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## ARTICLE VI.

## PROFESSOR HUXLEY VERSUS GENESIS I.

BY CHARLES B. WARRING, PH. D., POUGHKEEPSIE, N. Y.

SOME twenty years ago, Professor Huxley said "the students of nature will no longer trouble themselves with these theologies," referring to the narratives found in Genesis. The prophecy remains unfulfilled, for every little while we have proof that "these theologies" still cause some students of science a good deal of trouble. That which gives the most, if one may judge by the number of attacks which have been made upon it, is the Story of Creation given in the first chapter of the book. Professor Huxley has tried his great powers of argument and sarcasm on it, I do not know how many times. His most notable assault was made a few years ago in the *Nineteenth Century*, based on an alleged fatal disagreement between the order of life as laid down in Genesis, and the true order as revealed by geology. In that article he states a number of facts as to the order in which various creatures made their first appearance upon our globe, all of which are very true, but which, it is no disparagement to say, add nothing to the knowledge of any one who has given a moderate degree of attention to any of the excellent manuals of geology which have appeared during the last few decades.

I must confess to a feeling of disappointment in regard to his treatment of the account which he criticises. It was not too much to expect of one trained to original research, accustomed to give little weight to authority, and priding himself upon his devotion to truth irrespective of consequen-

ces, that he should cut loose from traditional beliefs, and see for himself just what that chapter says. It may seem very magnanimous in him to admit what its defenders and friends say it means, perhaps it was intended to be magnanimous, but one can hardly avoid the suspicion that it was only the policy of the chess player who gives away a castle to win a queen.

"Yes," he says, "I will grant the interpreters of Genesis almost anything, but one fact they must admit; there is in this account one central idea which cannot be explained away, and by which it must stand or fall. It teaches that the animal species which compose the water population, the air population, and the land population, originated in four distinct and successive periods of time, and only during those periods." Or, if I may put the same idea in another form, Professor Huxley asserts that Genesis teaches that there were no land animals before cattle, no flying creatures before birds, no water creatures before "great whales," and I may add, no plants before "grass, herbs and fruit trees."

That this is the Genesis of tradition cannot be successfully disputed, but whether it is the actual teaching of the account itself is quite another question. Professor Huxley regards the affirmative as too nearly self-evident to need argument. Had it been a matter pertaining to anything in science, he would be the last to accept traditional teaching without vigorous questioning, and then, having arrived at what he believed the truth, he would wait for the world to come over to his views, undisturbed by the thought that the consensus of former generations was against him.

The only way to know what this story really teaches is to study its own words, and not what somebody says it says. It professes to tell of things before man was created, and, therefore, it must be either a revelation from God, or the work of some ancient worthy who believed in one God, maker of all things, and who, as his thoughts took form, put

them in the words which we now have. The last is the theory which Professor Huxley adopts. He must therefore believe that the plants and animals of which that chapter speaks, were those and those only which were contemporaneous with man, because its writer could have no knowledge of any before them, and as the pictures on the monuments prove there has been no change since, they were the same in kind as those of our own day. If, on the other hand, we adopt the other theory, and believe God the author of the story, we are forced to the same conclusion, for certainly God knew too much, if he intended to speak of the first plants on our globe, to style them grasses, herbs and fruit trees; or, if he purposed to speak of the introduction of animals, to include among the first living creatures "whales" (or vertebrates of any kind) and fowl; or to mention as among the first of land animals "cattle." Hence, whichever theory we adopt, we must believe that this account was intended to speak only of now living plants and animals. Therefore, we need inquire only whether the present flora and fauna, the species now living, did in fact appear on the earth in the order of sequence given in this account.

Turning to the first chapter of Genesis, we see that the land vertebrates are represented as produced after the vertebrates of the water and the air, these occupying but one period. And that earlier yet were brought into existence the plants of to-day. If some ancient student of nature, looking over the broad landscape, had asked, which of the forms of life which delighted his eye, or of which he had heard, came first into being, which second, and third, and last, the answer he could read in this book was: Of the organic forms now before you, the plants are the oldest; at a later epoch appeared the "great whales" and birds; and still later, the cattle, and the beasts, and the creeping things. Last of all came Adam.

This is all in the account pertaining to the order of life,

is it correct? Count de la Saporta in his "Le Monde des Plantes," page 380, says: "The vegetable world acquired its characteristic traits long before the animal kingdom had completed its own; so that probably before the end of the tertiary, the principal groups, and even the genera which compose the immense majority of our actual floræ were established in the limits which they still occupy." In regard to species, he says, page 342: "Let us not forget to remark, the European species still living (*encore viventes*) already occupy their actual country since the end of the pliocene. They affect, with secondary variations and shadings more or less pronounced, the same characteristics as in our days." Present grasses, herbs and fruit trees, therefore, reach back into the pliocene. None of the higher animals then living, now survive according to Dana and others. In his "Manual of Geology," 3d ed., page 518, Professor Dana says: "All the fishes, reptiles, birds and mammals of the tertiary are extinct." In a true scheme, therefore, living vertebrates should be placed after living species of plants.

Present kinds of water vertebrates and fowl appeared in the next later period, the quaternary, and "no extinct species of fishes, amphibians or reptiles of that period have been found." As to the birds, they are all living except a few species, such as the moas, the dodo, and a few others which have died out in very recent times.<sup>1</sup>

As to cattle, and other mammals, they came still later, for "the mammals of the quaternary are, nearly all extinct."<sup>2</sup>

Le Conte, in his *Geology*, page 569, says,—I condense it—the mammals of the miocene are all extinct; after them in the pliocene, came another set, also extinct; then in the

<sup>1</sup> See Professor Nicholson, "Life History of the Earth," page 345.

<sup>2</sup> Dana, "Manual of Geology," 3d ed., page 563.

quaternary, another which also has disappeared; and last, came the present species, the living mammals of to-day.

Whatever doubt there may be as to the broadness of these statements, their truth in a very wide sense is beyond just question. The order of life which they give is identical with that in Genesis. Whatever dispute, therefore, Professor Huxley may have with its author, he must settle with these and other eminent geologists who, without being conscious of the bearing of their words upon this chapter, have so clearly sustained it.

Professor Huxley makes a great point of the fact that in the last creative period, and with cattle, are placed "the creeping things," or "rehmes." This word, he says, must mean "reptiles," and they, according to geology, came long before cattle. Hence, he concludes the order is fatally wrong. But there is no need of making "rehmes" mean reptile. With utmost exactness it is translated, "the thing that moveth" on the ground, whether by walking, or by creeping, or by crawling. It refers to that vast host of creatures, neither cattle nor beasts, which with them compose the present land fauna. And, as to the order, it is true that of the almost infinite number of living species which would be classed among the "rehmes," a large proportion have not been traced any further back than the cattle and beasts of which Moses speaks.

I fail, therefore, to see the error in the order which he has given.

But it may be said, there can be no doubt that Moses, or whoever it was, thought there were no plants before grasses, herbs and fruit trees, and no animals before whales, fishes and birds, and that was what he really meant to teach. I am unable to see what his belief as to the existence of earlier species—probably he had no belief about it—has to do with the matter. We are not considering his

views on paleontology, but simply whether he has placed in their true order the plants and animals of which he wrote. The case might now go to the jury, but the subject is too important to drop here. The fact that whatever the writer thought, his story is correct, offers a problem which requires a satisfactory solution. Possibly, if this were all of the account, one might say that the order came by chance aided probably by the good common sense of the writer. For what was more natural than to put land plants before land animals, but why put them before water animals? Why put birds with the water creatures instead of with the land creatures? If it is found, as I think it will be, that an equally correct order extends through the rest of the account, the number of items being large, the problem becomes insoluble on any theory which denies to its author actual knowledge, either personal or second hand, of the history of our world.

It would be impossible in a brief article, such as this is intended to be, to discuss with any sort of justice, this remarkable document. All that can now be done is to give its physical statements, all of them, in their unchanged order, interpolating in italics what seems to me helpful in bringing out the meaning.

What Genesis says:—

1. In the beginning God created the heaven and the earth.
2. The earth *at that early stage* was without form<sup>1</sup> and void.

<sup>1</sup>“Without form” is an unfortunate translation of “tohu.” Professor Huxley says, “However irregular matter may be, it has form as truly as the most symmetrical crystal.” What form, pray, has the chick in a new laid egg? or the water yet in the cloud, which is to fill my cistern? The egg has form and so has the cloud, but the chick and the water for my cistern, are as yet without form. It is not, therefore, because this meaning does not suit my purpose that I would substitute another. Tohu has no English synonym. We can get at its sense only by collating other texts in which it is used. We shall find that it means that which is nothing, or close upon nothing.

3. And *before motion*, darkness covered the deep.
4. And the Spirit of God moved upon the face of the waters.<sup>1</sup>
5. And *after motion* there was light.
6. And God saw the light that it was good.
7. And, *after that verdict*, God divided between the light and the darkness.
8. And God called the light Day, and the darkness he called Night.
9. And the evening and the morning *following* were numbered as the first day in that series of six which divide this story into six stages.

(Up to this time in our world's history, water existed only as separate gases, or as vapor which formed clouds hundreds of miles in thickness, and excluded the light of the sun. The next operation, therefore, necessary for the making of a world capable of sustaining life, was to reduce that thick envelope of clouds. And the next thing we read of in this account is just such an operation.)

10. And God made an expanse in the midst of the waters and divided the waters which were under the expanse from the waters which were above the expanse.<sup>2</sup>

11. The expanse was not pronounced good.

As, for example, in Isaiah, "They trust in vanity" (tohu); "graven images are all of them vanity" (tohu); "turn aside the just for a thing of naught" (tohu); "all of them are vanity" (tohu); "molten images are wind and confusion" (tohu). It is exquisitely applicable to the earth while an unsegregated part of the cosmic nebula, and many millions of times more tenuous than air.

<sup>1</sup>Mahyim "waters" is from a root signifying to flow, and is the exact equivalent of our word fluid, and it is applicable to any non-solid substance, hence to nebulous matter.

<sup>2</sup>The Hebrew word is "rakia," literally a thinning out with violence and noise. Expanse is poor indeed to represent the wealth of meaning in the Hebrew word, but it is the best we have. I suppose it is unnecessary, at this late day, to say that firmament is the grossest of mistranslations, for which we are indebted to what was once called "science."

See article on this word in Bibliotheca Sacra for July, 1879, or, a reprint of it in Genesis I. and Modern Science.



12. And the evening and the morning *following* were the second *divisional* day.

*Geology proper begins in the next verse.*

13. And God said, Let the waters be gathered unto one place, and let the dry land appear: and it was so.

14. And God saw it was good, *i. e., complete, final.*

15. And the earth brought forth grass, the herb yielding seed, and the fruit tree bearing fruit (*the plants of to-day*).

16. And God saw that it was good, *completed, or a finality.*

17. And the evening and the morning were the third *divisional* day.

18. I pass over the next stage, because it would require far too much space to do it any kind of justice. I will say only this, that in my opinion it has nothing to do with the creation of the sun and moon. It was a command to "the lights in the firmament of heaven" to be for signs and for seasons, and for days and years. In brief, it has to do with the introduction of seasons, and all that that implies. I hope at another time to discuss exhaustively the questions involved.

19. And God created great whales (tannim) and every living creature which moveth, which the waters brought forth abundantly after their kind.

20. *And at the same time, fowl.*

21. And God saw that it—*this water and air fauna*—was good, *i. e., final, fully complete for its purpose.*

22. And the evening and the morning *following* were the fifth *divisional* day.

23. And God *next* made the beasts of the earth and cattle, and everything that creepeth on the earth.

24. And God saw that it was good, *final, completed.*

25. And God created Adam.

26. And the evening and the morning *following* were the sixth day.

When much more is known about the primitive man, we shall be better able to dogmatize about the time of his appearance. Till then, I, for one, am content to wait.

The great importance of the subject is my apology, even at the risk of being tedious, for giving a sort of bird's-eye view of this extraordinary account.

God.

Creation of heaven and earth.

*The earth's earliest condition.*

It was without form (tohu) and void.

Darkness covered it.

Motion is imparted.

Light begins to shine.

It is pronounced good light.

A division is made between the light and the darkness, and day and night begin.

An open space, or an expanse, is made in the midst of the water.

The expanse not good.

The land appears and the seas are formed.

The land and waters are good, finished, no further change.

Present vegetation appears and is pronounced good, no new kinds since.

Seasons begin and are pronounced good.

Present water animals and birds appear at the same time, and both are pronounced good, i. e. no new species.

Living kinds of land animals are produced and are pronounced good, i. e. the finishing up of the land creatures.

Adam was created.

Of "these theologies" I hardly think this one will be annihilated even under Professor Huxley's stalwart blows. Possibly it may rise in his estimation, if he will ask himself how science would be affected if it should turn out that the statements in this account, or their order, are untrue. If, for example, it should be proved that the heavens and the earth had no beginning, what would become of that latest addition to science, Tait's "Degradation of Energy"? If the earth never was without form (tohu), it never was in a gaseous condition, and the foundation of every possible form of nebular hypothesis is annihilated, and Professor Huxley would have to take back that part of his New York lecture in which he said, "The physical form of the earth can be traced back to a condition in which its parts were separated as little more than a nebulous cloud, making part of a whole in which we find the sun and planets also resolved."

And as to the order, if that is wrong, how, for example, would all theories of light fare? For how could light precede motion? And what dependence can be put on spectroscopy, if light did not become good light until after cosmic evolution had made a division between light and darkness, i. e., after day and night had begun? And what of geology, if the order of life here given is wrong?

Whether all this was a mere guess on the part of some ancient sage each must answer for himself, but on any calculus of probabilities, the chances seem infinitely against it.

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Since the above was written, my attention has been called to an article in the *New York Tribune* of February 12, in which Professor Huxley is said to have recently restated his position. The following is given as his reply to Mr. Gladstone's order of life:—

"It was agreed on both sides that, according to Gen. i. 20-25, 'creeping things and beasts of the earth' and 'every-

thing that creepeth on the ground' appeared on the sixth day, while 'winged fowl' had come into existence on the fifth day; and it was not disputed that 'winged fowl' included birds, and 'creeping things,' reptiles. Consequently, if my assertion that, according to natural science, birds appeared on the earth after reptiles, is correct (and it has not been challenged), it follows that the teachings of natural science, so far from affirming the order given in Genesis, diametrically contradict it."

Here we have it again, the Genesis of tradition, which assumes that Moses undertook to tell of the long procession of life from its dawn in the Eozoic, down through millions of years to Man. It requires small knowledge of geology to prove that this would carry with it contradiction of science. But all that the real Genesis speaks of, is the present living head of that procession, all else of which is buried out of sight. The order of the appearance of the four classes which compose this head, is a very different question. Will Mr. Huxley say that present plants of rank as high as grasses, herbs, and fruit trees, did not appear before the present vertebrate air and water "populations"? and that these did not appear before the present land vertebrate "population"? If he cannot do this, I am unable to see on what grounds he can refuse to admit that the Genesis order of life is correct.

I submit that it will not be enough to show that here and there a species even of land mammal now extinct extends back into the tertiary. To disprove the Genesis order, he must show that as to a preponderance of living plants and animals, it is not true.

Of course everybody knows that the first fishes made their appearance before reptiles; the first reptiles before birds; the first birds most probably before mammals; and the first mammals before present fruit trees, and most probably before any kind of angiosperm, but as Genesis speaks only

of those kinds of plants and animals which are now living, man's contemporaries, the order of the others, however interesting in itself, or important as a matter of science, is in reference to Genesis, wholly irrelevant.

I cannot leave this account without speaking of a curious peculiarity in the wording of verses 21 and 25, a peculiarity which becomes luminous in the light of modern discovery. If the reader will turn to the first chapter of Genesis, he will see in verses 20 and 24, God's commands to the water, and to the land, to produce water creatures, and fowl, and cattle, beasts, and creeping things, and that nothing is said as to the comprehensiveness of the fiat. All, or every, does not occur in it. But in verses 21 and 25, we read that God created, or made, the creatures which the water and the land had been required to produce, and furthermore that he made, or created, every living creature that moveth in the water, and every winged fowl, and everything that moveth (creepeth) on the earth. The record of the work done is wider than the command, a fact easily explained, if the author knew that among the animals contemporaneous with man, were some that had existed before those called for in the fiats, and, meaning to include them also in God's claim to creatorship, he added that God made every living creature, those that came into existence then, and also all that had come down from an earlier period.