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EXTRACTS FROM AN ANNIVERSARY ADDRESS

Delivered before the Newburgh Lyceum of the Natural Sciences, November 11th, 1823—By the Rev. James R. Willson, A. M.

“ On the subject of GEOLOGY, but little of your time shall be occupied; the word, derived from $\gamma\eta$, (terra), and $\lambda\omicron\gamma\omicron\varsigma$, (ratio), signifies an account of the earth, and is limited chiefly to its exterior structure, and original formation. The term, which is of modern adoption, expresses what was formerly known by the name of COSMOGONY, $\kappa\omicron\sigma\mu\omicron\varsigma$, (mundus), and $\gamma\iota\nu\omicron\mu\alpha\iota$, (nascor), the birth, or generation of the world, except that under the word $\kappa\omicron\sigma\mu\omicron\varsigma$, was included the universe. The wild, utterly absurd, and clashing hypotheses, of the Egyptians, Babylonians, Grecians, and Chinese, and the theories of modern philosophers of Europe, such as those of Buffon, Whiston, Fontenelle, Hutton, &c. rendered Cosmogony ridiculous, and the name was abandoned while the thing has been retained under the term Geology. But as some deference must be shown to the inductive philosophy, the

science, as it is called, has been confined to our earth, and professes to proceed on the principle of induction. Towards erecting a theory of the formation of our planet, very little, however, has been accomplished. Two theories divide the ranks of geologists: the Vulcanian and the Neptunian. The former term is derived from Vulcan, the name of the heathen God of Fire; the latter from Neptune, the heathen God of the Ocean. In plain English, the fire theory and the water theory. The Vulcanian maintains that fire was the element by which all solid substances of the earth were held in solution in ancient chaos—the Neptunian, that water was the solvent: as they all take for granted the Mosaic account of the earth's "having been without form." The Neptunian theory is the more prevalent. It is sometimes called the Wernerian theory, from Werner, its great advocate in Germany. Among all these we have not the egg of the Pythagoreans, from which the universe was said to have been hatched, nor volcanoes in the sun, throwing out planets, nor comets striking them off as splinters; but we have what is not less wild and visionary—many thousand of years occupied in the successive formation of plants, marine animals, land animals and men; we have many universal deluges; whole continents submerged, with all their inhabitants, and ocean's bed heaved up into continents, with stupendous chains of mountains towering to the heavens; vast lakes drained; channels of mighty rivers opened; natural bridges fabricated; interminable strata of rocks manufactured from oyster shells, and thousands of coal-pits, where whole forests were charred in the bosoms of mountains, under the beds of rivers, and below the bottom of the seas. All this is dignified by the name of Science, while it is

no more worthy of the name than the Cosmogony of Sanconiathon. The very names by which the classifications of rocks have been called refer to these baseless theories—*primary*, those formed at first—*secondary*, those made perhaps thousands of years afterwards—and *transition*, those neither made at first, nor afterwards, but at some intermediate period.”

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“BOTANY, which unfolds the laws of the vegetable kingdom, introduces us into a higher region of philosophical enquiry, and lays open a wider, more diversified, and richer field of investigation, where life pours forth her exhaustless treasures of beauty on the innumerable ranks that adorn this department of her vast and glorious empire. But what is life endowed with energies so marvelous—life, that is propagated through millions of generations—life, that displays its attributes in forms so multifarious, so beautiful, so magnificent? I may not, I cannot here attempt an answer. This beautiful science, long lingered like a sickly plant in a sterile soil, however much labour had been bestowed upon it by Solomon, who wrote of plants from the hyssop on the wall to the cedar of Lebanon, by Dioscorides, by Pliny, and by other philosophers of antiquity, and of times nearer to our own, until Linnæus took it under his skilful culture. For plants the whole mineral kingdom, with all its treasures, were created, and by the products of plants almost the whole animal kingdom is nourished. They are then surely worthy of all the attention which philosophy has bestowed upon them.”

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“This would seem to be the place to draw the lines of demarcation among the mineral, vegetable, and animal

kingdoms. Probably we can find none more happy than those marked out by Linnæus, in his *Systema Naturæ*: "*Mineralia crescunt, sed non viventia, vel sentientia; vegetabilia crescunt et vivunt, sed non sentientia; animalia crescunt vivunt et sentiunt.*"* It is true that the shades by which the vegetable kingdom seems, like the colours of the rainbow, to commingle with the mineral kingdom on the one hand, and the animal kingdom on the other, render the application of these distinctive attributes, in many cases, difficult. If it be true, as has been maintained of late with great plausibility, that the coral rocks are not the product of insects, but that they grow by the circulation of fluids through an appropriate vascular system, then they seem, in the growing state, almost to live, while some sea plants appear to grow almost without life. The sensitive plant seems to be endowed with some property that bears the most striking resemblance to feeling: the same may also be affirmed of the *Dionæa muscipula*, or Venus' fly-trap, and some others; while the polypus, the sea anemone, and some other animals, seem to grow almost without feeling. Indeed, there is one instance in which the mineral and animal kingdoms appear to be united: that of the *crustaciæ*, which are covered with a mineral case; and, in fact, all animal bones being formed of the phosphate of lime, ally their possessors to minerals. It is often said that, in the gradation of being, the higher and lower orders are linked together by a chain extending from an atom to an angel. But this is Poetry and not Philosophy. The connection of the various ranks may be compared to a web, or

* Which translated is as follows:—Minerals grow, but do not live, nor feel; vegetables grow and live, but do not feel; animals grow, and live, and feel.

a net-work, rather than to a chain ; for should a whole species be destroyed, the connection would not be broken, like that of a chain, by the destruction of a link, but would remain fixed, adhering by innumerable other ligaments."

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"On one other topic only, I request that your patience will indulge me a little—the aspect of these sciences, in relation to the institutions of revealed religion. Others have very ably illustrated their benign influence on political economy and national prosperity, on which topics, we need fear no exaggeration. The direct tendency of all science is to exalt national dignity, to secure rational liberty, and to promote national happiness. If it ever produces other and malign effects, it is by a perversion of its natural tendencies. But I leave the illustration of these topics to others, and invite your attention to one more novel, and not less interesting. I am not aware that any of the modern sciences, with the exception of geology, has been thought to wear an unfriendly aspect to the religion revealed in the Bible ; and yet it is true, that many of their most distinguished cultivators have made an effort to array them in an attitude of hostility to Scripture revelation. On this subject, the friends of Christianity never have had any thing to fear. The storms that rage along the mountain's brow do not even threaten its stability. In relation to Geology, where the enemy thought to intrench himself but a few years ago, the cultivators of that science are now eager to wipe away the reproach, and to assert that the facts which it discloses are friendly to the Mosaic history of creation. That the facts are so, I have no doubt,

though this cannot be admitted of many of the theories erroneously erected on the facts. However often Cuvier and his followers may make the declaration, and labour to substantiate it, his theory of the world having existed for very many thousands of years, before man was created, and of numerous general deluges, never can be made to harmonize with Bible history ; and it is astonishing, that Dr. Jamieson, his translator, a Christian minister, should have committed himself before the Christian world as their advocate. He alleges, indeed, that every day in the Mosaic account of the creation may have embraced a duration equal to several thousands of our years, and thus he makes room for Cuvier's tedious formations, many deluges, submersions, &c. But all this is perfectly gratuitous, without even a shadow of proof, and utterly unworthy of so respectable a man. To interpret *one day* to mean a thousand years, when the phrase is no where used in the Scriptures, or in any other book in that sense, is contrary to every canon of sound criticism. Such a use of the phrase would be calculated to mislead the common reader for whom especially the Bible is written. But this may fairly be dismissed, until some proof is adduced to render it at least possible.

The objects presented to the student of modern science appear, on a superficial view, to be thrown together in splendid confusion, as an inattentive reader of the Bible might imagine, with respect to its communications. But a nearer inspection of both discloses the most perfect harmony, order and concinnity, of the several parts composing the whole. Every individual, species, and genus, occupies the proper place, and is necessary to the perfection of the system. He whose mind has

been habituated to penetrate and appreciate the harmonies of the great kingdom of nature, and to admire the stability of the laws, by which Heaven governs the diversified works of his hand, will find his intellectual faculties addressed to a similar, though incomparably more exalted, task in surveying the sublime and glorious harmonies of the system of revealed religion; where his mind may expatiate over an ample field, awakening the finest and the noblest emotions.

The knowledge of the works of the Creator ought to lead the mind to the contemplation and adoration of their Author, and the more accurately they are examined, the greater the effects; for the glorious attributes of the Deity, revealed in the Scriptures, are inscribed on the laws by which creation is governed. Let the youth of the church cultivate these pursuits, as far as their opportunities will allow, and their whole character will be improved, and their influence extended.

Whatever tends to promote national industry, refinement, peace, liberty, and knowledge, has a beneficent effect upon Christianity; for the professor of religion is a member of the civil commonwealth, and partakes of all the national blessings. The bounties of Heaven may indeed be perverted, by an attempt to divorce them from religion, to which they are naturally allied; but this affords no evidence that their innate tendencies are inauspicious to the immortal interests of man.

Let us look, too, at the facts that are brought to light in the pursuit of these liberal studies. Many plants, from the islands in eastern seas, migrate westward, by a slow progress, as their seeds float on the waves raised by the trade winds, and they are still ad-

vancing, like the emigrants from Europe, into regions of which they have not yet taken possession. The Mississippi, the Po, and the Nile, are pushing forward huge sand-banks into the seas where they discharge their waters. The sands from the Lybian deserts are moving onward, impelled by western winds, towards the banks of the Nile. Coral groves are multiplying annually, in the Red Sea, Indian Ocean, and other places; and lakes are filling up with the exuviae of plants and aquatic shells. A minute observation of the progress making in these, and other similar processes, demonstrate that the age of the world must be nearly that assigned to it in Biblical chronology. The order of creation, too, as given by Moses, is confirmed by facts which geological investigators have collected. According to the Bible history, plants were created before animals; and vegetable exuviae are found invariably in strata lower than those of animals: and these latter lower than the remains of human beings, the last work of creation. The general deluge recorded in the Scriptures is amply confirmed by the petrifications of marine animals found on the highest mountains—by whole groves found buried under ground: as well as the skeletons of animals. On the earth, and on all its inhabitants—men, animals, and plants, there are inscribed some traces of the great outline of the history contained in the Old Testament. To decypher these inscriptions is one part of the business to which the student of modern science must address himself.

Again, much of the imagery of the Scriptures is drawn from the three kingdoms of nature, and cannot be fully appreciated, nor its exquisite beauty felt, in so lively a manner, by any one who has not made some

progress in the study of the inhabitants, and laws of these kingdoms. Thus the lights of modern science shed fresh lustre on the sacred pages, and present, in more glowing colours, the heavenly garniture of Scripture truth. Whatever the labourers in the field of natural history may intend, they are hewers of wood and drawers of water to build the temple of the Lord. With truth it is affirmed by the poet—

“An undevout astronomer is mad.”

We may with equal truth affirm, an undevout natural historian is mad. Who can—who dares to contemplate the stupendous operations going forward in the mineral, vegetable, and animal kingdoms, on a scheme so magnificent and glorious, all conducted by an Almighty invisible agency; and all, however vast and complicated, advancing with the utmost harmony, without acknowledging the being of a God? This acknowledgment is not very remote from a belief in the divine authority of the Bible; “For he that cometh unto God must believe that he is.” Who can contemplate the drowning of the world in a mighty, universal and appalling deluge, without admitting that Heaven “executes wrath upon him that doeth evil?”

But many cultivators of modern sciences are not the friends of revealed religion. What then? Did Leo X. Lorenzo de Medicis, and their family, intend, by their efforts for the revival of letters, to promote the reformation of the sixteenth century? Was it easily foreseen that the resuscitation of the Greek and Latin poets, historians, orators, and philosophers, from the graves in which they had been buried for centuries, would be one of the means of rescuing the doctrines

and the institutions of revealed religion from the mass of rubbish, under which they had long been concealed from the greater part of Europe? All this we now know is true. It may not be easy to trace the whole connection of cause and effect in the results of the labours of that powerful and opulent Italian family in forwarding the reformation; and yet no one doubts that such a connection did exist. There is not now any ancient literature to revive. We have it all embodied in our literary institutions, and treasured up in the libraries of the learned. We may not expect to derive from this quarter any new auxiliary forces, to aid in the destruction of superstition and dissipation, of ignorance, and to be employed as a power operating indirectly in accelerating the march of Christianity. In the modern sciences we may look for fresh auxiliaries in this great and glorious course: auxiliaries far more powerful than the former; for the glory, symmetry, and beauty, of the works of nature, and the laws which pervade, govern, and harmonize every part of her empire, incomparably transcend all the productions of Grecian and Roman taste and genius.

In confirmation of these views, we may adduce the remarkable fact, that the institution of Bible societies, and the triumphs that the Bible cause is gaining in Christian and heathen nations, were preceded by the creation of the modern sciences, as the commencement of the reformation was by the revival of letters; and the modern sciences and the Bible, march together as did the cultivation of ancient literature, and the reformation of the 16th century. While the greater lights of revelation are kindling among heathen nations, the lesser lights of modern science, are kindling in the

firmament of nature, to demonstrate, that the God of the Bible and the God of nature is the same God over all blessed forever.

TRAVELS OF TITUS IN THE UNITED STATES.

(Continued from page 170.)

Next morning taking leave of the intelligent and respectable Mr. T——, the iron manufacturer, Bonaface yet in bed, Donald and I set forward on our journey from Ligionier. We continued on the magnificent highway along which we had been travelling. It is paved with stone from Philadelphia to Pittsburgh, in a manner resembling the military roads made in England by the ancient Romans. The large waggons, more similar to some large machine of war, than the peaceful car of commerce, as they crowded the road, bearing to the west the products of every clime, some of them laden with not less than three tons, and drawn by six stately horses, never ceased to excite our attention, and afford topics of pleasing reflection. How astonishing the connections that bind together the great family of man! These vehicles are the means of rendering the western planters tributary to the Chinese cultivator of the tea plant, on the other side of the globe. We met this morning a stage coach of a line which sets off every day in the week, except Sabbath, from Philadelphia and Pittsburgh, and in four days and a half performs the route of three hundred miles, traversing this great range of mountains, laden with passengers and news from all nations. In little more than five days intelligence from New-York, the great emporium of foreign news,