

## CHAPTER II.

Oriental Cosmogony—Doctrine of the successive destruction and renovation of the world—Origin of this doctrine—Common to the Egyptians—Adopted by the Greeks—System of Pythagoras—Of Aristotle—Dogmas concerning the extinction and reproduction of genera and species—Strabo's theory of elevation by earthquakes—Pliny—Concluding Remarks on the knowledge of the Ancients.

THE earliest doctrines of the Indian and Egyptian schools of philosophy, agreed in ascribing the first creation of the world to an omnipotent and infinite Being. They concurred also in representing this Being, who had existed from all eternity, as having repeatedly destroyed and reproduced the world and all its inhabitants. In the "Institutes of Menù," the sacred volume of the Hindoos, to which, in its present form, Sir William Jones ascribes an antiquity of at least eight hundred and eighty years before Christ, we find this system of the alternate destruction and renovation of the world, proposed in the following remarkable verses.

"The Being, whose powers are incomprehensible, having created me (Menù) and this universe, again became absorbed in the supreme spirit, changing the time of energy for the hour of repose.

"When that power awakes, then has this world its full expansion; but when he slumbers with a tranquil spirit, then the whole system fades away. . . . For while he reposes as it were, embodied spirits endowed with principles of action depart from their several acts, and the mind itself becomes inert."

Menù then describes the absorption of all beings into the Supreme essence, and the Divine soul itself is said to slumber, and to remain for a time immersed in "the first idea, or in darkness." He then proceeds, (verse fifty-seven,) "Thus that immutable power, by waking and reposing alternately, revivifies and destroys, in eternal succession, this whole assemblage of locomotive and immoveable creatures."

It is then declared that there has been a long succession of *manwantaras*, or periods, each of the duration of many thousand ages, and—

“ There are creations also, and destructions of worlds innumerable : the Being, supremely exalted, performs all this with as much ease as if in sport, again and again for the sake of conferring happiness \*.”

The compilation of the ordinances of Menù was not all the work of one author nor of one period, and to this circumstance some of the remarkable inequalities of style and matter are probably attributable. There are many passages, however, wherein the attributes and acts of the “ Infinite and Incomprehensible Being” are spoken of with much grandeur of conception and sublimity of diction, as some of the passages above cited, though sufficiently mysterious, may serve to exemplify. There are at the same time such puerile conceits and monstrous absurdities in the same cosmogony, that some may impute to mere accident any slight approximation to truth, or apparent coincidence between the oriental dogmas and observed facts. This pretended revelation, however, was not purely an effort of the unassisted imagination, nor invented without regard to the opinions and observations of naturalists. There are introduced into the same chapter, certain astronomical theories, evidently derived from observation and reasoning. Thus for instance, it is declared that, at the North Pole, the year was divided into a long day and night, and that their long day was the northern, and their night the southern course of the sun ;\* and to the inhabitants of the moon it is said, one day is equal in length to one month of mortals †. If such statements cannot be resolved into mere conjectures, we have no right to refer, to mere chance, the prevailing notion, that the earth and its inhabitants had formerly undergone a succession of revolutions and catastrophes, interrupted by long intervals of tranquillity.

Now there are two sources in which such a theory may

\* Institutes of Hindoo Law, or the Ordinances of Menù, from the Sanscrit, translated by Sir William Jones, 1796.

† Menù Instit. c. i. 66 and 67.

have originated. The marks of former convulsions on every part of the surface of our planet are obvious and striking. The remains of marine animals imbedded in the solid strata are so abundant, that they may be expected to force themselves on the observation of every people who have made some progress in refinement; and especially where one class of men are expressly set apart from the rest for study and contemplation. If these appearances are once recognized, it seems natural that the mind should come to the conclusion, not only of mighty changes in past ages, but of alternate periods of repose and disorder—of repose when the fossil animals lived, grew, and multiplied—of disorder, when the strata wherein they were buried became transferred from the sea to the interior of continents, and entered into high mountain chains. Those modern writers, who are disposed to disparage the former intellectual advancement and civilization of eastern nations, might concede some foundation of observed facts for the curious theories now under consideration, without indulging in exaggerated opinions of the progress of science; especially as universal catastrophes of the world, and exterminations of organic beings, in the sense in which they were understood by the Brahmin, are untenable doctrines. We know that the Egyptian priests were aware, not only that the soil beneath the plains of the Nile, but that also the hills bounding the great valley, contained marine shells; and it could hardly have escaped the observation of Eastern philosophers, that some soils were filled with fossil remains, since so many national works were executed on a magnificent scale by oriental monarchs in very remote eras. Great canals and tanks required extensive excavations; and we know that in more recent times (the fourteenth century of our era) the removal of soil necessary for such undertakings, brought to light geological phenomena, which attracted the attention of a people less civilized than were many of the older nations of the East\*.

\* This circumstance is mentioned in a Persian MS. copy of the historian Ferishta, in the library of the East India Company, relating to the rise and progress of the Mahomedan Empire in India, and procured from the library of Tippoo Sultaun in 1799; and has been recently referred to at some length by Dr. Buckland.—(Geol. Trans. 2d Series, vol. ii. part iii. p. 389.)—It is stated that, in the year 762, (or 1360 of our era) the king employed fifty thousand labourers in cutting through a

But although we believe the Brahmins, like the priests of Egypt, to have been acquainted with the existence of fossil remains in the strata, it is probable that the doctrine of successive destructions and renovations of the world merely received corroboration from such proofs; and that it was originally handed down, like the religious dogmas of most nations, from a ruder state of society. The true source of the system must be sought for in the exaggerated traditions of those partial, but often dreadful catastrophes, which are sometimes occasioned by various combinations of natural causes. Floods and volcanic eruptions, the agency of water and fire, are the chief instruments of devastation on our globe. We shall point out in the sequel the extent of these calamities, recurring at distant intervals of time, in the present course of nature; and shall only observe here, that they are so peculiarly calculated to inspire a lasting terror, and are so often fatal in their consequences to great multitudes of people, that it scarcely requires the passion for the marvellous, so characteristic of rude and half-civilized nations, still less the exuberant imagination of eastern writers, to augment them into general cataclysms and conflagrations.

Humboldt relates the interesting fact, that after the annihilation of a large part of the inhabitants of Cumana, by an earthquake in 1766, a season of extraordinary fertility ensued, in consequence of the great rains which accompanied the subterranean convulsions. "The Indians," he says, "celebrated, after the ideas of an antique superstition, by festivals and dancing, the destruction of the world and the approaching epoch of its regeneration\*."

The existence of such rites among the rude nations of South America is most important, for it shews what effects may be produced by great catastrophes of this nature, recurring at distant intervals of time, on the minds of a barbarous and uncultivated race. The superstitions of a savage tribe are transmitted through all the progressive stages of society, till they exert a powerful influence on the mind of the philosopher. He

mound, so as to form a junction between the rivers Selima and Sutluj, and in this mound were found the bones of elephants and men, some of them petrified, and some of them resembling bone. The gigantic dimensions attributed to the human bones shew them to have belonged to some of the larger pachydermata.

\* Humboldt et Bonpland, *Voy. Relat. Hist.* vol. i. p. 30

may find, in the monuments of former changes on the earth's surface, an apparent confirmation of tenets handed down through successive generations, from the rude hunter, whose terrified imagination drew a false picture of those awful visitations of floods and earthquakes, whereby the whole earth as known to him was simultaneously devastated.

Respecting the cosmogony of the Egyptian priests, we gather much information from writers of the Grecian sects, who borrowed almost all their tenets from Egypt, and amongst others that of the former successive destruction and renovation of the world\*. We learn from Plutarch, that this was the theme of one of the hymns of Orpheus, so celebrated in the fabulous ages of Greece. It was brought by him from the banks of the Nile; and we even find in his verses, as in the Indian systems, a definite period assigned for the duration of each successive world †. The returns of great catastrophes were determined by the period of the *Annus Magnus*, or great year, a cycle composed of the revolutions of the sun, moon, and planets, and terminating when these return together to the same sign whence they were supposed at some remote epoch to have set out. The duration of this great cycle was variously estimated. According to Orpheus, it was 120,000 years; according to others, 300,000; and by Cassander it was taken to be 360,000 years ‡. We learn particularly from the *Timæus* of Plato, that the Egyptians believed the world to be subject to occasional conflagrations and deluges, whereby the gods arrested the career of human wickedness, and purified the earth from guilt. After each regeneration, mankind were in a state of virtue and happiness, from which they gradually degenerated again into vice and immorality. From this Egyptian doctrine, the poets derived the fable of the decline from the golden to the iron age. The sect of Stoics adopted most fully the system of catastrophes destined at certain intervals to destroy the world. These they taught were of two kinds—the *Cataclysm*, or destruction by deluge, which sweeps away the

\* Prichard's *Egypt. Mythol.* p. 177.

† *Plut. de Defectu Oraculorum*, cap. 12. *Censorinus de die Nat.* See also Prichard's *Egypt. Mythol.* p. 183.

‡ Prichard's *Egypt. Mythol.* p. 182.

whole human race, and annihilates all the animal and vegetable productions of nature; and the Ecpyrosis, or conflagration, which dissolves the globe itself. From the Egyptians also they derived the doctrine of the gradual debasement of man from a state of innocence. Towards the termination of each era the gods could no longer bear with the wickedness of men, and a shock of the elements or a deluge overwhelmed them; after which calamity, Astrea again descended on the earth, to renew the golden age\*.

The connexion between the doctrine of successive catastrophes and repeated deteriorations in the moral character of the human race, is more intimate and natural than might at first be imagined. For, in a rude state of society, all great calamities are regarded by the people, as judgments of God on the wickedness of man. Thus, in our own time, the priests persuaded a large part of the population of Chili, and perhaps believed themselves, that the great earthquake of 1822 was a sign of the wrath of heaven for the great political revolution just then consummated in South America. In like manner, in the account given to Solon by the Egyptian priests, of the submersion of the island of Atlantis under the waters of the ocean, after repeated shocks of an earthquake, we find that the event happened when Jupiter had seen the moral depravity of the inhabitants †. Now, when the notion had once gained ground, whether from causes before suggested or not, that the earth had been destroyed by several general catastrophes, it would next be inferred that the human race had been as often destroyed and renovated. And, since every extermination was assumed to be *penal*, it could only be reconciled with divine justice, by the supposition that man, at each successive creation, was regenerated in a state of purity and innocence.

A very large portion of Asia, inhabited by the earliest nations whose traditions have come down to us, has been always subject to tremendous earthquakes. Of the geographical boundaries of these, and their effects, we shall, in the proper place, have occasion to speak. Egypt has, for the most part, been exempt from this scourge, and the tra-

\* Prichard's Egypt. Mythol. p. 193.

† Plato's Timæus.

dition of catastrophes in that country was perhaps derived from the East.

One extraordinary fiction of the Egyptian mythology was the supposed intervention of a masculo-feminine principle, to which was assigned the development of the embryo world, somewhat in the way of incubation. For the doctrine was, that when the first chaotic mass had been produced, in the form of an egg, by a self-dependent and eternal Being, it required the mysterious functions of this masculo-feminine demi-urgus to reduce the component elements into organized forms. Although it is scarcely possible to recall to mind this conceit without smiling, it does not seem to differ essentially in principle from some cosmological notions of men of great genius and science in modern Europe. The Egyptian philosophers ventured on the perilous task of seeking out some analogy to the mode of operation employed by the Author of Nature in the first creation of organized beings, and they compared it to that which governs the birth of new individuals by generation. To suppose that some general rules might be observed in the first origin of created beings, or the first introduction of new species into our system, was not absurd, nor inconsistent with anything known to us in the economy of the universe. But the hypothesis, that there was any analogy between such laws, and those employed in the continual reproduction of species once created, was purely gratuitous. In like manner, it is not unreasonable or derogatory to the attributes of Omnipotence, to imagine that some general laws may be observed in the creation of new worlds; and if man could witness the birth of such worlds, he might reason by induction upon the origin of his own. But in the absence of such data, an attempt has been made to fancy some analogy between the agents now employed to destroy, renovate, and perpetually vary the earth's surface, and those whereby the first chaotic mass was formed, and brought by supposed nascent energy from the embryo to the habitable state. By how many shades the elaborate systems, constructed on these principles, may differ from the mysteries of the "Mundane Egg" of Egyptian fable, we shall not inquire. It would, perhaps, be dangerous ground, and some of our contemporaries might not sit as patiently as the Athenian audience, when the fiction of the

chaotic egg, engrafted by Orpheus upon their own mythology, was turned into ridicule by Aristophanes. That comedian introduced his birds singing, in a solemn hymn, "How sable-plumaged night conceived in the boundless bosom of Erebus, and laid an egg, from which, in the revolution of ages, sprung Love, resplendent with golden pinions. Love fecundated the dark-winged chaos, and gave origin to the race of birds \*."

Pythagoras, who resided for more than twenty years in Egypt, and, according to Cicero, had visited the East, and conversed with the Persian philosophers, introduced into his own country, on his return, the doctrine of the gradual deterioration of the human race from an original state of virtue and happiness; but if we are to judge of his theory concerning the destruction and renovation of the earth, from the sketch given by Ovid, we must concede it to have been far more philosophical than any known version of the cosmologies of Oriental or Egyptian sects. Although Pythagoras is introduced by the poet as delivering his doctrine in person, some of the illustrations are derived from natural events which happened after the death of the philosopher. But notwithstanding these anachronisms, we may regard the account as a true picture of the tenets of the Pythagorean school in the Augustan age; and although perhaps partially modified, it must have contained the substance of the original scheme. Thus considered, it is extremely curious and instructive; for we here find a comprehensive and masterly summary of almost all the great causes of change now in activity on the globe, and these adduced in confirmation of a principle of perpetual and gradual revolution inherent in the nature of our terrestrial system. These doctrines, it is true, are not directly applied to the explanation of *geological* phenomena; or, in other words, no attempt is made to estimate what may have been, in past ages, or what may hereafter be, the aggregate amount of change brought about by such never-ending fluctuations. Had this been the case, we might have been called upon to admire so extraordinary an anticipation with no less interest than astronomers, when they endeavour to divine by what means the Samian

\* Aristophanes' Birds, 694.



philosopher came to the knowledge of the Copernican theory. Let us now examine the celebrated passages to which we have been adverting \* :—

“ Nothing perishes in this world ; but things merely vary and change their form. To be born, means simply that a thing begins to be something different from what it was before ; and dying, is ceasing to be the same thing. Yet, although nothing retains long the same image, the sum of the whole remains constant.” These general propositions are then confirmed by a series of examples, all derived from natural appearances, except the first, which refers to the golden age giving place to the age of iron. The illustrations are thus consecutively adduced.

1. Solid land has been converted into sea.
2. Sea has been changed into land. Marine shells lie far distant from the deep, and the anchor has been found on the summit of hills.
3. Valleys have been excavated by running water, and floods have washed down hills into the sea †.
4. Marshes have become dry ground.
5. Dry lands have been changed into stagnant pools.
6. During earthquakes some springs have been closed up, and new ones have broken out. Rivers have deserted their channels, and have been re-born elsewhere ; as the Erasinus in Greece, and Mysus in Asia.
7. The waters of some rivers, formerly sweet, have become bitter, as those of the Anigris in Greece, &c. ‡
8. Islands have become connected with the main land by the growth of deltas and new deposits, as in the case of Antissa joined to Lesbos, Pharos to Egypt, &c.
9. Peninsulas have been divided from the main land, and have become islands, as Leucadia ; and according to tradition Sicily, the sea having carried away the isthmus.
10. Land has been submerged by earthquakes: the Grecian

\* Ovid's *Metamor.* lib. 15.

† *Eluvie mons est deductus in œquor*, v. 267. The meaning of this last verse is somewhat obscure, but taken with the context, may be supposed to allude to the abrading power of floods, torrents, and rivers.

‡ The impregnation from new mineral springs, caused by earthquakes in volcanic countries, is, perhaps, here alluded to.

cities of Helice and Buris, for example, are to be seen under the sea, with their walls inclined.

11. Plains have been upheaved into hills by the confined air seeking vent, as at Træzen in the Peloponnese.

12. The temperature of some springs varies at different periods.

13. The waters of others are inflammable\*.

14. Extraordinary medicinal and deleterious effects are produced by the water of different lakes and springs †.

15. Some rocks and islands, after floating, and having been subject to violent movements, have at length become stationary and immoveable, as Delos and the Cyanean Isles ‡.

16. Volcanic vents shift their position; there was a time when Etna was not a burning mountain, and the time will come when it will cease to burn. Whether it be that some caverns become closed up by the movements of the earth, and others opened, or whether the fuel is finally exhausted, &c. &c.

The various causes of change in the inanimate world having been thus enumerated, the doctrine of equivocal generation is next propounded, as illustrating a corresponding perpetual flux in the animate creation §.

\* This is probably an allusion to the escape of inflammable gas, like that in the district of Baku, west of the Caspian; at Pietra-mala, in the Tuscan Apennines; and several other places.

† Many of those described seem fanciful fictions, like the virtues still so commonly attributed to mineral waters.

‡ Raspe, in a learned and judicious essay (chap. 19, de novis insulis), has made it appear extremely probable that all the traditions of certain islands in the Mediterranean having at some former time frequently shifted their position, and at length become stationary, originated in the great change produced in their form by earthquakes and submarine eruptions, of which there have been modern examples in the new islands raised in the time of history. When the series of convulsions ended, the island was said to become fixed.

§ It is not inconsistent with the Hindoo mythology to suppose, that Pythagoras might have found in the East not only the system of universal and violent catastrophes and periods of repose in endless succession, but also that of periodical revolutions, effected by the continued agency of ordinary causes. For Brahma, Vishnu, and Siva, the first, second, and third persons of the Hindoo triad, severally represented the Creative, the Preserving, and the Destroying powers of the Deity. The co-existence of these three attributes, all in simultaneous operation, might well accord with the notion of perpetual but partial alterations finally bringing about a complete change. But the fiction expressed in the verses before quoted from Menù, of eternal vicissitudes in the vigils and slumbers of the Infinite Being, seems accommodated to the system of great general catastrophes followed by new creations and periods of repose.

In the Egyptian and Eastern cosmogonies, and in the Greek version of them, no very definite meaning can, in general, be attached to the term "destruction of the world," for sometimes it would seem almost to imply the annihilation of our planetary system, and at others a mere revolution of the surface of the earth.

From the works now extant of Aristotle, and from the system of Pythagoras, as above exposed, we might certainly infer that these philosophers considered the agents of change now operating in Nature, as capable of bringing about in the lapse of ages a complete revolution; and the Stagyrite even considers occasional catastrophes, happening at distant intervals of time, as part of the regular and ordinary course of Nature. The deluge of Deucalion, he says, affected Greece only, and principally the part called Hellas, and it arose from great inundations of rivers during a rainy winter. But such extraordinary winters, he says, though after a certain period they return, do not always revisit the same places\*. Censorinus quotes it as Aristotle's opinion, that there were general inundations of the globe, and that they alternated with conflagrations, and that the flood constituted the winter of the great year, or astronomical cycle, while the conflagration, or destruction by fire, is the summer or period of greatest heat†. If this passage, as Lipsius supposes, be an amplification by Censorinus, of what is written in "the Meteorics," it is a gross misrepresentation of the doctrine of the Stagyrite, for the general bearing of his reasoning in that treatise tends clearly in an opposite direction. He refers to many examples of changes now constantly going on, and insists emphatically on the great results which they must produce in the lapse of ages. He instances particular cases of lakes that had dried up, and deserts that had at length become watered by rivers and fertilized. He points to the growth of the Nilotic delta since the time of Homer, to the shallowing of the Palus Mæotis within sixty years from his own time, and although, in the same chapter, he says nothing of earthquakes, yet in others of the same treatise‡, he shews himself not unacquainted with their effects.

\* Meteor. lib. i. cap. xii.

† De Die. Nat.

‡ Lib. ii. cap. 14, 15, and 16.

He alludes, for example, to the upheaving of one of the Eolian islands, previous to a volcanic eruption. "The changes of the earth, he says, are so slow in comparison to the duration of our lives, that they are overlooked (*λανθάνει*); and the migrations of people after great catastrophes, and their removal to other regions, cause the event to be forgotten\*." When we consider the acquaintance displayed by Aristotle with the destroying and renovating powers of nature in his various works, the introductory and concluding passages of the twelfth chapter of his "Meteorics" are certainly very remarkable. In the first sentence he says, "the distribution of land and sea in particular regions does not endure throughout all time, but it becomes sea in those parts where it was land, and again it becomes land where it was sea, and there is reason for thinking that these changes take place according to a certain system, and within a certain period." The concluding observation is as follows: "As time never fails, and the universe is eternal, neither the Tanais, nor the Nile, can have flowed for ever. The places where they rise were once dry, and there is a limit to their operations, but there is none to time. So also of all other rivers, they spring up and they perish, and the sea also continually deserts some lands and invades others. The same tracts, therefore, of the earth are not some always sea, and others always continents, but every thing changes in the course of time."

It seems, then, that the Greeks had not only derived from preceding nations, but had also, in some degree, deduced from their own observations, the theory of great periodical revolutions in the inorganic world, but there is no ground for imagining that they contemplated former changes in the races of animals and plants. Even the fact, that marine remains were inclosed in solid rocks, although observed by many, and even made the groundwork of geological speculation, never stimulated the industry or guided the inquiries of naturalists. It is not impossible that the theory of equivocal generation might have engendered some indifference on this subject, and that a belief in the spontaneous production of living beings from the earth, or corrupt matter, might have caused the organic world

\* Lib. ii. cap. 14, 15, and 16.

to appear so unstable and fluctuating, that phenomena indicative of former changes would not awaken intense curiosity. The Egyptians, it is true, had taught, and the Stoics had repeated, that the earth had once given birth to some monstrous animals, which existed no longer; but the prevailing opinion seems to have been, that after each great catastrophe the same species of animals were created over again. This tenet is implied in a passage of Seneca, where, speaking of a future deluge, he says, "Every animal shall be generated anew, and men free from guilt shall be given to the earth\*." An old Arabian version of the doctrine of the successive revolutions of the globe, translated by Abraham Ecchellensis †, seems to form a singular exception to the general rule, for here we find the idea of different genera and species having been created. The Gerbanites, a sect of astronomers who flourished some centuries before the Christian era, taught as follows:—"That after every period of thirty-six thousand years, there were produced twenty-five pair of every species of animals, male and female, from whom animals might be propagated and inhabit this lower world. But when a circulation of the heavenly orbs was completed, which is finished in that space of years, other genera and species of animals are propagated, as also of plants and other things, and the first order is destroyed, and so it goes on for ever and ever ‡."

\* Omne ex integro animal generabitur, dabiturque terris homo inscius scelerum. Quest. Nat. iii. c. 29.

† This author was Regius Professor of Syriac and Arabic at Paris, where, in 1685, he published a Latin translation of many Arabian MSS. on different departments of philosophy. This work has always been considered of high authority.

‡ Gerbanitæ docebant singulos triginta sex mille annos quadringentos, viginti quinque bina ex singulis animalium speciebus produci, marem scilicet ac feminam, ex quibus animalia propagantur, huncque inferiorem incolunt orbem. Absolutâ autem cœlestium orbium circulatione, quæ illo annorum conficitur spatio, iterum alia producuntur animalium genera et species, quemadmodum et plantarum aliarumque rerum, et primus destruitur ordo, sicque in infinitum producitur.—Histor. Orient. Suppl. per Abrahamum Ecchellensum, Syrum Maronitam, cap. 7 et 8. ad calcem Chronici Oriental. Parisiis, e Typ. regia 1685. fol.

Fortis fell into a singular mistake in rendering this passage, imagining that the number twenty-five referred not to the pairs of every animal created, but to the number of new species created at one time; and hence the doctrine of the Arabian sect appeared to coincide somewhat with his own views; and, to be consistent with his hypothesis, that man and some species of animals and plants are more modern than others.—Fortis, Mem. sur l'Hist. Nat. de l'Italie, vol. i. p. 202.

As we learn much of the tenets of the Egyptian and Oriental schools in the writings of the Greeks, so many speculations of the early Greek authors are made known to us in the works of the Augustan and later ages. Strabo, in particular, enters largely, in the Second Book of his Geography, into the opinions of Eratosthenes and other Greeks on one of the most difficult problems in geology, *viz.*, by what causes marine shells came to be plentifully buried in the earth at such great elevations and distances from the sea. He notices, amongst others the explanation of Xanthus the Lydian, who said that the seas had once been more extensive, and that they had afterwards been partially dried up, as in his own time many lakes, rivers, and wells in Asia had failed during a season of drought. Treating this conjecture with merited disregard, Strabo passes on to the hypothesis of Strato, the natural philosopher, who had observed that the quantity of mud brought down by rivers into the Euxine was so great, that its bed must be gradually raised, while the rivers still continued to pour in an undiminished quantity of water. He therefore conceived, that, originally, when the Euxine was an inland sea, its level had by this means become so much elevated that it burst its barrier near Byzantium, and formed a communication with the Propontis, and this partial drainage had already, he supposed, converted the left side into marshy ground, and that, at last, the whole would be choked up with soil. So, it was argued, the Mediterranean had once opened a passage for itself by the Columns of Hercules into the Atlantic, and perhaps the abundance of sea-shells in Africa, near the Temple of Jupiter Ammon, might also be the deposit of some former inland sea, which had at length forced a passage and escaped. But Strabo rejects this theory as insufficient to account for all the phenomena, and he proposes one of his own, the profoundness of which modern geologists are only beginning to appreciate. "It is not," he says, "because the lands covered by seas were originally at different altitudes, that the waters have risen, or subsided, or receded from some parts and inundated others. But the reason is, that the same land is sometimes raised up and sometimes depressed, and the sea also is simultaneously raised and depressed, so that it either overflows, or returns into its own place again. We must therefore ascribe the cause to the ground, either to

that ground which is under the sea, or to that which becomes flooded by it, but rather to that which lies beneath the sea, for this is more moveable, and, on account of its humidity, can be altered with greater celerity\*. “*It is proper,*” he observes in continuation, “*to derive our explanations from things which are obvious, and in some measure of daily occurrence, such as deluges, earthquakes, volcanic eruptions, and sudden swellings of the land beneath the sea ; for the last raise up the sea also, and when the same lands subside again, they occasion the sea to be let down. And it is not merely the small, but the large islands also, and not merely the islands but the continents which can be lifted up together with the sea ; and both large and small tracts may subside, for habitations and cities, like Bure Bizona, and many others, have been engulfed by earthquakes.*” In another place, this learned geographer, in alluding to the tradition that Sicily had been separated by a convulsion from Italy, remarks, that at present the land near the sea in those parts was rarely shaken by earthquakes, since there were now open orifices whereby fire and ignited matters and waters escaped ; but formerly, when the volcanoes of Etna, the Lipari Islands, Ischia, and others, were closed up, the imprisoned fire and wind might have produced far more vehement movements†. The doctrine, therefore, that volcanoes are safety-valves, and that the subterranean convulsions are probably most violent when first the volcanic energy shifts itself to a new quarter, is not modern.

We learn from a passage in Strabo ‡, that it was a dogma of the Gaulish Druids that the universe was immortal, but destined to survive catastrophes both of fire and water. That this doctrine was communicated to them from the East, with much of their learning, cannot be doubted. Cæsar §, it will be remembered, says, that they made use of Greek letters in arithmetical computations.

\* “*Quod enim hoc attollitur aut subsidit, et vel inundat quædam loca, vel ab iis recedit, ejus rei causa non est, quod alia aliis sola humiliora sint aut altiora ; sed quod idem solum modò attollitur modò deprimitur, simulque etiam modò attollitur modò deprimitur mare : itaque vel exundat vel in suum redit locum.*”

Postea, p. 88. “*Restat, ut causam adscribamus solo, sive quod mari subest sive quod inundatur ; potiùs tamen ei quod mari subest. Hoc enim multò est mobilius et quod ob humiditatem celerius mutari possit.*”—Strabo, lib. ii.

† Strabo, lib. vi. p. 396.

‡ Book iv.

§ l. vi. ch. 13.

Pliny had no theoretical opinions of his own, concerning changes of the earth's surface ; and in this department, as in others, he restricted himself to the task of a compiler, without reasoning on the facts stated by him, or attempting to digest them into regular order. His enumeration of the new islands which had been formed in the Mediterranean, and of other convulsions, shew that the ancients had not been inattentive observers of the changes which had taken place on the earth within the memory of man.

We shall now conclude our remarks on the opinions entertained before the Christian era, concerning the past revolutions of our globe. No particular investigations appear to have been made for the express purpose of interpreting the monuments left by nature of ancient changes, but they were too obvious to be entirely disregarded ; and the observation of the present course of nature presented too many proofs of alterations continually in progress on the earth to allow philosophers to believe that nature was in a state of rest, or that the surface had remained, and would continue to remain, unaltered. But they had never compared attentively the results of the destroying and reproductive operations of modern times with those of remote eras, nor had they ever entertained so much as a conjecture concerning the comparative antiquity of the human race, and living species of animals and plants, with those belonging to former conditions of the organic world. They had studied the movements and positions of the heavenly bodies with laborious industry, and made some progress in investigating the animal, vegetable, and mineral kingdoms ; but the ancient history of the globe was to them a sealed book, and, although written in characters of the most striking and imposing kind, they were unconscious even of its existence.

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