, as soon as they descended to the lime-stone rocks; where, passing under ground for some way, they burst out again towards the base. There is likewise to the west and north a great many swallows or holes, some vastly deep and frightful, others more shallow, all astonishing, with a long range of the most beautiful rocks that ever adorned a prospect, rising in a manner perpendicular up to an immense height."

Before I proceed to shew, that these *Swallet-holes* are to be found in other parts of the world than *England*, it may be proper to subjoin some other particulars (which could not well be reduced under the foregoing heads, without breaking the narrative too much) which will serve farther to prove, that these *Cavities were formed by the passage of water*.

First then, it is common to observe in Caverns of this kind, where the Rock contains any extraneous fossils, such as shells, corals, bones, &c. that these extraneous substances are all worn smooth and shaped to the form of the rock. Now
it is certain that these bodies have naturally a determinate figure, each different from the other, and all diverse from what we can suppose the inside of a rock to be; and when we see that parts only of these bodies remain in the rock, here an half, there a quarter, and in another place a third part, and these remaining portions, not of their natural figures, but shaped and curved according to the concavity of the rock, it is manifest that some external force hath carried away the deficient parts; and when we consider the regular smoothness of the rock, and the gradual wear or attrition that these bodies have apparently undergone, we can attribute this work to no other agent than water; and though in these caverns there are generally drainings and droppings of this fluid, yet the motion of it in this cave is so slow and the quantity so small, that the above-mentioned effects can never be ascribed to it; nay, I have observed the above-mentioned phenomena in covered Swallets, and even near the mouths of them, when the mouths themselves had been covered for the depth of several feet with rubble, and yet none of the rubble in the inside of the Swallet-holes, so that the wear and tear of these extraneous bodies could never have been owing to the sluggish motion of the drainings of water from the surface of the earth. And besides, these bodies themselves exhibit full proof that the water passed through the concavities in which they are with vast violence and impetuosity; for it is common to observe in the natural and unworn fissures of the earth (where the rock happens to contain extraneous bodies).
part of a shell or of a branch of coral sticking in
the rock on one side of a fissure, and the other
part of the same shell or coral on the opposite
side, so that it is plain that no force has been here
used besides that which made the original crack;
but, on the contrary, in Swallet-holes I have often
seen part of a large shell or the stem of a spreading
branch of Coral on one side of the cavity, and no
appearance of any similar substance on the other;
so that it is undeniable, that the original fissure
has been torn, widened, and the rock carried
away; the whole face of the cavity pointing out
that Water was the Agent, which therefore must
have passed through with great force and vio-
lence.

Another proof that these Caverns were form-
ed by water, or, that rapid currents of that fluid
have passed through them, may be drawn from
the multitude of in-land pebbles that are to be
found in most of them. That these pebbles ob-
tained their shape by being agitated in water, and
that wherever they are now naturally found, wa-
ter has been, I have already shewn at large, (p.
287.) and that this water passed through the ca-
averns in a full body, and brought down with it
vaist quantities of these pebbles, is evident from
hence, that they are not only to be found at the
bottoms or in the lower parts of these caves, but
even high up in the niches and covered cavities
in the sides, and many of these pebbles consist of
a different kind of stone from that of the rock of
the cavern, so that they must have came from far,
and the streams that brought them been rapid
and strong.

Another
Another material circumstance, evincing that these Swallows were made by water, is, that where great numbers of them occur together, reaching over perhaps an extent of land of some miles in circumference, there the land is nearly level and flat, without any of the divisions or breaks in the earth caused by Combs and Dales; and the reason is plain, for the water, that would otherwise have torn the ground into gills and dales, passed off through these Swallet-holes, and so tore inward and subterranean Cavities, instead of outward and superficial Hollows. This, I say, is the case where vast numbers of these holes happen to be near each other, but where there are few, not more than three or four, and those very large, and so close together as to make but one, and no swallows near them for the space of several miles, there I have observed two or three small Combs, running in different, almost opposite, direction, and meeting in the mouth of the Swallet as in a center. And the reason of this is equally clear for the point in question. For there being here a natural drain for the waters, and that a very large one, and no other similar cavity near it, not only the waters that were immediately over this hole, but even those that were at a distance, would rush towards it, and in their access and tear the ground into gulleys and combs, and leave the present standing marks of its course and agency. And wherever we see three or four combs terminating, from opposite sides, in a point, and a deep sinking in the earth in the center, we may depend upon it there was a Swallet-hole; and this I have
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I have frequently observed to have been the case in a low wet marshy bottom, or where there has been a small lake or natural pond. And from the description that I have already given of Lakes, (p. 228, &c.) we may conclude that most, if not all of them, were originally Swallet-holes, and also that the Cavities of the Whirlpools, Under-currents, and Gulphs, treated of p. 220, &c. were the same, and therefore that these holes are to be found all over the face of the earth, and of course the water that passed through them must have been equally extensive.

But besides what I have already said, to shew the extensiveness of these effects, I may also add some other accounts from different countries.

Mr. Smith in his Ancient and present State of the County of Kerry in Ireland, p. 122. speaks "of a large and deep Hole, filled with water, called the Devil's punch-bowl, on the West-side of the mountains called the Reeks;" which certainly can be no other than a Swallow; and the caves mentioned p. 167, are of the same fort, "All the lands about Killeene are good lime-stone grounds, having in some places considerable caverns; a thing not uncommon in such kinds of Soil:" Which last observation is so true that I scarce ever saw a lime-stone country but what abounded with Swallet-holes. In the county of Kilkenny is the famous Cave of Donmore, near Donmore House, which has several large irregular cavities in it, resembling those in the Peak, and is above a quarter of a mile long. b

\[b \text{ Britifh Mag. for March, 1763. p. 130.}\]
In France, at a place called Roussignac, about five Leagues from Perigueux, is a Cavern called Grandville's Hole, which has several deep cavities, collateral conduits, and circular holes in the vaulted roof, rising like regular cupolas, similar to those in Ookey and in the Peak-holes.  

Bishop Pontoppidan, in his history of Norway, p. 47, describes a rock or mountain, "that has an aperture in it passable throughout, one hundred and fifty ells in height, and three hundred in length;" and p. 49, 50, he mentions other caves, "in some of which he observed smooth beds of little flones or a gravelly bottom."

Dr. Behrens in his Natural History of Hartz-forest, in Germany, gives a full and particular account of a great number of Cavens that are to be found there; and from the description it appears, that there is such a similarity between them and those found in England, that no doubt can be made that they were all owing to the same origin, or formed by the same means.

In the Philos. Trans. (N. 109, and N. 191) there is a long account of a little Sea or rather a large Lake, called the Zirehnszew-Sea in Carniola, in the South-East part of Germany; the water of which retires under-ground through several great holes at the bottom of it, once every year, and then these holes are visible, "Which are in the shape of basons or cauldrons, the breadth of them being from twenty to sixty cubits more or lees; and the depth from eight to twenty cubits; and in the bottom of them are several lesser holes." "And besides..."
besides these, there are also diverse Caverns and deep places in this Country, even where there is no water; particularly in the mountain called Javorrick, near this lake, there are two Holes or exceeding deep Precipices, in which many thousand wild pigeons roost all the winter; and on the top of this Hill is a Hole of an unknown depth, out of which there often proceed noxious steam: and on another mountain are two great and terrible stony caves which, though far distant from each other, have yet the same effect, viz. when it thunders and lightens, do emit water with an incredible force. Near this lake is the natural grotto Podpeschkio, with several channels in it, running diverse ways, and all the channels are formed in a very hard rock, and are smooth or polished as if cut by men’s hands.” And the Author shews from several phænomena, that the country is cavernous for several miles in extent, and though water paffes through some of these caverns at present, yet it does not through all, though all have marks of it’s force.

In the same collection of tracts, No. 266. we have the following account of a deep Pit; which from the description appears evidently to be a Swallet-hole.

“At some leagues distance from Gottenburgh in Sweden, that river rushes down from a prodigious high precipice into a deep pit with a terrible noise, and such a mighty force, that the masts (which are floated down this river to Gottenburgh) usually turn topsy-turvy in their fall, and do often fly to pieces when dashed against the surface.
of the water in the pit. This occurs if the masts fall side-ways upon the water; but if the masts fall end-ways, they dive so far under water that (according to my information) they rise not again for a quarter of an hour; others half an hour; several three quarters of an hour, and some a whole hour and upwards. The lake or pit into which they fall has been often founded with a line of some hundred fathoms long, but never could they find any ground."

Maundrell in his *Journey from Aleppo to Jerusalem* (p. 5, 6.) describing the passagio out of the jurisdiction of the Bassa of Aleppo into that of Tripoli, accidently gives us an account of a Swallet-hole. "Having spent about two hours we descended into a low valley: at the bottom of which is a fissure into the earth, of a great depth; but withal so narrow that it is not discernible to the eye till you arrive just upon it: though to the ear a notice of it is given at a great distance, by reason of the noise of a stream running down into it from the hills. We could not guess it to be less than thirty yards deep: but it is so narrow that a small arch, not four yards over, lands you on it's other side." The Author of *Observations on divers passages of Scriptures &c.* thinks that Solomon alludes to this dangerous place, when he says, *The mouth of a strange woman is a deep pit: be that is abhorred of the Lord shall fall therein.* *Prov. xxii. 14.*

Probably of the swallet-kind was the Cave of Adullam mentioned *1 Sam. xxii. 1.* to which David with four hundred men fled, in order to hide and
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and defend themselves from the power of Saul: and of the same sort might That have been, mentioned 1 Kings xviii. 4. in which Obadiab hid an hundred prophets of the Lord.

Under this head may be reckoned a remarkable Cavern in America, situate about ninety miles west of the city of Philadelphia, on the banks of Swatawra Creek; of which an account is given at large in the Universal Museum for January 1766.

The famous Grotto, in one of the islands of the Archipelago, called Anti-paros, which is reputed to be nine hundred yards deep, and has several collateral Cavities and profound Abysses in it, is certainly a great Swallet, as is abundantly evident from the description given at large of it by Monf. Tournefort in his *Voyage into the Levant,* Vol. I. p. 146, &c.

Scheuchzer in his *Itinera Alpina,* Vol. I. p. 281, speaking of a lake upon one of the mountains of the Alps, writes thus, "Circa hunc lacum, &c. You may see on every side around this lake certain winding traces or furrows worn in the hard rock, which perhaps were owing to the waters of the deluge."

Kircher in his *Mundus Subterraneus,* (lib. ii. cap. xx.) gives particular accounts of several Caverns (too long to be inserted here) and shews from a variety of Authors, that such like cavities are to be found in all parts of the world, both in Europe, Asia, Africa, and America; and as no doubt is to be made that similar effects were owing to similar causes, so we may safely conclude, that
the caverns in other parts of the earth were formed by the same means and are of the same kind with those in England; and as I have already shewn that those in England were owing to or at least have been torn and widened by the passage of strong currents of water, so we must determine of the rest; and of course that the water was as extensive as its force, i.e. extended all over the earth, and therefore that there has been an Universal Deluge.

I shall now subjoin a corollary, or an observation or two, to what has been above discussed, by way of general proof of some of the particulars already advanced.

1. As the regular descent of combs, dales, and vallies, and the final union of all these in one large furrow, even under the sea, shewed that the water that excavated these hollows descended into some great cavity in the inside of the earth, even beyond the bed of the ocean, and there formed an Abyss; so the collateral conduits of the swallow-holes, leading down into one great unfathomable cavity in the bowels of the earth, prove that the water that formed them descended likewise even through the shell of the earth, and there constituted a part of the above-mentioned subterranean Reservoir.

2. It is not uncommon to find Swallows that have small rivers running into them, and which have no known exit; and when miners are digging very deep in the earth, they sometimes break sideway into a swallow-hole, and when they do so,

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See Page 279, &c.
so, they advantageously turn all the water of the mine into it, and moreover throw in all the rubbish they dig out, and yet can discover no bottom. And if those lakes mentioned p. 229, which receive one or more large rivers into them, are also swallets (as I have above shewn they in all probability are) then this also is a proof that there is a subterranean reservoir of water. And lest any one should imagine from this particular, that therefore swallets in general might have been formed by river-water, let it be remembered that they are commonly found upon the tops of the highest mountains, especially such as have extensive flats, where neither river nor rain-water could have any force to tear such cavities, and therefore they could not owe their origin to such a cause. In those places indeed where these holes lie at the bottoms of mountains, such rivers as take their rise near the tops would naturally flow into them; and where the swallet-holes are superficial, or even run for a considerable way under the earth but not deep into it, would flow out again; in the same manner as the rivers run down the bottoms of combs and dales, or any natural declivity or hollow; but as these latter were not formed by river-water, so neither were the former.

3. As swallet-holes are extended all over the earth, and the water that formed them descended downwards from every side towards the center and passed through the shell of the earth, it would naturally reposit at the center all the matter that it tore out in excavating these hollows, which would there constitute a nucleus or inner globe.
4. After the strictest search and examination I could make, either from books or observation, I could never learn that there had ever been any natural sea-shell, coral, or coralline discovered in any of the caverns at land in the manner they are frequently found in the caves and cavities in the rocks on the sea-shore, the sides of which are usually lined, and the smaller cracks and crevices filled with them; but no such being to be discovered in the caverns and swallow-holes at land, we may safely conclude, that the parts of the earth where these in-land cavities are were never the bottom of the sea, or for any considerable time covered with the ocean; and therefore that the hypothesis (lately renewed and refitted by some French philosophers, and favoured by several English) is false, which attributes the manifest appearances of this globe’s having been covered by water to the primæval inundation of the sea, by which it is supposed that, at the first settlement of things, the water would naturally cover the whole surface of the globe, and constitute a sea over every part; but after a long time (by some means or other) it receded and permitted the sea to retire into the lower and hollow parts of the earth; and to this original inundation or disposition of things are to be attributed all the marks of an inundation on the surface and in the inside of the earth; but had this been the case, these in-land caves would have been filled with the spoils of the ocean, and we should see shells, corals, and corallines, in their natural state, sticking on to the sides and filling the crevices of the rocks;
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rocks; whereas all the shells and corals that ever I discovered in these caverns were in an *extraneous* state, either filled with stone or immersed in the solid body of the rock, which could never have been their natural state; and therefore they could never have been placed in this manner according to the common laws of nature.

And from the same arguing and circumstances of things we may have undeniable marks how far the sea, in any place for any considerable time, has covered the land; for if in the holes and caves of the earth, in any such supposed place, there be found shells and corals in their natural state, especially if they be of the kinds with those usually growing in the nearest adjoining sea, we may then justly suppose that the sea has covered these parts; but if no such shells or corals be discovered in these caverns, then we may depend upon it that the sea has never reached these parts, or covered them in the manner it now covers and overflows it’s usual and well-known bed, the seashore.

IV.

Another general and comprehensive Proof of an *Universal Deluge* may be drawn from the numerous and various *spoils* of sea and *land animals* and *vegetables* that are now found in every part of the earth.

"Here then [to make use of the words of a learned and ingenious Author *] we appeal once more

*Revelation examined with Candour, Vol. I. p. 192; and for the truth of the subsequent particulars, and many more equally surprizing.*
more to Nature; and find that, in fact, there are,
at this day, as evident, as demonstrative, as in-
contestable proofs of the deluge, over the face of
the whole Earth, at the distance of about four
thousand years, as if it had happened but last
year. And whereas Moses assures us, that the
waters prevailed fifteen cubits above the tops of the
highest mountains, let the mountains themselves be
appealed to for the truth of this assertion: exa-
mine the highest eminences of the earth, and they
all, with one accord, produce the spoils of the
ocean deposited upon them on that occasion; the
shells and skeletons of sea-fish, and sea-monsters
of all kinds. The Alps, the Apennine, the Py-
renees, Libanus, and Atlas, and Ararat, every
mountain of every region under heaven, (where
search hath been made) from Japan to Mexico,
all confpire in one uniform, one universal proof,
that they all had the sea spread over their highest
summits. Search the earth; you shall find the
mouse-deer, natives of America, buried in Ire-
land; elephants, natives of Asia and Africa, bu-
ried in the midst of England; crocodiles, na-
tives

surprising, the Reader may consult Dr. Woodward's, Dr.
Scheuchzer's or Dargenville's Writings; or indeed any
other eminent Author on the subject.

One circumstance of this kind I shall mention of my own
knowledge. A few years since I received, as a present, from a
Gentleman in Somersetshire, four teeth (dentes molares) two thigh-
bones, and part of the head of an Elephant, that were dug out of
Hutton-Hill (which is a branch or a lateral continuation of the
high ridge of Mendip Hills) in Somersetshire. Upon the reception
of this present, and information that there were still some other
bones left behind, I went down to the place, and, in company
with three or four other persons, entered the pit from whence they
were
tives of the Nile, in the heart of Germany; shellfish, never known but in the American seas, together
were dug; and found two other dientes molares, or grinders, one of them lying in the jaw, three rib-bones, two thigh-bones, part of a tusk, with a multitude of lesser bones belonging, in all probability, to the same animal. Besides these we picked up part of a large Deer's horn, very flat, and the flough of a horn (or the spungy porous substance that occupies the inside of the horns of oxen, &c.) of an extraordinary size, together with a great variety of teeth and small bones, belonging to different species of land-animals. One of the men, that had been at work in these pits, brought me a collection of small bones that he found in a pit adjoining, lying by themselves, and no extraneous body near them. Upon putting these bones together at my leisure, I found they composed almost the entire skeleton of an animal, about the size of a fox; but the teeth, jaw, and several of the bones did not answer to any European animal I was acquainted with. The same person assured me, that before I came down, he had found in digging in the same place the head of a strange animal, that he believed was near three feet in length, a foot broad in the hinder part, and three or four inches at the extremity, from whence issued four tusks, two from each jaw. The teeth were large, and all well preferred in the jaw. From this description it seems to have been the head of the Hippopotamos, or Sea or River Horse. [The nearest river to us in which this animal is bred, is the Nile.] He had concealed this head in a wood adjoining, but so carefully, that neither he nor myself could ever after find it. All these bones lay in a dark yellowish ochreous kind of matter, from fifty to an hundred feet deep. The largest and greatest number lay about twenty feet deep in an horizontal cavity (that had been dug for the ochre) eighteen yards long, and six feet square. The bones and teeth were extremely well preferred, all retaining their native whiteness, and as they projected from the sides and top of this cavity, exhibited an appearance not much unlike the inside of a charnel house. We laid in this place two hours, digging out all the bodies we could find, till the roof in two or three places began to fall in, and we thought it too dangerous to continue any longer. Upon my second intention of visiting it, I was informed, the whole had fallen in. There were no marks nor the least sign of any pit having been opened on this hill besides those dug for the ochre; and the person who opened the first pit assured me, he believed the hill had never been dug into before. Which consideration, together with the number of strange bones and teeth, be-
gether with entire skeletons of whales, in the most in-land regions of England; trees of vast dimensions, with their roots and tops, and some also with leaves and fruit, at the bottoms of mines and marls; and that too in regions where no tree of that kind was ever known to grow; nay, where it is demonstrably impossible they could grow."

This has been thought by several to be the chief and indeed the only argument that could be brought in proof of an Universal Flood, and hence it has been opposed by every objection that the infidel could think of. About a century or two ago it was urged, that these fossil Animals and Vetetables were not really what they appear to be, but only Mock-forms, or representations of such things, caused by a lusus naturae, or an accidental Sporting of Nature under-ground. But since this affair has been more accurately inquired into, and collections of sea and land Productions been made from every part of the globe, and compared with the fossils of the same kind, such a nice resemblance and exact agreement has been found between them,—"The fossil ones being of the same size that the others are of, and of the same shape precisely; of the same substance and texture; as consisting of the same peculiar Matter, and this constituted and disposed in the same manner, as that of their respective fellow-kinds at Sea: the tendency of the fibres and Striae the

 longing to different animals, of countries far distant from England, and the depth in which they were found (without mentioning other circumstances, that cannot be enlarged upon in such a note as this) may serve as a sufficient proof that they were left there by the Deluge.
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the same: the composition of the Lamelle, con-
stituted by these fibres, alike in both: the same Vestigia of Tendons (by means whereof the Ani-
mal is fastened and joined to the shell) in each: the same Papille: the same Sutures, and every
thing else, whether within or without the shell, in its cavity or upon its convexity, in the substance
or upon the surface of it: answering all Chymical tryals in like manner as sea-shells do; their parts
when dissolved have the same appearance to view, the same smell and taste; they have the same
vires and effects in medicine, when inwardly ad-
ministered, to animal bodies; Aqua-fortis, Oil of
Vitriol, and other like Menstrua, have the very
same effects upon both⁴.—Such an exact agree-
ment as this, I say, being found between the
foossil and natural bodies of the animal and vegetable
kind, it is now universally allowed that the foossil
are, what they appear to be, the Remains of de-
stroyed Animals and perished Vegetables.

And at present a prevailing opinion is, that
though these bodies are what they appear to be,
yet those that seem to have belonged to the tea
were never of marine production, nor the vege-
tables the growth of the earth, but both sorts
were produced and formed in the places where
they are now found, the semina of these things
having been placed in and dispersed throughout
the whole globe of the earth at the time of it's
Creation, when all things were confusedly mixt
together: and since that time these semina have
occasionally

occasionally shot out, grown, and increased by some plastic virtue or power.

But till this plastic virtue or power be farther shewn, and proved to exist, it will be looked on by all sensible persons to be no other than the _hysus nature_, or an occult quality of the Ancients.

And with regard to the Semina of these bodies being placed in the earth at the time of the Creation, when the whole earth was in a dissolved chaotic state, it must be remembered (if we follow the Mosaic account, which I have already shewn is the only true, p. 126, &c.) that the _semina_ of these things were not made till after the earth was consolidated and dry land had appeared, (Gen. i. 12, 20, &c.) so that they could never have sunk through the earth at that time: and if it be supposed that some of them sunk through after, it must have been through the cracks and crevices, not the solid body, of the earth; but unfortunately for this opinion there are scarce ever any of these bodies, even in a fossil state (never any in a natural) to be found in the cracks and crevices, but commonly _all fixed in the solid strata_; and as that part of the strata, which immediately surrounds these animal and vegetable bodies, has the express image of the outsides of these bodies delineated upon it to the nicest exactness, it is certain that the Rock, Stone, Clay, &c. that contains these bodies, was formed and hardened after them; as certain as that the impression of a Seal upon Sealing-wax was posterior to the seal; and both formed after a different manner, at different times,
times, and in different places. Besides, as *Fabius Columna* argues, "*Natura nihil facit frustra. Nature makes nothing in vain;* but these teeth, bones, shells, &c. were they thus formed in the earth, would be in vain; for they could not have been of any use as teeth, neither could the bones have been of use in supporting of any animal. Nature never made teeth without a jaw, nor shells without an animal inhabitant, nor single bones, much less pieces of bones, teeth, &c. no not in their own proper element, much less in a strange one." Therefore the places where these bodies are now found could never have been their original.

And in order to shew that the *fossil* shells, bones, teeth, &c. that so exactly re semble the marine ones of the same species, were really the product of the sea, and not formed in the places where they are now found, I shall make use of a few arguments as they are judiciously drawn up by Dr. *Woodward* in his *Nat. Hist. of the Earth illustrated*, p. 151. "First, the (fossil) shells, which are digged up in places, and found lodged in matter, fit to preserve them, and which therefore are firm, found, and have less felt the injuries of time, yield still a true marine salt, such as recent shells taken out of the sea, or cast on the shores, are wont to yield. Secondly, There are also found in the earth the teeth of fishes ground down and worn away, in the very same manner as the teeth of those kinds of fishes, taken at sea, usually are, by chewing their food. Thirdly, The shell-fish called the *Purpura*, has a tongue
a tongue of a considerable length, terminating in a hard bony sharp point, with which, as with an augre, he bores holes through the shells of other shell-fish, and feeds on the substance of them drawn forth through those holes. Now there are commonly found in the earth, among others, shells bored thorow in the manner above described, whence it is certain that those shells had once living fishes in them, and that those fishes formerly lived in some place, where also there were Purpurae to feed on them: and that place could be no other than the sea. Fourthly, It is common to dig up the shells of Oysters, Concha, Pectines, and other Bivalves, which retain plain marks of tendons, and other signs which undoubtedly shew that they had once living creatures in them. Fifthly and lastly, The Echinate, Conchite, Cochlitæ, and other bodies of that kind, consisting of stone, flint, spar, and other mineral matters, which every way match the size and exhibit the perfect resemblance of the interior part of those shells, from which they have derived their names, could never have been so formed, moulded, and shaped, had not those shells been quite empty. But there are other bodies also, of which I have samples by me, formed likewise of stone, flint, and spar, which represent only pieces, or some particular parts of the Echinate, Conchite, and Cochlitæ. These any one, at first sight, may plainly discern were formed in the shells, while they had yet their fishes actually in them; and therefore could receive only so much of the stony, flinty, or sparriy matter as
as would fill up the parts which were empty or vacant, and not possessed or taken up by the fish. Thence it is, that those stony, flinty and sparry bodies bear only the resemblance of that vacancy, as having been moulded in it. Now these bodies plainly shew those shells to have had fishes formerly in them: and at the same time point forth to us the true origin of them, viz. that they were not produced in the places where they are now found, but were at some time brought all from the sea."

Others indeed allow that the fossil animal and vegetable bodies are really what they appear to be, and that the marine ones were produced at Sea; but then they suppose that they were brought to land by partial deluges, or occasional inundations of the sea. But certain it is, there are no records in history of any such inundations that can by any means be applicable, either with respect to their Antiquity or Extent, to the phænomena of this kind observable throughout the whole body of the Earth. The Pyramids of Egypt are reckoned to be some of the most ancient structures in the known World, and situated also in a Country that is frequently overflowed by the Sea, and yet the Stones of which these Pyramids consist abound with fossil marine shells and corals; (as I have seen in several samples of these stones, and have some specimens by me, given me by Dr. Shaw) and these shells and corals are of the same kind with those that are now found in the regular strata of the earth in the neighbourhood of these buildings.

See Shaw's Travels, p. 416.
So that it is evident that these marine bodies were brought to land before the time of erecting these Pyramids.

Again; Steno (who was an Italian, and wrote about a Century ago) in his Prodromus to a Dissertation De Solido intra Solidum naturaliter contento, i.e. Concerning Solids naturally contained within Solids (p. 87.) says, That in the foundation-stones and walls of the City of Volaterra (the ancient Seat of the Etrurians) there are various sorts of shells; and the shells are of the same species with those that are found in the stone and natural beds of the Hill on which the City formerly stood. Now it is certain that Volaterra was a place of great note and power, long before the foundation of Rome. It is now somewhat more than two thousand five hundred years since Rome was first founded. And certainly several centuries must have passed from the time that the Etrurians first settled there, till their City had gained the character and size it had when Rome was first began to be built. Now if we allow but five or six hundred years for the completion of this, it will then follow, that these shells have remained there for at least three thousand years. And when we consider that this will advance the proof of their existence to within one thousand years of the very time when the Deluge of Noah happened, surely none will be at a stand to attribute the time of their transportation to this Cause, which in every respect was answerable thereunto, and prior to all accounts of partial Floods.

But
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But when we take in the additional circumstance of the extensiveness of the Effects of that Deluge in which these things happened, the matter will soon appear incontrovertibly clear. Let any one read the argument in proof of an Universal Deluge as stated and described p. 359, &c. and he can never, with the least shew of reason, attribute the Effects there related to partial Floods. Besides; I have already laid down such marks as will demonstrably shew, how far the Sea in any place has occasionally covered the land, and that the effects of an Universal Flood are visible where partial inundations never reached (p. 330); and also have shewn that the marine bodies that are discovered at land are found in such places, viz. in the solid substance of the strata, where partial floods or any mere inundation of the Sea, how extensive soever, could never have placed them, and that these bodies are scarce ever found in those parts, viz. in the cracks and fissures of the earth, where such floods would most naturally have thrown them (p. 364); which is an unanswerable argument against this hypothesis; and other particulars, to shew the weakness of this Supposition, will occasionally occur in the progress of this treatise.

But before I finish this head, it may be proper to take notice of Mons. Le Cat's argument against the opinion of the fossil animal and vegetable bodies being placed in the earth at the time of that Deluge which is recorded in Scripture: "The waters of the Deluge, faith he, according to the assertion of Scripture itself, exceeded the highest mountains by fifteen cubits; whence it must follow,
follow, that these mountains were before the Deluge. Now in the bowels of these mountains are found animals inclosed in the stones and quarries of which they consist. Therefore those animals, inclosed in the bases of these mountains, must have existed, together with those mountains, before the Deluge. "The Deluge then is a Revolution which does not account for these phenomena." But Mons. Le Cat seems not to have considered, or not to have known, that the mountains that were before the flood and those that were after were not one and the same, but formed at two different times, and with respect to the point in question vastly different. The mountains that were before the flood were formed by the retreat of those waters that first covered the surface of the earth, and permitted dry land to appear, on the third day after the Creation (p. 64), which was before any animal or vegetable body was made; and therefore no such could possibly have been found in those mountains. The mountains that were formed after, or at the end of the Flood, had their origin at a time when the earth was replete with animal and vegetable bodies; and as all the solid structure of the earth had just before been totally dissolved (and so all the antediluvian mountains wholly destroyed, p. 85.) but these animal and vegetable bodies preserved entire, it could not but be that in the settlement of this dissolved earth these bodies would be found involved therein, and buried at the lowest depths; which could not have been the case with regard to the mountains before the flood, for the reasons above.
above given: and therefore Monf. Le Cat's argument, which he is pleased to say is founded upon a "Reason which admits of no reply," is, in short, founded upon a false matter of fact, and so destroys itself.

As likewise is another boasted argument of the favourers of M. Le Cat's System: which in short is this, That since it is common to find among other fossil shells, corals, &c. many that have been broken and worn since they were first placed in the earth, and in particular the cast of shells now worn round or of a form different from what they originally had, it is very certain, say they, that there must have been two Deluges, at least, for the execution of these phenomena. One, in which these shells and the stony matter that now fills them, were laid in their proper beds; and another, in which they have been removed, worn, and injured by being agitated a second time in the turbulent waters of a flood. But surely to have recourse to more causes than one, to explain any phenomenon in nature that may be easily explicable by the effects of one, shews neither the philosopher nor the divine. It is certainly the greatest proof of wisdom (if we may judge from the works of the All-wise) to act by the most simple means, or to produce the greatest variety of effects from one and the same cause. And the antient philosophers were so sensible of this, that it was a standing maxim with them, Entia non sunt multiplicanda absque necessitate. And it is so with these philosophers in cases where Scripture is not concerned: but to attack and invalidate

That,
That, it is lawful to deviate from any established rule, and make any the wildest and most unreasonable hypothesis imaginable. For what they attribute to two Deluges may far more reasonably be ascribed to one. I have already shewn at large, that the matter, that once filled the present combs, dales, and vallies, was of the same kind of strata or stone with that in the adjoining rock or mountain, and that this matter was broken and torn from its original bed, and laid here and there, or dispersed over the surface of the whole earth, in large fragments of rocks or small loose stones, some round, other angular, by the descending waters in the universal Deluge in the time of Noah: and if these effects are to be attributed to that cause, then certainly the shells, and corals, and stony casts of shells that are now found worn and rounded, as they once were included in, and constituted part of, these broken strata, would suffer the same fate with the strata themselves, and be found worn and broken just as the fragments of stone, &c. themselves now are. And whoever would have a right notion of the effects of the Deluge, should be very careful to make proper distinctions between what was done by the waters at their first eruption from the abyss, and what was effected by them in the end of the flood, at their retreat thither.

Thus I have shewn, by several general and extensive arguments, the certainty of an Universal Flood, or that this earth has been covered to an immense height by an inundation of water; and more-
moreover have proved, that this water was brought from the abyss beneath, and have shewn that in several other respects the effects of the flood, so observable on and in every part of the earth, are exactly consonant to, and cannot with propriety be attributed to any supposed event of this kind other than, that Deluge which happened in the time of Noah, and is described by Moses in his writings. And

In the proceed of these arguments the reader cannot but have observed, that I have been very careful and industrious in collecting a variety of testimonies (besides my own) from different Authors who lived at different times and in different places, in order to confirm and establish the chief particulars upon which each argument depends; so that it appears that there is scarce a region under heaven but what bears testimony to the UNIVERSALITY of the flood: but lest the reader should suspect these evidences, or rather would be satisfied in this case by nothing less than ocular demonstration, I would desire him to ascend the nearest high mountain to the place where he lives, and carefully examine the upper parts of it, and in all probability he will soon find some marine extraneous fossil, either a shell, tooth, bone, coral, coralline, or else some in-land pebbles, trains of stone, &c. or at least perceive some one or other of the marks already given, whereby he will soon be satisfied that this mountain has been covered to a considerable height by an inundation of water: and if this mountain was thus covered, certainly the combs, dales, and vallies beneath (which
were formed by currents of water from this mountain) were equally inundated: or rather, since the parts of water have no tie or connection with each other, but naturally fall away or are carried to the lowest places first, it could not but be that every comb, dale, and valley, nay hill and mountain, over the whole surface of the earth, that was of equal height with this, must have been equally covered. So that, in short, any person at this day, by giving himself only the trouble of visiting the nearest high mountain, may have full proof that that mountain was covered, nay, formed by water; and if any one mountain upon the earth was thus covered and formed, he will readily conclude that they all have been so; and hereby have, from any single mountain, undeniable testimony that all the high hills and mountains under the whole heaven have been covered by an inundation of water.

THIRDLY.

I am now come to the third Division of this Section, wherein I am to shew, that, during the above-mentioned Flood, the earth was not only covered by water, but totally dissolved, all the mineral and metallic matter being reduced to it’s original corpuscles, and assumed up into the water; so that the whole terraqueous globe once constituted one fluid mass or colluvies.

The effects of this Dissolution are visible on, in, and throughout the whole body of the earth. For,
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I. The very outward form of the earth indicates as much. I have already shewn that all the cavities upon the earth's surface, such as combs, dales, vallies, &c. were once filled up with beds of matter of the same kind, and placed in the same manner, as their corresponding strata in the sides of the adjacent hills or eminences; so that the earth was once regularly round without any of the inequalities of hills and dales. But this form could never have been the result of matter settling in large separate masses or detached rocks: had the parts of the earth subsided in such enormous fragments as these, the surface of the earth would have been almost as irregular as it is at present. But as the earth, when the parts of it first settled, was perfectly spherical, and all the strata lay upon each other with the nicest exactness in parallel circular lines; so it must follow, in order that such a regular disposition of things might take effect, that the whole was dissolved, and subsided in the minutest parts or primogenial atoms.

II. The spherical shape of the earth also may be justly esteemed as the natural result of the equal pressure of the air upon it's once fluid dissolved parts. It is certain that whatever is in a fluid state, and is surrounded and supported by the air, is of a globular form; and as the earth is not only buoyed up, but at present pressed on all sides by the air, and was at first formed by its circumambient force, and as this force is not sufficient to reduce solids (if of a different figure) into a regular spherical shape, unless the parts thereof are so inti-
mately mixed with a fluid as to be equally susceptible of motion, to the earth, unless it had been dissolved, and the parts of it blended with a fluid, could never have been modelled to a globular form.

III. The solidity or cohesion of the solid parts of the earth is another proof that the whole has been dissolved and immersed in a fluid. If you take any of the solid substances of which the earth consists, though reduced to the minutest size possible and pressed ever so close together, yet if the mass is free from all moist or fluid particles, the whole will still remain in a manner disunited and the parts thereof easily separable from each other, being no other than a congeries of fine dust or dry sand pressed together; and in order to bring the parts into such a close contact and cohesion with each other as to form a compact solid, there is a necessity of adding, or rather of intimately mixing with these substances some fluid body; in which and by which (on account of the lubricity of its parts) the particles of the solids might be so moved and shifted every way, till at last similar surfaces might meet, press out the fluid between them, and come into closer contact with each other than they were before; and this compresure and union still continuing and increasing by the farther expulsion of the moist particles, the mass would at last be brought into a much narrower compass than it at first occupied, i.e. the parts would be brought into a closer contact with each other, and so the (before) loose, separate,
separate, detached solids be united into one firm compact body. And if this be the general process of consolidation in the various substances of the earth that we can make any trials or experiments upon, we may reasonably conclude the same of the whole; and also that the firmer, finer, and closer any body is at present, the greater has been the dissolution and division of its parts.

IV. A fourth argument that the earth has been in a loose fluid state may be drawn from the consideration of the Veins in some sorts of stone, particularly in the hardest and most beautiful marbles. It is common to observe in such, a great variety of matter in the greatest variety of forms and directions; in some part matter that was lighter (to speak in the common acceptance of words) than the neighbouring, pressed down below the place due to its specific gravity, and afterwards elevated to a considerable height, till at last meeting with matter that was heavier and making its way downwards, the whole shall be curved by the ascent of the one and the descent of the other into a vast variety of arches, consisting of the finest and most delicate lines; in other parts you may see streaks or seams of different substances proceeding on, as it were, horizontally, in nearly straight lines, till they have been met and opposed by other matter in a contrary direction; and at the point of conflux both species of matter turned back and deflected in all the variety of wave-like dispositions that can well be imagined to have happened to two streams of water, meeting each
fluid state; for it consists of a multitude of long and extremely fine spiculae, closely united together, and all driven to a center; and the substance of which it is formed is of a quite different nature and kind from the matter or stratum in which it is usually found, and bears but a very small proportion to the stratum. Now this body must either have been formed out of the stratum, and afterwards have settled in it, or else been originally formed where it is now found: and in either case there must have been a dissolution or separation of the parts of both. For wherever the body was formed (either in the stratum where it now lies, or in any other above it) as it consists of matter of such a peculiar kind, and is of such a particular shape as plainly to shew that it's atoms, during it's formation, were collected together from above, from beneath, and from each side (otherwise it could never have been of a radiated globular form), so it must follow that there must have been a separation of it's own parts, and also of the matter around it, in order to permit a free and easy passage for the access of one and reccefs of the other sort of matter. Other nodules there are that were undeniably formed out of the stratum where they now lie, and afterwards settled in it; especially those of the coated kind, and in particular where the coats or crusts of the nodules consist of the same kind of substances, respectively, with those that constitute the strata immediately above the bed where they are now found. Now it is certain that these bodies could never have obtained teguments of the same species of matter, and placed
placed in the same order from the center with the superincumbent strata, unless they had passed through them; for the beds wherein they are now found have no such matter in them (except what immediately surrounds these bodies themselves), and the strata underneath are frequently of a very different kind from either; so that they must have passed through the superior strata, and have procured their coats in their passage; and if so, those strata must undeniably have been soft and fluid, otherwise they could never have passed through them and have collected coats from each, as also must the bed have been so where they are now found, otherwise they could never have subsided and settled in it: so that the whole was once in a state of Fluidity.

VII. But the most striking proof of this kind may be drawn from the extraneous fossils, or those bodies that are now found in the earth, and which do not properly belong to the places where they are now found, such as corals, sea-shells; the bones, teeth, &c. of sea and land animals; plants, trees, &c. Now I have already shewn (p. 365.) that the former sort of these bodies were produced at sea, and the latter at land; that the broken parts of these bodies once constituted complete forms; that the bones, teeth, and shells once belonged to living animals, surviving in their proper elements; that the leaves and branches of the vegetables once grew upon their proper plants and trees: so that the marine productions were originally bred and formed at the bottom of the sea;
the terrene upon the surface of the land: but at present these bodies are found lying promiscuously throughout the whole solid body of the earth; some at the tops of the highest mountains, others at the bottoms of the deepest cavities that were ever dug; and lying too in such a manner as to make but one common mass with the strata in which they are found; and this not only in the softer kinds of strata, as those of clay, chalk, &c., but in the inmost substances of the hardest and closest marbles; and generally the harder and more compact the matter is, the closer and more intimately united is the extraneous fossil; which, if a tooth or a shell, has not only the exterior surface or outward lineaments most nicely delineated in the rock, but the inside totally replete with the same substance, every, even the smallest, vacuity and slightest indenture being filled up with stony matter; and in some cases where the shell has been closed, the cavity through which the matter passed or entered into the shell is inconceivably small; in others the various convolutions and different concamorations are so many and yet so minute, and the passage leading through them so extremely small, as not to exceed in size the orifice of a capillary tube in the human body, and yet each and every one of these totally filled up with the stony substance; so that the matter contained within the shell exactly resembleth any liquable substance cast fluid into a mould. If the extraneous fossil be a leaf, then not only the upper and under sides are most accurately impressed in the rock, but the very pores filled to the inmost recesses,
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recesses, and the leaf as turgid and as much swelled by the penetration of the stony matter, as if it had been for a long time soaked in, and most intimately permeated by, the particles of water. Now for a substance—The texture of which is inconceivably delicate and complicated, and even it's largest pores invisible to the naked eye; and which once grew upon the surface of the earth—to be thus immersed in, and penetrated by, the solid rock, and to have sunk through the solid body of the earth to the greatest depths we ever dig, is an undeniable testimony that the Earth was once as fluid as water itself. And these extraneous bodies point out also the time when this Dissolution happened, viz. at the Deluge, and not at the Creation, as some have imagined (see p. 364).

VIII. The eighth argument I shall mention in proof of the Dissolution is drawn from the internal Structure of the Shell of the Earth. It is well known to those that are in the least conversant with philosophical matters, that all the various substances of which the main body of the earth consists, are disposed (as the Chymists call it) strata super strata, or layer upon layer; and it is also well known that such a Disposition of things could naturally be the result of nothing but the settlement of these bodies in a dissolved state through such a Fluid as Water. If, for instance, you take a certain portion of these bodies, and pulverize them to the finest degree imaginable, and mix them as confusedly together as possible, and let them
them fall through a dry Fluid, such as the Air, they will settle just in the same confused state as they were at first, and without the least appearance of forming strata: if, on the contrary, you permit them to subside through the water, they will settle more or less in parallel strata.\footnote{I may here mention an old experiment made by Hippocrates, vide Lib. de Nat. Purri, (or Lownorth’s Abridgment of Phil. Transact. vol. 11. p. 522.) “If earth, sand, and filings of lead, be put into a bladder, and water added to them, and motion given to the sublunary mixture by blowing in the bladder through a reed; first they are all mixt together with the water, but in a while, continuing in a gentle motion, they separate themselves and retire each to its like, the lead to the lead, &c.”} Indeed it requires twenty or thirty times the Quantity of water to earth to make this layer-like subsidence tolerably apparent, even in the mixture of but three or four bodies. But the greater quantity of water you use, and the finer you pulverize the substances, the more apparent and regular the strata will be: yet after all the trials that can be made, the distinction of strata will never be so exact as they are in the body of the earth. It is not uncommon to see in the earth vastly large beds of stone, coal, clay, &c. lying each upon the other, at one depth the stone above the coal, at another depth the coal above the stone, in one part the clay above each, in another under all, &c. and yet each of these strata so distinct in themselves, and so nicely sorted, that the stone contains none of the coal, nor the coal any of the stone, nor does the clay partake of either (only each stratum a little tinged on the sides next to the adjoining strata). Now the quantity of water requisite
requisite for effecting this must have been "imm-
menely great, and the whole body of the earth must
have been dissolved to its very elements or prim-
genial atoms, to produce such a regular assortment
of strata.

HAVING thus proved that the whole structure of
the earth has been unbinged, the constituent parts
thereof separated one from another, and assumed up
into a large body of water; I shall now draw some
conclusions from what has been advanced.

I. SINCE the quantity of water requisite for
the assumption of the dissolved parts of the earth,
and the subsidence of them in regular strata, must
be vastly greater than what appears of this Fluid
on the surface of the earth or in the Seas or Ocean,
there must be an "immensely large body of water in
the inside. I have observed already indeed (p.
167, &c.) that the water on the surface of the
teraqueous Globe occupies more than two thirds
of the earth's superficies: but then it must be re-
membered, that the land is still continued, in a
great measure, under this water: and from the
appearance of islands in the midst of large seas,
at a great distance from the sea-shore, and from
the many known ridges of mountains that run
under the sea, and from the time that, according
to scripture, the waters of the deluge were re-
treating from the surface of the earth, we must
conclude that the apertures in the seas through
which the water descended are, comparatively
speaking, but small: so that the shell of the earth
is in a manner continued quite under the seas

(except
(except where the above apertures occur). And probably the land under any sea equals in bulk that sea itself. So that upon a thorough inspection of the whole shell of the earth, the terrestrial parts vastly exceed the waters. And though there appears water enough upon the surface of the globe abundantly sufficient for barely covering the dry-land, yet there by no means appears a quantity sufficient for dissolving or assuming up the dissolved parts of the earth, and permitting them to subside in the manner we now find them: and since this quantity does not appear upon the surface or within our reach, it must be in the inside, and there constitute an abyss of water.

2. FROM the quantity of water necessary for the sublevation of the dissolved parts of the earth we see, that all solutions of a deluge, without having recourse to an Abyss, must fail, or not answer the effects visible throughout the whole body of the earth. And hence I am surprized, that a modern ingenious Writer a (whose works I have made some quotations from in this Tract) should attempt to solve it without the introduction of such means. He imagines that the water of the Sea only would be sufficient for the work. And in order to account for the elevation of this water over the tops of the highest mountains, he supposes that the Omnipotent hand of God, or first Almighty Cause, lifted up the bottom or bed of the sea, and by that means poured it’s water all over the earth; and by letting it drop down again, restored all things to their former situation: and so the

a Rev. Mr. Borlase in his Natural History of Cornwall, p. 78.
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the deluge was over. This he is pleased to call
the easiest and most eligible method of transacting
this event: but I suppose that all methods are
equally easy to Omnipotence; and I could mention
an hundred other methods by which God might
have deluged the world, and yet neither of them
the true, though all equally easy to the first Cause.
The point to be decided is, What was the method
God did use? If we can discover this, we may
depend upon it that That was the most eligible.
Now God himself tells us that, in order to de-
stroy the earth by a flood of water, he broke up the
Fountains of the Abyss, and opened the windows of
heaven (or the passages of the air through the shell
of the earth) and so unbridged and dissolved the
whole globe. This I have shewn to be the Cæs
from the state of the earth, from the Center to
the Circumference; and all nature bears ample
testimony to the truth of the Word of God: and
yet Mr. Borlase is pleased to ridicule this method
and characterize it as attended with "the egre-
gious absurdities of an Abyss, apertures, disruptions of
the shell, and the like:" I was sorry to see such words
fall from such an Author, and as he gives us reason
to think that he will write something farther upon
the subject, I hope he will kindly take this friendly
hint, and re-consider the affair.

3. From the certainty that the whole globe
was dissolved during the deluge we may see the
impropriety of his Lordship's opinion,—that the
superficial parts only were affected during that ca-
tastrophe, and that the Rubble and Slutch left by
the deluge on the surface of the earth are the only
marks
marks of its devastation; but we have seen that the very form of the earth throughout, its internal constitution, its disposition in strata, and these strata abounding with the exuviae of land and sea animals, &c. manifestly demonstrate it's Dissolution in every part.

Though indeed there is one circumstance even in the Rubble and Sludge that indicates the Dissolution of the whole earth, and therefore may not improperly be mentioned in this place. After all the researches I could make, or the best testimonies I could procure, I could never learn that there was ever any ante-diluvian artificial thing, either utensil or weapon of stone, iron, or brass, &c. found in the Rubble, as naturally left there by the waters of the deluge. All things of this kind that I have seen were evidently found in places where the Rubble had been disturbed, such as in old castles, camps, &c. and therefore the things themselves might have been posterior to the Deluge. And though the Rubble itself lies in an irregular manner (with respect to the regularity of Strata) yet it is not so irregular, but that had it been disturbed or broken through by digging; &c. the rupture would have been visible: for as it consists of streaks and seams extended lengthways or inclined in wave-like directions, any perpendicular irruption must have been discernible. So that if the Rubble, left by the deluge, naturally contains no metallic or mineral substance worked by the art of man or engraven by his device, we may then justly conclude that all

1 See of this Tract, p. 18, &c.
all such instruments, and of course all matter of the
same kind with them, i.e. all the metallic and
mineral substances in the whole body of the earth,
were dissolved during the deluge.

4. It may seem strange to some, how it was
possible that all the dissolved parts of the earth
should float in or be supported by such a thin sub-
stance as Water. But to solve this difficulty, let
it be remembered, that they were dissolved, and
also to their finest parts or original atoms. Salt and
Sugar, when in masses, will both sink in water,
but when the parts thereof are disunited and se-
parated one from another, they are easily sus-
tained thereby: and the quantity of Salt that is
swimming in the waters of the Ocean is incon-
ceivably great, and if collected in one mass would
be immensly weighty. Then too, there is no
water whatever, even the most limpid, but what
contains a great variety of earthy particles, as
chymical experiments undeniably shew; nay, that
there is a species of water or of a fluid (Aqua
regia) that will dissolve and support the dissolved
parts of the heaviest of terrestrial bodies, Gold;
and though the particles of the gold shall be
swimming in or dispersed through every part of
this fluid, yet the whole shall be as clear as
chrysal.

Or, what is more to the purpose,

C c 3 a Thunder-

m It appears from Exod. xxxii. 20. and Deut. ix. 21, that
Moses was so well skilled in Chymistry or Natural Philosophy,
that he knew the art of dissolving and reducing gold to the finest
powder, and making it bouyable on, and potable in, common
water. For he took the golden calf, which the children of Israel
had made, and burnt it with fire, and flame it, and ground it to
powder.
a Thunder-cloud, big with a deluge of rain, and containing a vast variety of terrestrial substances, is yet supported, at a considerable distance from the earth, by such a thin fluid as the air: now according to Scripture, at the time of the deluge there was a large body of expanding air in the inside of the earth, acting or pressing from beneath upwards, i.e. from the center to the circumference, which therefore would counter-act and in some degree abate the force of the perpendicular pressure of the air or expand upon the surface of the earth, and by this means lessen the power of, what is called, the Gravity of bodies, and so make them lighter; as is the case in rainy or misty weather, when bodies do not weigh so heavy as at other times, and when, on account of these ascending f teams impeding the pressure of the atmosphere, the mercury also in the barometer subsides and sinks. Such being the state of the earth during the time of the deluge, it was really no more wonderful, that the water of the terraqueous globe (which in all probability exceeds in bulk several thousand times the quantity of earth) should sustain all the dissolved powder, and strained it upon the water (of the brook that descended out of the mount) and made the children of Israel drink of it. “This he did, says a Commentator, to make them sensible how much they had debaafed themselves in worshipping so vile an idol, which, after passing through so many changes, was at length thrown out into the draught.” That gold may be reduced to powder, or a calx soluble in water, the Reader may see by consulting DICKIN-SON’S Physicus Vetus & Vera, p. 317. Where also he will find such an account of Moses’s knowledge of nature, as sufficiently to convince him that he was superior to any modern Philosopher whatever.
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...dissolved strata thereof, with the exuviae of animals and vegetables then destroyed, than that a thunder-cloud should contain and support a vast variety of mineral and metallic effluvia, intermixed with hailstones of various sizes; for in both cases a body of expanding air was the basis and prop: and Air, as I have already shewn (p. 60.), will keep water above as well as under it.

That the state of the earth and air, during the time of the deluge, was really different from what it is at present, is very manifest from several effects, then transacted, and now visible, in the terraqueous globe. Certain it is, that neither the strata of the earth, nor the heterogeneous bodies enclosed therein, do lie according to the *Laws of Specific Gravity*, or as bodies would settle at present. It is as common to find heavier strata above lighter as lighter above heavier: and the same kind of strata (after the interposition of both heavier and lighter ones) repeated; and in some places the whole in a retrograde order. So that this phenomenon seems plainly to point out the actions of two Agents, one that acted from above downwards, the other from beneath upwards: from whence it should follow, that at the same time as the downright perpendicular pressure of the Air separated and precipitated any species of terrestrial atoms through the waters of the deluge and formed them into a stratum, the same also did the Air from beneath, with respect to the same species on the opposite side. To effect which also there must have been a *total dissolution* of the terrestrial Globe, otherwise there could never have...
been such a free and easy access for the Air to
and from the Center.

And what farther shews that there was a body
of Air or some Agent at the center of the earth
during the time of the deluge, which counter-
acted the force of Gravity, is the manner in which
the diluvian Spars and Crystals are at present
found; the shoots of such being in some places
perpendicularly upright, in others varied in all
kinds of direction, but generally speaking they
are in an horizontal position, so that the angles and
columns meet in and interfect each other from
the sides of the vein or fissure. But as the Spar
that has been formed since the deluge, or, as the
Miners call it, that is forming at this day, is al-
ways pointed downwards, (unless where the rock
intervenes, and diverts it's natural course) hang-
ing like icicles from the tops and arches of ca-
verns, grotto's, &c. in form of Stalactites; it is
evident that the pressire of the Air downward is
at present stronger than it was at the time of the
Deluge: and as many of the diluvian Spars and
Crystals are pointing perpendicularly upright, it
shews that the force of the air from beneath up-
wards was then stronger than it is now: and of
course that the gravity of bodies was less, and so
more easily sustainable in the waters of the flood
than such bodies would be now.

5. And this consideration, that the gravity of
bodies was less during the flood than before or
since, will serve to remove another difficulty which
hath been thought to attend the affair of the De-
luge, viz. how it came to pass, that shells, and
corals,
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corals, especially such as are called pelagiae, or those that live and grow only at the bottoms of the deepest seas, should be now found upon the tops and in the bodies of the highest mountains, even such as are at the greatest distance from any sea: whereas if the ocean itself were to be emptied out upon the earth, it would never carry these heavy bodies with it to so great a distance.

In answer to which objection I would first observe, as proved above, that the gravities of bodies were certainly less during the flood than since; which is moreover evident from the manner in which these bodies lye in the strata; it being not uncommon to find one particular species of shells or corals, or even a row of single shells, running parallel, or keeping the same depth with the stratum in which they are found throughout the extent of a whole country, or as far as the stratum itself continues; which is a plain proof that these shells settled together with the dissolved parts of the stratum; and of consequence were before to light as to be bouyed together with that in the same medium.

And with respect to the conveyance of these bodies from their original beds to the places where they are now found, it must be remembered, that not only the ocean, but the Abyss itself was emptied out upon the surface of the earth: and as the Abyss lies beneath the ocean, and came out through the apertures in the bottom of That, in order to cover the earth, it would necessarily bring along with it all such bodies as lay loose near those apertures, and were bouyable in water, and carry
carry them to the greatest distance itself was carried.

And what would farther tend to the more easy conveyance of these bodies would be, that as there was a central nucleus or a globe of loose terrestrial matter at the center of the primitive earth (as is evident from the Mosaic description of the formation of that earth, p. 64, &c.) and as this globe consisted of nothing but lax incoherent matter, so, as the waters came out of the Abyss, and the air occupied its place, this globe would naturally be broken to pieces; and the parts thereof being disseminated through the water, and coming up along with it through the apertures of the seas, would drive away before it all loose bodies, such as:

Besides, we are expressly told Gen. i. 10. That there were Seas in the antediluvian earth; there were also Rivers (Gen. ii. 10.) and Mountains (Gen. vii. 20.) and of consequence Valleys, which are only the intervals between mountains, and without which mountains cannot be. The truth of which representation is also sufficiently evidenced by the remains of the products of the antediluvian earth now found buried in this. There are fossil shells, the fish of which live and grow only in the sea; there are other shells that could be found only in river-water; and there are fossil plants now found that naturally grow only upon mountains; and others that germinate only in valleys. From whence it is very evident, that the external form of the antediluvian earth was much the same as the present, diversified into seas, rivers, mountains, valleys, &c. and from what is said in note p. 70, &c. the seas, rivers, &c. were in the same situation, with regard to themselves, in the one earth as in the other. Now if the external form of the two earths were alike, there is no reason to imagine that the internal was not; at least with respect to the point in question, the existence of the central nucleus, which I have already shewn was no more than the confluence of the surface of the earth being torn and broken into hollows and channels for seas, rivers, valleys, &c. and the matter that before filled up these hollows being placed at the center: see pages 64, &c. and 280, &c.
as shells, corals, bones, &c. that lay near those apertures, and also whatever land-productions that were of a light nature it might accidentally meet with in its passage, and scatter them over the whole face of the earth.

So that it is no wonder that we find such a strange confusion of things as sea and land animals, corals, and corallines, of far distant places, lying in one and the same bed; and in particular that the pelagiae shells should be now found in the most inland parts; for as these shells lay at the bottom of the sea, they would be subject and exposed to the first and most violent irruption of the subterranean waters, and be carried by them over the face of the whole earth. And as it is well known (which has surprized many fossils) that we find a far greater number of shells of the pelagiae kind than any other now buried in the earth, so it is hence evident that all recourse to partial floods, or accidental inundations of particular seas (supposing such to have been) can never solve these phenomena; and nothing but an irruption of the subterranean waters, and thorough washing and cleansing of the immense basin of the ocean, and the bottoms of all the seas by these waters, can account for these extraordinary and extensive effects.

I may here just add, notwithstanding the sea and all its various productions were thrown out upon the land, yet the land and its products were not thrown into the sea: the earth was not dissolved, till the waters had risen to the highest (see p. 85.) and all was calm and quiet; so that the
the mineral and metallic parts of the globe, though reduced to their primogenial atoms, and vegetables and their seeds though floating in the waters, did not move far sideway, but principally ascended upwards and settled down again, in or near the same places from which they were before assumed. So that the waters, in their retreat into the Abyss, would have much the same kind of earth to act upon at the end of the Deluge as they had at the beginning of the creation, and as they acted in both cases in the same manner and under the same direction, the two earths would be alike.

6. But it has been farther asked, How came it to pass, that the hardest rocks and the solid strata of the earth should be dissolved, and yet such tender substances, as shells, bones, teeth, and even plants, should preserve their texture and remain uninjured during the Deluge?

In answer to which I would first observe, that the matter of fact is indisputable, the former were dissolved, and the latter were not; as the whole body of the earth proves to a demonstration. The impression of the most curiously engraved seal in wax cannot evidence the once liquid state of the wax more than the exact delineation of the fibres of the most tender plant in stone proves the dissolution of the stone: it is impossible that stone, unless it were soft and fluid, could receive the impression of a plant, and impossible that the plant, unless it preserved it's form and texture entire, could give such an impression. And as these impressions are found in the hardest rocks and firmest strata
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strata throughout the whole body of the earth, so the matter of fact is undeniable, and on this alone my arguments are founded. And therefore their force would not be invalidated if no other solution to this difficulty could be given. But I shall endeavour to proceed farther in the disquisition of this subject.

*When indeed we view the immense strata of the earth, or consider the size and hardneſs of a single rock, it appears scarce credible that that rock should have been dissolved and a tender plant preserved entire in the inside of it. And yet of this we have many similar instances in the world. Certain it is that immense masses of ice frequently contain within them a vast variety of bodies, such as shells, corals, bones, vegetables, &c. and the impression of these bodies are as exquisitely delineated in the ice, as the forms of the same bodies are frequently found to be in the hardest stone. Both substances therefore, that include these bodies, were once in an equal state of fluidity, and yet the bodies included in neither case destroyed nor injured. Now let us suppose the ice to be exposèd to the influence of the Sun’s rays; in which case the action of the cold air, which had hardened and congealed the water, would be taken off, and the frozen mass, by the penetration of the particles of light, be soon reduced to its original element; and yet the bodies included would remain whole and entire.*

To enlarge the reader’s idea, let him cast his eye over a map of the earth and view the frigid Zones, or those immense tracts in the ocean which are
are frozen at times or throughout the whole year; and let him suppose the action of light to prevail there, how soon would the whole be reduced to atoms or fluidity? and yet the finest shell or most tender vegetable substance, even a leaf, would not be injured by such a dissolusion. Now as ice is harder than plants, &c. this is a plain instance that, according to the present course of nature, one and the same Agent may dissolve a hard and firm body, even of great extent and magnitude, without injuring those that are smaller, of a finer and more delicate construction. Nay, what may be thought more to the purpose, it is well known that, in case of lightning, the action of light will penetrate, tear asunder, and dissolve the parts of the hardest and most solid bodies, without injuring those of a more soft and pliable texture, though it has had a free passage through them.

And such also is the case of the action of the air upon different bodies. Such substances as naturally admit a free and easy passage to the air will not be injured by the penetration of that Agent; whereas those that resist it’s force, and the more they resist, i.e. the stronger, firmer, and finer their constituent particles are, the more extensive will the dissolution be upon the separation of their particles by the permeation of that Agent. And such was the case at the time of the Deluge. In order that a way might be opened for the ascent of the subterranean water over the surface of the earth, we are told, Gen. vii. 11. That the fountains of the great Abyss were broken up, i.e. the sides of those passages or cavities, through which
Part III. Natural Proofs of the Deluge.

Springs and fountains received their supplies in the ante-diluvian earth were widened and thrown open upwards, and by this means the shell of the earth, destroyed, or broken and shattered in a vast number of places. But in order that the earth might be dissolved (and the evidence both of the destruction and dissolution remain to all future generations) we are told, ver. 11. (see p. 69. of this treatise) that the passages of the airs were also opened; i.e. the smaller cracks and crevices in the strata of stone, &c. through which air only can pass, were opened and distended; and the air passed freely through every pore and between every atom of stone, &c. and so the whole earth was really dissolved or reduced to its original, fluid, chaotic state. That the air has a free passage through the cracks and pores of most sorts of stone, no one will deny, and that it can pass through all, and even the hardest of metals, is well known to those who are acquainted with the nature of these bodies. If for instance (to mention but one experiment, which may illustrate the subject I am upon in other respects) iron or copper be dissolved by aqua fortis, a prodigious quantity of air-bubbles arise from the decomposition of the metals, and if this experiment be performed under an exhausted receiver, the appearance of the air-bubbles is greatly increased: and that this air was included in the pores of the metal, and set at liberty by the dissolution of the metallic bodies, is evident from hence, because aqua fortis by its self will yield no such appearance under the air-pump. Now if we suppose the pores of all mineral and metallic
metallic bodies to be opened wider than they are naturally, and even so far, or extensively, as that the air should pass freely between every atom of stone, &c. how would this injure or hurt the parts of a plant or animal? The air had a free and easy passage through them before, much freer than it had through any sort of stone or metal; and therefore such an execution as this against the solid body of the earth would not affect them; not to mention they were not intended to be in the execution.

Besides; the texture of plants and animals would greatly tend to their preservation. It is well known that they consist of fibres or stringy parts, which are complicated, twisted, and tied together; and these fibres constitute the sides of vessels or tubes through which not only air but a much groser fluid [the sap in vegetables, blood, &c. in animals] together with that passes most freely. But the parts of stone have no such tie or connection, or any such easy, regular channels for the admission and permission of air: their constituent principles seem to be joined together only by a juxta-position or application of plane or sphericical surfaces one to another: whereas the primogenial parts of plants and animals, by the strict union and complicated toughness of these bodies, are in all probability linked together in a great variety of directions.

To all which considerations we may add that plants and animals are so small and light in themselves, and so easily susceptible of motion any way, especially when swimming in a fluid that could bouy
buoy them up (as was the case at the time of the deluge) that they would make no resistance to the force of the agents (the wind and the water) that dissolved the solid and resisting body of the earth, but would be readily driven, this way or that, as the currents of each conveyed them. So that though plants and animals, with regard to what we call the Life of them, would be destroyed, at least those that remained immersed in the earth during the deluge, yet their parts would not be dissolved, or their texture reduced to atoms; for the smallness, porosity, pliability, and toughness of their parts would all conspire towards preferring them during the most violent effects of that catastrophe.

FOURTHLY.

HAVING thus proved that all the solid structure of the earth has been dissolved, and the dissolved parts thereof assumed up into, and supported by, a large sphere of water;

I AM now to shew, that all this dissolved matter, together with the animal and vegetable bodies inclosed within it, subsided again, and formed the present solid strata of the earth.

I have observed already (p. 243.) that there is such a close Connection between the several parts of the Subject I have been treating, or the Heads I have been naturally led to divide it into, that very often one and the same argument would prove several of these heads; and so it has come to pass that the discussion of the former articles of this
this Section has in a manner exhausted this laft. For, in short, this laft depends entirely upon the truth of the Cafe as represented in the former. All the arguments that I have there brought in proof of the Flood, the Dissolution, &c. were entirely taken from the present state of the earth. If therefore the foundation, on which those arguments were built, was found, or the state of the Earth justly given, little more need be said in this place. And in order that the reader should not rely barely upon my testimony, I have subjoined, under each of the former articles, the testimonies of a variety of authors, who lived in different times, and in very distant places: so that, in a manner, the voice of all mankind and the face of the whole earth speak the truth of what I have endeavoured to prove.

"What weight these testimonies ought to have (to speak in the words of the celebrated Author of Revelation examined with Candour) the reader will best judge:—Testimonies so numerous, so various, so disconcerted, and yet so connected, is it possible that they can deceive? Could all nations conspire with all nations, and all ages with all ages, to impose upon themselves and their posterity? Could the religion of the true God, and the religion of the Syrian goddess! the Jews, and the Heathens that hated them! Moses and Melo his enemy! tradition conspire with history, and history with mythology! men of all characters, complexions, conditions, and persuasions! Plutarch with Berosus, Benjamin the Jew with Chrysostom, and Lucian with both! Plato with
with Pliny, and Dio with Falconerius! the imaginations of poets, and the experiments of naturalists! antiquity, poetry, philosophy, and philology! wisdom, and folly! truth, and fiction! regions unknown to one another! and regions that never heard of one another! the Greeks, and the Hottentots! the Persians, and the Banians! Asia, with the isles of the Gentiles! and America with both! all conspire to establish one universal delusion!—And all nature join in the attestation; produce all her animals, and all her vegetables, all her heights, and all her depths, her mountains, her vales, her levels, to vouch one universal Iye, with all the irresistible evidence of truth?"

Surely those, who see not the force of the Evidence in this particular, must wilfully shut their eyes against the truth; and may justly be characterised with a set of people (if they are not themselves the very people) spoken of by St. Peter;* —in the last days shall come scoffers walking after their own lusts, and saying, where is the promise of his (Christ's) coming? for since [or as it should be rendered, except that] the fathers fell asleep, [save only, that our fathers or all the men that have lived upon the earth are dead, and others now live in their stead] all things continue as they were from the beginning of the creation; i.e. there hath been no material alteration in heaven or earth that can evidence the interposition of Providence in the affairs of men, either to

* 2 Epist. iii. 5.
† See Hammond on the text.
punish the wicked or reward the good, and therefore we may do as we please; walk after our own lufts, &c. For this (continues the Apostle) they are willingly ignorant of, That by the Word of God the heavens were of old, and the earth standing out of the water and in the water; whereby the World that then was, being overflowed with water, perished: that is, the Eyes of their understandings are so blinded by a wilful pursuit after their passions and lufts that they cannot see, or will not acknowledge, (if they do) the plainest truths in Nature; they will not own, what all the world besides confesseth, what all ages have maintained, what is faithfully recorded in the written word of God; and what is engraven in the deepest characters all over the face of the earth, and what they may have (which infidels so often demand) ocular demonstration of the truth of, viz. That there has been an Universal Deluge, and that the Threatning pronounced by God four thousand years ago on a wicked race of mortals was really accomplished, viz. And God said unto Noah, the end of all flesh is come before me, for the earth is filled with violence through them, and I will destroy them, i.e. the inhabitants, with the earth that bare them; and which through it's abundant fertility (abused by them) furnishes provision only for their lufts, luxury, and idolatry.

The Evidences of this Destruction are such, that the very bodies or bones of the persons thus destroyed, together with the animal creation that perished  

* Gen. vi. 13.
Part III. *Natural Proofs of the Deluge.*

perished with them, are still remaining as standing, striking Monuments of this execution of Divine Wrath upon a wicked world, and are to be seen in every part of the Earth, not only upon the surface, but in the very solid substance of it, not only in vallies and dales, but upon the tops of the highest mountains and eminences, and buried also to the greatest depths that human art or labour has ever penetrated.

Certain then it is that this whole earth has been destroyed, all the solid structure of it unhinged, broken to pieces, and reduced to its original loose chaotic state, and afterwards formed anew into its present solid, beautiful, and convenient shape. Effects these so great! that they could never have happened of themselves, never have been the performance of blind inanimate matter. Matter cannot even destroy itself, much less, when destroyed, form itself anew. These transactions therefore must have been effected by a Being superior to all the Powers of Nature: and they carry in themselves such evident marks of *Wisdom, Power, Goodness* and *Justice,* that they not only prove that there is a GOD, but that he governs the World,—that sin is his greatest detestation, and a life of faith and righteousness the only recommendation to his favour, *Heb.* xi. 7. *By faith Noah being warned of God of things not seen as yet, moved with fear, prepared an ark to the saving of his house; by the which he condemned the world, and became heir of the righteousness which is by faith,*

Dd3

Thus
Thus does the Book of Nature lead to the Book of God, and the one bears witness to the truth of the other, not only with respect to its philosophy but even its divinity.

I could wish therefore that all searchers into nature, especially those who examine the subterranean kingdom, and are so anxious, and at so much pains, expence, and difficulty to procure the productions thereof, would consider these two particulars, and make a right use of their labours and studies.

It is at present too fashionable a custom with fossilists to admire the external beauties of their curiosities, and to place them with great care and art in their cabinets, with no other view than to exhibit them to the ignorant as a raree-show. Poor amusement to a rational mind! An employment quite unworthy the dignity of a philosopher, who may draw so many and such advantageous truths from his subterranean researches.

If the medalist can creep but half way to the time of the Deluge, and can prove from his collection the existence of a Cæsar or Alexander, he thinks he rises high in antiquity, and has made some noble discovery. But how vastly beneath the fossilist does he fall? I have fully shewn, that all the works of the artificers in brass, iron, stone, &c. were dissolved at the time of the Deluge, and that the knowledge of their arts were not recovered, or at least in general applied, 'till long after the flood, p. 135. So that the medalist must be content to make his observations upon things and impressions, that had not an existence when the
the imprimatures of the ante-diluvian animal
and vegetable bodies were formed in the solid
rock all over the earth.

Neither do the fossil reliquiae of plants and
animals by any means yield in elegancy and ex-
actness to the medalic insignatures; nay they far
exceed them, for they exhibit not only the pre-
cise figure and due size, but the very bodies them-
selves are most exquisitely preserved: whereas in
medalic impressions the form is contracted and
the likeness imagined.—“These fossil bodies
then (fays the author of Spectacle de la Nature,
Vol. III. p. 415.) so seemingly useless, do speak
demonstration to our senses, and are a language
which is understood by the most common capa-
cities, having been appointed by Providence as so
many standing monuments of the most remark-
able of all transactions, and are with regard to
the history of Moses the fame as medals to the Ro-
man history.” Voilà (fays another French writer,
Histoire de l’Acad. Roy. 1710. p. 28.) des nouvelles
especes des medailles, dont les dates sont & sans com-
paraison plus anciennes, & plus importantes, & plus
fures, que celles des toutes les medailles Grecques &
Romaines.

Again; certain it is that the works of God
are contrived and executed by the utmost wisdom,
and for the most noble and useful purposes. And
yet if we look into the earth, we shall see a strange
distribution of things, an appearance quite con-
trary to all order and regularity, propriety or uti-
liness. If we visit the tops of the highest moun-
tains, and examine the state of things just under
the turf, at least in such as are boggy and morassly, we shall find a vast variety of perished vegetables, of such kinds or species as at present are not known (in their natural state) to the inhabitants of the countries where they are discovered. If we examine the inside of the earth, instead of finding things peculiar to the land or its internal constitution, we shall there discover, even at the lowest depths, the spoils of the ocean in great abundance, together with a vast variety of animal and vegetable bodies that can live and grow only upon the surface of the earth. And what is farther remarkable, in many places, only parts of these bodies, trunks of trees and leaves of plants without roots or branches, teeth of fishes without jaws, and bones without any bodies to support them; and all these so closely fixed to and completely circumscribed by the solid rock, as to shew that they could never have been of any use to any creature where they are found, neither could they ever have increased to complete forms. Then as for those that are complete in their shapes, and carry evident marks of having been once living creatures, it is equally surprising for what end or purpose they could be laid there, or why a set of beings, that invariably pursue the will of their creator, or could not possibly offend him, should be destroyed in such amazing multitudes, that several whole species seem to have been buried alive in the earth. These strange, striking phenomena certainly deserve the notice and call for the examination, not only of the philosopher, but even of the divine.

Now
Part III. Natural Proofs of the Deluge.

Now it is an allowed case that nature, the Author of nature, does nothing in vain. It therefore behoves the philosopher to shew this, and to solve all appearances to the contrary. And, in the article under consideration, it appears, I hope, from the foregoing treatise, that nothing but the supposition of the universal Deluge can answer these phenomena, and that That in every respect is equivalent to them; and therefore we may fairly conclude the reality of such an event.

And with regard to divinity; it is a certain truth, that the natural world never suffered, unless the spiritual or moral had first offended. It cannot be supposed that God would fall out with senseless inanimate matter, that operates mechanically, or punish the brute creation on their own account, that unvariably pursue the rules and instincts he has prescribed them. If therefore either of these suffer, or the state and condition of either be altered, at least from better to worse, it must be on account of that Being, for whose sake they were at first made, and for whose welfare they are still continued in existence. And when they can be no longer of any service to man (for whose use they were originally formed) it would be needless to preserve them alive. If therefore man, or the whole species of the human race, except a few righteous, should in such a manner offend their Maker as to deserve a total extirpation; it would be but requisite that the brute creation should perish together with them, or at least the far greater part of them, left at the renewal of the world the small remnant of the human race should
Natural Proofs of the Deluge. Part III.

Should be overcome by those very creatures that were made for their benefit. And the manner in which they were destroyed, and the distribution of their bodies or bones after, indicate the wisdom and goodness of that God, who in judgment always remembers mercy; for by burying of them in the earth, especially in the most solid parts (which are of the greatest service to man, and therefore are daily dug and brought up to light) they are, and will remain, to each succeeding race of men as an evident proof of the truth of the destruction and of the wrath of God against a world of sinners; so that though dead they still speak in the lively oracles of God and in the book of Nature.

The certainty that this globe has been destroyed by a flood of water may serve, not only as an argument against the eternity and immutability of nature, but also to convince us of another scriptural truth, that it will be destroyed by fire, 2 Pet. iii. 10. To an undiscerning eye there are as few marks of fire in the earth, as there were of a subterranean Abyss of waters to the ante-diluvian scoffers. And the general conflagration seems at present as incredible, and is as much ridiculed, as the Deluge was before it happened. And though God could consume the whole world, if he pleased, by the blast of his mouth, yet he hath so constructed the earth, and stored it with such combustible materials, as coal, sulphur, bitumen, &c. as to afford us some kind of pre-signification of it's final destruction by fire. And this event seemed so probable in the opinion of an heathen philosopher,
philosopher, who had carefully examined the internal structure of the earth, that he wondered it had not come to pass ages ago; for Pliny in his second book of Nat. History, chap. cvi. cvii. after having given an account of some fiery mountains and other parts of the earth that are the seats and sources of fire, makes this reflection: "Seeing, then, this element is so fruitful that it brings forth itself, and multiplies and increases from the least sparks, what are we to expect from so many fires already kindled on the earth? How does nature feed and satisfy so devouring an element, and such a great voracity throughout all the world, without lois or diminution of herself? Add to these fires we have mentioned the stars and the great sun; then all the fires made for human uses; fire in stones, in wood, in clouds, and in thunder. So that it exceeds all miracles, that one day should pass without setting the whole world on fire; excedit profecto omnia miracula, ullam diem suisse quo non cuncta conflagrarent."

But why need I mention one or two scripture philosophical truths only, as verified by the natural state of the earth? I have already shewn, that the Mosaic account of the manner in which the whole earth was at first formed, together with the powers of the heavens or airs, and the manner in which it was destroyed and reformed at the time of the Deluge, are philosophically just and literally true: and therefore that the biblical philosophy is strictly consistent with nature. And several reasons may be given why it ought to be so.

First,
First, Because when Moses wrote, the world was wholly given to idolatry, and this idolatry consisted in the worship of the heavens, earth, &c.—the sun, the moon, and the stars, and all the host of them, (see p. 6.) and of no other god or gods (except the true) do we ever read throughout the Old Testament. Now the most likely and effectual way to destroy this idolatry would be, to reveal a true system of nature—to declare that the heavens were created (and so not God)—to shew how, step by step, they were formed into a machine for the service of man; and therefore that man ought not to be subservient or pay adoration to them; and to omit declaring this, would be to leave and encourage men in their idolatries; especially, if any account of nature was given in the Bible; and as such is undeniably laid down, principally, in the first chapter of Genesis, that must undoubtedly be true.

Secondly, Besides, was not the Bible written for this age, as well as those in which the writers of it lived? Nay, was it not written for, and therefore is to continue to, all ages?—Did not the Spirit of truth (in whose sight a thousand years are but as one day) very well know, that certain self-sufficient mortals would rise up (after his revelation was delivered and sealed) contradict his word, dispute his philosophy, and presume to give a system of nature out of their own brains; when it was as much, or rather more impracticable for them to give the true one, than it would be for a man—who had never seen a watch, or any machine like it, and was utterly ignorant of the movements
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upon a false hypothesis, or accommodated to vulgar apprehensions? And if it be not true either in appearance, or in reality, I see not how it can be true in any respect."

Fifthly, "We must not suppose the word of God to speak false in any case whatsoever. It's history, it's chronology, and it's philosophy must be in fact as true as it's theology. If we suppose any part of the divine word to be erroneous, this so far shakes the authority of all the rest. And as God knows all things perfectly, we must believe him the fittest to give us an account of his works as well as of his nature."

Sixthly, "There is a necessary connection between the knowledge of natural and spiritual things; since scripture constantly, or at least very frequently, refers our thoughts to natural ideas, in order to illustrate spiritual truths. And for this reason it appears to be of some considerable importance, that the natural ideas referred to be strictly just and true, in order to be a proper foundation for a right conception and representation of divine matters."

Or, as Mr. Spearman (in his Enquiry after Philosophy and Theology, p. 254.) has most judiciously stated this case: "When the senses have acted upon any material natural object, what they take in and retain by that action is the inward sense or idea of the thing; and the knowledge we gain by such repeated acts of the senses upon nature and her operations is natural knowledge or physics. When we make use of these natural and acquired ideas to help us to ideas of spiritual things,
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things, the knowledge we, by these means, gain of God and his operations is *super-natural knowledge* or *metaphysics*; and so by things that are *visible* within the reach of our senses, and which we can understand, we are led to the knowledge of things which are *invisible*, without the reach of our senses, and which we could not otherwise understand. It is agreed, that we *have no innate ideas*; and that nothing can be in the understanding but what comes in by the senses. We therefore either can have no ideas of God and spiritual things, or we must take them in by our senses. But our senses cannot act immediately upon spiritual objects, because they are not the objects of our senses; therefore we must have our ideas of spiritual and invisible things from natural and visible things. But natural and visible things can give us no ideas of spiritual and invisible things, unless they bear some analogy to them, are the *simulacra* or images of them. And if they be the images of them, they must have been *so created* and framed by God the Creator, and to this very end, and with this very design: for nothing could be created by infinite wisdom but with foreknowledge and design. And since we find in the scriptures God and spiritual things represented to us under the ideas and names of visible and sensible

*As Rom. i. 19. That which may be known of God is manifest among men; for God himself hath shewed it unto them.* [hath manifested it; for otherwise it could never have been known.]

*For [Inasmuch as] the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, [visibles being made substitutes for invisibles] even his eternal power and Godhead,*
sensible things, it is a demonstration in itself that God framed them to represent himself; and what he pre-intended to reveal of himself and his ways to mankind."

So that we may well say with Tully from Plato, *neceffë eft bunc mundum, quem cernimus, simulacrum esse æternum alicujus æterni*. It cannot be but that this world, which is visible to us, should be a standing type or representation of something eternal.

So also Milton,

*Earth is the shadow of heav’n, the things therein
Each other like, more than on earth is thought.*

I shall leave the pious reader to pursue this thought (as I want words to express the height, length, breadth, and depth of it) — to the consideration of the new heavens and new earth (spoken of by St. Peter 2 Ep. chap. iii.) wherein dwelleth righteousness; — to the great city (Revel. xxi.) the holy Jerusalem that is to descend out of heaven from God, having the glory of God; whose light is like unto a stone most precious, even like a jasper stone, clear as crystal; which hath a wall great and high, and twelve gates, and the wall of the city hath twelve foundations. And the city lieth four-square; the length, and the breadth, and the height of it are equal. And the foundations of the wall of the city are garnished with all manner of precious stones. The first foundation was jasper; the second, sapphire; the third, a chalcedony; the fourth, an emerald; the fifth, sardonyx; the sixth, sardius;
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the seventh, achry solite; the eighth, a beryl; the ninth, a topaz; the tenth, a chryoprasus; the eleventh, a jacinth; the twelfth, an amethyst. And the twelve gates were twelve pearls; every several gate was of one pearl: and the street of the city was pure gold, as it were transparent glass. And I saw no temple therein: for the Lord God Almighty and the Lamb are the temple of it. And the city had no need of the sun, neither of the moon to shine in it: for the glory of God did lighten it, and the Lamb is the light thereof.
Before I quite conclude this treatise, I shall take the liberty to present the reader with a poetical paraphrase of the 104th Psalm, as composed by my Father from the true sense of the Original; since that Psalm contains, among other things, a description of the two principal Particulars discussed in this Tract, viz. the Manner in which the Earth was at first formed, and the Manner in which it was destroyed and formed anew at the time of the Deluge.
The Hundred and Fourth PSALM PARAPHRASED

By the late Rev. Mr. A. S. Catcott.

Exert thy reason'ing pow'rs, my vital frame,
And grateful praise the great JEHOVAH's name;
Hail thou who ART! restless in thy might,
Array'd in glory and majestic light!

As a wide tent, extended over-head,
Thy forming hands the vast expanse out-spred,
Whose binding force the fluid orb restrain'd,
And reach'd those atoms the loose mass contain'd.
Whence the firm strata, which the globe compose,
Each over each in mounting stories rose.
Onward it mov'd, impell'd by grains of air;
The wings of winds the floating orb upbare.
With * double impulse push'd the Spirit's force,
And Light prim'val steer'd it in it's course.

* As דּוֹמִי, being in the plural number, indicates. The Wind or Spirit and the Light or a Flame of Fire were the Agents or Ministers

On
On th' AIRS, as basés, he machin'd the sphere,
And firmly bid the solid parts cohere.
As yet the shell beneath the waters lay,
And future mountains had not seen the day.
At thy command th' affrighted waters fled,
And sought tumultuous their appointed bed.
O'er hills they roll'd, and follow'd the descent,
Deep channels tore, and the split vallies rent.
There lodg'd, in earth's spacious womb, they rest,
By the strong heav'n's expansive pow'r compress'd.
Their bound'ries still their raging waves confine,
Bound'ries unmov'd by any pow'r but thine.
Hence rais'd in steam, they work their secret way,
In lowly vales through openings meet the day,
Or trickling 'twixt the winding mountains stray.
Here haunt the beasts, and find a cool retreat,
And parch'd wild-asses quench their thirsty heat.
In neighb'ring trees, amidst the leafy sprays,
Birds build their nests, and chaunt their cheerful lays,
The ouzing springs bedew the mossy hills,
And thence glide down the fertile vale in rills:

Hence

Ministers that God made use of in garnishing the Heavens and in forming the Earth, as I have shewn p. 52, &c. of this Tract. As the Works of Nature are here spoken of, it is certainly more natural to suppose the material Angels or Agents are here meant than immaterial and spiritual Beings.
Hence new in strength the saturated soil
With verdant grass supports the cattle’s toil;
With various herbs for human use is crown’d,
Or yellow harvests load the fruitful ground.
Hence rise th’ effects of industry and art;
Hence bread is form’d, the strength’ner of the heart.
From swelling grapes the foaming wine is press’d,
Diffusing gladness o’er the pensive breast.
Oil with youth’s bloom renews each fading grace,
And sheds fresh glories o’er the beauteous face.
Trees, sacred emblems, and once Eden’s pride,
From the same storehouse are with sap supply’d;
Cedars, which Lebanon’s high summits grace,
Set there by God, † coeval with their place:
Lodg’d in whose branches fowls securely rest,
And tow’ring firs which yield the stork a nest.
On highest hills the shy Chamois are found,
And delving conies bore the rocky ground.
The moon’s fair light (her orb by fiatd force
Impell’d) determines periods by it’s course:
The sun’s more glorious runs it’s known career,
And gilds by turns each shifting hemisphere.
The light goes off, and night succeeds the day;
The beasts come forth, and proul in search of prey.

† i.e. Set there by Nature, or the Author of Nature, in opposition to those planted by the Art of Man.
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First, Because when Moses wrote, the world was wholly given to idolatry, and this idolatry consisted in the worship of the heavens, earth, &c. —the sun, the moon, and the stars, and all the host of them, (see p. 6.) and of no other god or gods (except the true) do we ever read throughout the Old Testament. Now the most likely and effectual way to destroy this idolatry would be, to reveal a true system of nature—to declare that the heavens were created (and so not God)—to shew how, step by step, they were formed into a machine for the service of man; and therefore that man ought not to be subservient or pay adoration to them; and to omit declaring this, would be to leave and encourage men in their idolatries: especially, if any account of nature was given in the Bible; and as such is undeniably laid down, principally, in the first chapter of Genesis, that must undoubtedly be true.

Secondly, Besides, was not the Bible written for this age, as well as those in which the writers of it lived? Nay, was it not written for, and therefore is to continue to, all ages? —Did not the Spirit of truth (in whose sight a thousand years are but as one day) very well know, that certain self-sufficient mortals would rise up (after his revelation was delivered and sealed) contradict his word, dispute his philosophy, and presume to give a system of nature out of their own brains; when it was as much, or rather more impracticable for them to give the true one, than it would be for a man—who had never seen a watch, or any machine like it; and was utterly ignorant of the movements