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A table of contents for *Journal of the Transactions of the Victoria Institute* can be found here:

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POSTSCRIPT.

(Pp. 10, 11, 12, 14.)

1. Since this pamphlet was originally written and published, Dr. Colenso has returned to Natal, and he has there repeated the same statements he made in England "as to the science of geology flatly contradicting Scripture." In doing so (if the newspaper reports are to be relied on), he referred to Dr. Temple as having publicly declared the same thing while preaching in St. Paul's cathedral. I am almost certain that I am correct in saying (p. 10) that he also said this when preaching in Whitehall Chapel; so that it would appear to be his habit to go about preaching what is only calculated to discredit the Scriptures among the ill-informed and those who, apparently like himself, have learnt nothing as to the changes that have taken place in the conclusions of the most eminent geologists since the *Essays and Reviews* were published.

2. In addition, therefore, to the citations already given in the text, from Sir Charles Lyell's Address as President of the British Association at Bath in 1864, I now cite the following passages from the Anniversary Address of Mr. Hamilton, the President of the Geological Society of London, delivered in February, 1865, which ought, as a matter of common literary decency, to stop this constant "preaching" that anything worthy of the name of geological "science" has contradicted or upset the Scriptures. He said:—

"Recent investigations have upset the ancient theories, that all the highest points consisted of crystalline rocks, and that no sedimentary rocks formed high mountains. Again it was formerly supposed" [and relied on as "certain science" in the "Essays and Reviews"] "that the crystalline rocks, particularly granite, owed their origin to igneous action. Now it is well known that these granites are chiefly arranged in layers. The granite passes into gneiss, and the gneiss into mica-schist and talc-schist; and this is again closely connected with the green and grey slates; and it is well known that many of these rocks, formerly considered as plutonic, are really metamorphosed rocks."

3. Now, in making this citation, I am not saying whether Mr. Hamilton's views are right or wrong, or whether I agree with him or not. I quote him as an "authority," like Sir Charles Lyell, speaking *ex cathedra scientiæ* to a scientific body, and declaring that what *was* called geological science as to granite, for instance, when the "Essays and Reviews" were written, is no longer regarded as science in the Geological Society of London, whatever it may be in the pulpits where Dr. Temple preaches, or among the Zulus at Natal; but, on the contrary, is itself now "*upset*." If Mr. Hamilton is wrong in his views as to the granites being "*chiefly arranged in layers, and stratified*—if

that is meant, then that will only still further show how very uncertain, after all, even the *quasi* "facts" of science sometimes are, as well as the scientific "theories" that thus get *upset* by fresh investigations. Mr. Evan Hopkins, in reference to these words of Mr. Hamilton, says:—"The primary crystalline rocks are formed in parallel *vertical* bands, not stratified, but divided in plates like crystals. . . . The distinction that exists between the semi-crystalline *vertical bands* of the primary series, and the *stratified sedimentary* rocks, is not yet fully recognized."*

4. As Mr. Hopkins was one of the first, if not, rather, the very first geologist who disputed the "plutonic," or dry-heat origin of the granites, in the first edition of his valuable and interesting work, which was written in South America so far back as 1837-38, and published in London in 1843, he is entitled to a deferential hearing upon this cognate point. But my object throughout this pamphlet, and with reference to *all* the questions of science alluded to in it, is not to show that this or that has been "established" in any case, but to show how scientific opinions have changed, and that further investigations are necessary before we can boast we have got hold of any real science at all. I find it necessary to say this much, as one or two gentlemen have managed to persuade themselves that I have necessarily adopted the opinions expressed in some of the citations and references in the text (which might or might not be true, and yet be of no consequence), but which is not really warranted by the language I have used, and not at all necessary for my argument. I have quoted recognized authorities in science against Bishop Colenso, Dr. Temple, and Mr. Goodwin; and I have quoted men whose views in science were despised, and who were refused a hearing at one time, but whose views are now accepted, as so far correct, by such authorities.

5. I go on, therefore, to make one more citation from Mr. Hamilton's Address, with reference to other changes in geological views:—

"We are daily becoming more convinced that no real natural breaks exist between the Faunas and the Floras of what we are accustomed to call geological periods. . . . We learn now that those forms of animal life which roamed over the surface of the earth before man came to *exercise* dominion over them, were not, as was at one time supposed, destroyed before his arrival, but continued to coexist with him, until the time came when they were to make way for other forms, more suited to the new conditions of life and to his requirements."

This, it will be observed, bears upon the remarks in the text (p. 12), made in allusion to Sir Charles Lyell's "Antiquity of Man." But, again, I beg leave to say I am not adopting Mr. Hamilton's opinions any more than Sir Charles Lyell's upon this point. Were I to express my own opinion, I would venture to say that, though I hold it to be clearly proved (as *now* acknowledged by these eminent geologists) that man was contemporaneous with animals at one time supposed to have been destroyed ages before his "arrival" on the scene

* *Geology and Terrestrial Magnetism*. By Evan Hopkins, C.E., F.G.S., 3rd Ed., with a new Introduction and Appendix, &c., p. vii. (London: Taylor & Francis, Red Lion Court, Fleet Street, 1865.)

of this world, I do not, therefore, admit the great antiquity of man. *I think it remains to be proved that the extinct animals are of the great antiquity that has been assigned to them.** Bearing in mind that Mr. Hamilton says, "We are daily becoming more convinced that no real natural breaks exist between the Faunas and Floras of what we are accustomed to call geological periods," I think the following remarks are worthy of consideration.

"The first step in the false inductions geology made, arose from the rash deduction that the order in which the fossil remains of organic being were found deposited in the various strata, necessarily determined the order of their creation; and the next error arose from blindly rushing to rash conclusions and hasty generalizations, from a very limited number of facts and the most imperfect investigations. There were also (and indeed are still) some wild dogmatisms as to the time necessary to produce certain geologic formations; † but the absurdities of the science culminated when it adopted from Laplace the irrational and unintelligible theory of a *natural* origin of the world from a nebula of gaseous granite, intensely hot, and supposed to be gradually cooled while gyrating senselessly in space. This necessitated the further supposition of a long lapse of ages before this gas-world cooled down; when again it was supposed that a hard granite crust would be the result, with the still hot liquid granite-matter inside! Then it was supposed (whence or how not explained) that rain would fall upon the hardened granite, and that it would break up into soil, gravel, &c., &c., in the course of another lapse of ages or millions of years; and so on and on, always supposing some fresh occurrence, without the most remote attempt at explaining how any one of them could have naturally occurred, and always allowing ages upon ages to intervene, as if to give time enough for totally inadequate causes to produce the continued series of improbable effects, which, without a Deity and without a design, were to result in this glorious world!

But, although we have now got rid of the "Azoic" strata, and the Azoic ages of this world of ours, it is nevertheless worth while to suggest that, even had they existed, and even had all the fossils ever discovered been embedded exclusively as was long supposed to be the case, this would not have afforded any proof of the sole existence of the lower orders found in the lowest strata at any particular time; but only that such animals as naturally

* In a Paper read in the Royal Institution of Great Britain by the eminent geologist Mr. Prestwich, on the Flint Implements found at Amiens, he said,— "That the evidence as it then stood, seemed to him as much to necessitate the bringing forward the extinct animals towards our own time, as the carrying back of man to the geological times." (Quoted from *Cosmogony*, by Evan Hopkins, Esq., C.E., F.G.S. Second Edition, 1865: Longmans.)

† In an able review of Sir William Logan's *Geological Survey of Canada*, which appeared in *The Times* of 21st of October, 1864, the following remark occurs, with reference to arguments based upon these "immense geological periods":—"In order to expose the fallacy of such an argument, it would be only necessary to appeal to a few of these Canadian geological monuments, the true interpretation of which, we believe, will establish the fact that the element of time has very little share in the alteration and crystallization of the sedimentary rocks."

occupied the bottom of the oceans were the first to be embedded, when the first deposits of sediments were thrown down into the waters.

Were the world even now overwhelmed with a flood, and great masses of earths of various kinds carried violently into the sea, it must be evident that sponges and sea-anemones, and other lower orders of living organisms in the sea, which inhabit or are fixed at its bottom, would immediately be embedded in the sediment, while only an occasional fish might be poisoned or otherwise accidentally covered over. In time, however, the waters might become unfit even for the fish to live in, and many of those dying would be embedded in other sediments [superimposed]. As the waters rose, the reptiles and amphibæ would next be drowned and embedded; while land animals would mostly for a time escape to the higher grounds. But were the waters still to rise, even they, and also man at last, would be swept away, though, probably, in most cases their carcasses would not be embedded in sediments, but floated and dashed about, to be left [in caves, or] on the surface of the earth, and to waste away on the subsequent subsidence of the waters. Moreover, at the time of Noah's flood, it must be remembered, that many parts of the world may have then had no human inhabitants, and that strata formed in such regions would therefore necessarily be wanting in the remains even of human workmanship, though man might have lived contemporaneously in other regions of the globe, and his remains might be embedded there.

But no traces of man having been found by geologists in what was then supposed to be the oldest strata, it was concluded that man did not exist on the earth at all when these strata were formed; and long periods and intervals were therefore assigned between the time of the various formations."

This was published before Mr. Hamilton's Address was delivered. And now (the author goes on to ask), when the evidence of man's co-existence with certain extinct species of animals is admitted by the authorities, what is the consequence?

"Not a modest consideration of the whole series of geologic theories, which had rashly proclaimed Holy Scripture untrue, but which have been found to be really untrue themselves; but only further rash and extravagant generalizations, with a fresh atheistic theory tacked on to the others, to render the whole again somewhat more plausible! The long times and intervals between the various formations and the "geologic periods" are not given up; but only the abrupt divisions between each are abandoned, and man is now pushed further back into 'antiquity,' and is supposed to have been originally a savage, developed by some unexplained process, in the course of millions of ages, out of a gorilla or chimpanzee!" *

7. These observations by an anonymous author are, of course, not quoted as of any "authority," but only as a view of the whole state of the case that may fairly be entertained. Having alluded to Professor Ansted (on p. 14) as sending the official answer to Dean Cockburn, refusing to re-open the discussion of the nebular theory in the Geological Section of the British Association in 1844, I have the satisfaction of being now able to quote from

* *Fresh Springs of Truth* (chapter on "The Scriptures and Science"), pp. 104, 105, 113-115. (London: Griffin & Co., 1865.)

what that learned Professor has more recently written in his *Geological Gossip*; and which will be found an ample justification of the very strongest things I have said throughout this pamphlet. I commend Professor Ansted's candid remarks to the special consideration of Dr. Colenso, Dr. Temple, and the two or three gentlemen who have favoured me with somewhat hypercritical strictures upon some sentences in the Circular of 24th May and the *Scientia Scientiarum*.

"An account (says the distinguished Professor) of the correction of the mistakes in geology might furnish matter for many amusing and instructive chapters in a work like the present. Few of the younger geologists of the day, and fewer still among general readers, have any idea of the extent to which opinions have become imperceptibly modified in many important departments of geological science within the last quarter of a century, while there have not been wanting several absolute and formal recantations enforced from time to time by direct discovery. The great cause of this is to be found in the inveterate habit that almost all of us have of over-estimating the value of negative evidence.

Geologists examine a certain district, and remark the absence of some objects or group concerning which there seems no good reason why it should not have been handed down as perfectly as some others that have been preserved. At once the theorist jumps to the conclusion that the tribe of animals not represented had not been created. A theory is soon built up on the strength of it; for no one can oppose it without having the *onus probandi* thrown upon him. But some fine day the required fact is discovered, often to the disgust of the theorists, to the equal vexation of the student, and it would almost seem to the annoyance of everybody.

The first impulse of human nature is to put the unlucky discovery on one side—say nothing about it:—most likely it will bear investigation, and therefore don't let us have the trouble of investigating it! It is so painful to be stopped in a pleasant career of progress, and to be obliged to examine carefully, and weigh fairly, the evidence in regard to a matter we thought settled when we began work some twenty years ago.*

A troublesome Frenchman—M. Boucher de Perthes—took it into his head that some remains of men ought to be found in gravel. M. Perthes, although he found plenty of specimens, and published an octavo volume about them, and even offered his specimens to the *savants* of Paris, could not obtain a hearing. Few readers, either in France or England, seem even to have been aware of his book. The subject was tabooed, because people's minds were quite made up on the subject, confiding in the strength of the negative evidence, which really meant little more than a total absence of inquiry."

* One of my critics recently boasted in print that he continued now to teach the same geology he had done for fifty years!