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ARTICLE VI.

THE COSMOGONY OF GENESIS.

PROFESSOR DRIVER'S CRITIQUE OF PROFESSOR DANA.

IN the BIBLIOTHECA SACRA for April, 1885, Professor Dana published an article, on the Cosmogony of Genesis, which has attracted wide attention. Twice, since, Mr. Gladstone has occupied the last page of *The Nineteenth Century*¹ with special communications calling attention to the weighty truths set forth in this article. And now, after two years, the Regius Professor of Hebrew in the university of Oxford, England, feels called upon, in the *Andover Review*,² to attempt a rebuttal of the numerous points in it which conflict with his own article in the *Expositor*, published about the same time.

We are glad to see that Dr. Driver is not inclined to take undue advantage of his own superior acquaintance with Hebrew, and so to shield himself behind a barricade of technical knowledge, but is ready to admit that the question at issue lies so near the surface that an ordinary British jurymen can hope to decide intelligently between the opposing specialists. Without, therefore, presupposing any more knowledge in ourselves than in the average British jurymen, we are permitted by Dr. Driver to come into the field and give our impressions of the weight of argument as presented by these two eminent authorities. We feel constrained, however, to make one further preliminary remark as to the spirit of the disputants.

We confess to no little surprise that Dr. Driver should accuse Professor Dana of *misrepresenting* facts for the sake of a theory, and of deflecting the sense which the text of Genesis legitimately expresses, *in order to gain his point*. But the exact language used by the Hebrew professor (italics, punctuation, and all) is as follows: "Thus the *facts*, though revealed, are *misrepresented* [by Professor Dana], for the sake of a theory!" (P. 647.) And again, "Professor Dana is too sound and genuine a scientist to deflect the facts of science, even by a hair's-breadth, for the sake of harmonizing them with the book of Genesis; he does not hesitate, in order to gain the same object, to deflect the sense which the text of Genesis legitimately expresses" (p. 648). Far be it from us to retort with similar charges; but the way is certainly opened for us to speak with plainness.

Professor Driver is probably correct in his unwillingness to allow Professor

¹ January, 1886, p. 176; August, 1886, p. 304.

² December, 1887, pp. 639-649.

Dana to take advantage, in his scheme for harmonizing Genesis and geology, of a difference among commentators as to the interpretation of Hebrew words and phrases, since it is the truth itself, and not the opinions of commentators, with which we have to do, and the geologist cannot evade his own responsibility of deciding as to which of the commentators he will follow as most trustworthy. Dr. Driver, however, himself attempts to take such advantage in case of disagreement among scientific authorities. But in attempting to set Professor Huxley and Professor Pritchard in the scientific field over against Sir J. W. Dawson and Professor Dana, he has fallen into a curious misconception as to the character of the field in which these scientific men are found contending; since it seems, on examination, that in respect to the cosmogony of Genesis these worthy champions are not contending in the scientific arena at all, but in the exegetical. We happen to know that Professor Dana's summary in the *BIBLIOTHECA SACRA* of the facts bearing on the question in hand has been accepted by Professor Huxley as correct. Mr. Huxley's forte in the discussion seems then to consist largely in sneering at the elasticity of a literary document like the first chapter of Genesis which can be accommodated to so vast and complicated a scheme of development as is brought to view by modern science. Where Professor Huxley sneers, we find Professors Dana, Guyot, and Dawson adoring the Providence that has kept this important literary document from being cast in such form that it should be in continual conflict with the physical discoveries of later ages. Professors Dana and Huxley differ, therefore, not about science, but in their appreciation of a most important piece of sacred literature.

It appears, also, from Professor Driver's own quotations, that Professor Pritchard's disagreement with Professor Dana is not at all upon scientific points, but upon questions of the interpretation of Genesis. Dr. Driver's quotation from Professor Pritchard is as follows: "That it (the Proem of Genesis) could not originally have been intended to give a scientific account of creation in its precise order, or method, or limitation of time, I am convinced, when I read of (1) the existence of waters before the appearance of the sun: (2) the clothing of the earth with fruit-trees and grass, each bearing its fruit, before the creation of the sun: (3) the successive orders or stages of creation, occupying each one single day" (p. 640).

Upon this quotation in general it is pertinent to remark that Professor Dana does not claim, or need to claim, that the first chapter of Genesis is a "scientific account of creation" in the technical sense of that word. The cosmogony of Genesis has, throughout, the sustained sublimity of Hebrew poetry. But even poetry may reveal the author's familiarity or unfamiliarity with the scientific truths underlying the representation. A chief merit of Professor Dana is that he approaches the first chapter of Genesis with due appreciation of its literary and rhetorical character, and knows the difference between a detailed scientific account and an attempt to summarize, in a few sublime utterances, at the beginning of a long series of revelations, the

salient facts concerning the origin and development of that material universe which was to be the scene of man's tragic fall and glorious redemption.

But let us notice Dr. Pritchard's statements more particularly. He cannot believe that the Proem of Genesis was originally intended to give a "*scientific*" account of creation, because he reads in it (1) "of the existence of waters before the appearance of the sun." But, it will be observed, the whole difference between him and Professor Dana turns upon the interpretation to be given, in such a piece of literature, to the word "waters." That "waters" is not the scientific term which would be applied, at the present time, to the nebulous matter out of which the universe in its present order has been developed, is freely admitted and expressly stated by Professor Dana. But what Professor Dana claims, is, that, in the state of knowledge, or rather of prevailing ignorance, at the time of the composition of this Proem, we are not sure that any better word than that translated "waters" could have been chosen for the figurative representation of the chaotic state of the universe which is affirmed by the writer originally to have existed. Here, then, it is not a question of science, but of exegetical judgment, which separates the two scientific authorities.

A similar result is arrived at from an examination of Dr. Pritchard's second point. He says that he cannot believe the Proem of Genesis could have been intended to give a "*scientific*" account of creation, because (2) the representation of "the clothing of the earth with fruit-trees and grass, each bearing its fruit, before the creation of the sun," is unscientific. But here, too, it is a case of rhetoric, and not of science, which is in dispute. Professor Dana does not affirm that vegetables were created before the sun, but he contends that the record of the fourth day's work may legitimately refer to something else than the original formation of the sun and moon, namely, to their first appearance through the phosphorescent swaddling-band of cloud which must for long ages have enveloped the earth, and when first they began to assume their appropriate offices of dividing the day from the night, and of serving for signs and seasons, and for days and for years. It should be noticed that creation is not the only word used in describing the events of the fourth day. The account of that day opens with the phrase "Let there be lights in the firmament," and then follows the expressions "Let them be for signs," etc., and "Let them be for lights...to give light upon the earth," etc., and the account closes with the affirmation that God made two great lights, and set them in the firmament to give light upon the earth, and to rule over the day and the night. Professor Dana can justly claim that this sustained description of the work of the fourth day is to be considered as a whole, and is to be interpreted under those limitations to the exact literalism of the words with which the characteristic Hebrew poetic parallelisms make us familiar. And in respect to the creation of fruit-trees and grass upon the third day, Professor Dana may also justly contend that the creation of the germs out of which the higher vegetation has ultimately developed may be properly regarded as the creation of the whole; that the essential thing in this description is a proper definition of the vegetable

kingdom, as having its seed in itself. Otherwise, as Mr. Gladstone has said, a man might contend, that as, according to the sacred writer, "Every winged fowl" was produced on the fourth day of the Hexaëmeron, therefore the birth of new fowls continually is a contradiction to the text of Genesis."³ And on this principle, also, Professor Bowen's objection to the derivative origin of species would be valid, namely, that, since according to his metaphysical theory every *individual* is a fresh creation, it is absurd to speak of *species* as derived. It will be seen, a little later, that both Professor Driver and the scientific authorities with whom he allies himself are led into their attitude of opposition to Professor Dana, not so much by their science or their exegesis, as by their metaphysics. Professor Dana would not contend that fruit-trees and grass were created on the third day, any more than that Shakespeare and Milton were created in the Garden of Eden, and yet, doubtless, he would freely speak of the human race, with all its possibilities of development, as created at that time. The initial point of the creation is that to which, in summary language, attention is fittingly directed, and around which the skilful writer will cluster the salient features of the future developments of that creation.

Again, Professor Pritchard asserts that he cannot believe the Proem of Genesis could "originally have been intended to give a scientific account of creation," because he reads there (3) of "the successive orders or stages of creation, occupying each one single day." Here, again, it will be observed that it is not a question of science at all on which he differs from Professor Dana, but it is wholly a question of exegesis, namely, the latitude which in such a piece of literature may legitimately be given to the word "day;" and this is a point upon which Dr. Driver disagrees with Pritchard and agrees with Dana, using in this very article the following words: "Professor Dana's interpretation of 'day' as period, I am ready to accept. I do not indeed feel sure that it is right; but (as I have stated elsewhere), I think it reasonable to allow that it may have been used consciously by the writer in a figurative sense, as a part 'not of the reality, but of the representation;' and I am not prepared to recede from this position" (p. 643). Thus Dr. Driver himself discredits the third position of Professor Pritchard.

Another point worthy of remark is suggested by what Dr. Driver says concerning the statements of Guyot and Dana, respecting the original creation of the universe. Here the distinguished professor of Hebrew carries the war into Africa, and boldly ventures into the field of science himself to combat these eminent men on their own ground; but examination shows that the Hebrew scholar is armed for the encounter neither with scientific nor with exegetical facts, but only with bad metaphysics.

Dr. Driver makes light of Guyot and Dana for making reference to "inert" matter (pp. 642-643), and says that Professor Dana does not state what he considers to have been "the condition of 'inert' matter," and asks, with apparent triumph (italicizing the whole question), "*Is it a fact that the matter of which a gas is composed is inert?*" This question is followed by a

³ *The Nineteenth Century*, January, 1886, p. 8.

quotation from Professor Tait calling attention to the enormous activity of hydrogen gas, stating that every particle in a mass of hydrogen has, on an average, "17,700,000,000 collisions per second with other particles," which, he well says, does not look like "inertness." He complains, also, that "Professor Dana offers no definition of the properties or appearance of 'inert' matter,—of matter prior to its endowment with heat and other molecular activities" (from which it would appear that Dr. Driver does not know what "inert" matter is), adding "A competent British scientist, intimately acquainted with astronomical physics, to whom I have submitted this part of the present article, permits me to say that, in his judgment, 'inert' matter is inconceivable, and unthinkable."

These remarks are somewhat curious, and we may be permitted to show their nature by asking a few questions ourselves. And, in the first place, we should like to know if Dr. Driver rejects every fact which any competent British scientist considers to be "inconceivable and unthinkable." Does he suppose that the universe can be measured by, or God's work can be limited to, the realm of reality which his friend is able to comprehend? If so, he will find himself with a very meagre equipment of beliefs. Does Dr. Driver believe in the eternity of matter, or in its creation? He will find either of these alternatives (one of which must be true), quite beyond the powers of conception possessed by his scientific friend. Again, when Dr. Driver, on Tait's authority, refers to one particle of hydrogen colliding with another particle, what is it that collides? Are those ultimate particles inert or not? or does this motion belong to their essential nature? Does Dr. Driver deny to matter the property of inertia?

It is pertinent to remark, further, that we gladly avail ourselves of some of the principles of interpretation endorsed by Dr. Driver, as, for example, when he grants (p. 64) the correctness of Professor Dana's statement, that man's comprehension of any idea communicated to him by another is conditioned by the amount and character of the knowledge and beliefs already possessed by him, though insisting that the accommodation which this principle implies must be restricted within "*reasonable* limits." And again (p. 646), speaking of the classification of plants in Genesis, Dr. Driver says, that it "is evidently borrowed from popular use, and it would be unfair to limit each particular with scientific rigor. But the terms must be interpreted with *reasonable* fidelity." We have italicized the word "*reasonable*" in these two cases, for on the meaning of that word the whole discussion turns. What are the *reasonable* limits of elasticity or of accommodation which may properly be assigned to a word in such a passage of literature as we find prefacing the divine revelation of the Bible? Upon this point Dr. Driver says (p. 642), "Our only means of learning what the nature of a communicated idea is, is the language used by the recipient for the purpose of expressing it; and if the idea has been transformed in his mind in the manner supposed, there is no revelation or communication of truth whatever. If that which the recipient expresses stands in no intelligible relation to the reality which

it is the purpose of the revelation to communicate, the reality remains unknown."

This position will not bear investigation, since it unwarrantably limits the meaning of the teacher by the present capacity of the pupil; whereas it is a true and familiar principle that a superior genius is permitted to use words (as God uses the phenomena of nature) in a pregnant sense—that is, to use language which will be more and more fruitful of meaning as the recipient advances in experience and powers of comprehension. The whole Old Testament economy is full of such divinely chosen words and symbols; whose deepest meaning could only appear to those who had enjoyed the light of the Christian dispensation. Many of the words of Christ remained enigmas until after his resurrection. "Destroy this temple," he says, "and in three days I will raise it up," referring to his body and to his resurrection. But there is no more resemblance between his body and the temple than there is between Guyot's gaseous atmosphere and the original meaning of the Hebrew word *mayim*. And so, repeatedly, the sayings of Christ are said to have been incomprehensible until the later experiences shed upon them their backward rays of light. Indeed, he said it was his purpose to speak to them in parables, that they might misunderstand if they would. The reward of knowledge, both in the study of the facts of nature and of grace, is bestowed only upon those who earnestly seek and patiently wait. "What I do," says Christ, "thou knowest not now, but thou shalt know hereafter." We challenge, therefore, this whole position upon which Dr. Driver and others like him plant themselves, when they assume that the language of the Old Testament had no deeper meaning than the dull minds of the original recipients were able to get out of it. It is the misleading principle of rationalism, and is contrary to the whole teaching of the New Testament concerning the Old. From beginning to end, the law and the prophets spoke of Christ, but in language whose meaning was to a great degree hidden to the original speakers and auditors.

The true principle of accommodation, as applied to the passage under consideration, may be stated thus: If the cosmogony of Genesis is true, there is necessarily an altogether unique difficulty in interpreting its language—a difficulty which pertains to no other portion of the Bible and to no other ancient document. In the first place, the scientific facts are presented in language strictly popular. This is the case for the double reason that when the account was written, scientific language had not yet been invented, and that even if it had been at command it would have been permanently unintelligible to the mass of men. But the use of popular language by no means always creates a serious difficulty in apprehending the facts which an author aims to state. If we are already otherwise familiar with the true nature of the phenomena, and with the fixed popular usage of language regarding them, we interpret such language as readily and as accurately as the strict phraseology of science. Thus the expression, "the sun rises," although only popular and, strictly taken, false, is yet used with such uniformity of a well-known daily phenomenon that even savants avail them-

selves of it as convenient and unambiguous. This is perhaps the simplest illustration that could be selected. Where the facts are less common, and popularly less often observed and spoken of, the sense of popular statements becomes more difficult to determine; and this difficulty increases exactly as the rarity of observation and report. Still the interpreter's duty is plainly the same in all cases, namely, to study the nature of the facts in themselves and the uniformities of such usage of language as exists. But the difficulty of interpreting popular language reaches its climax, and becomes unique, when the phenomena have never been but once observed, and cannot be observed again, and have never been but once stated, so that there is an absolute absence of usage. What language shaped to express the facts of this late day must be understood to mean when applied to the phenomena of an inchoate world, it is hard to say. Obviously many words must lose part of their common connotation. After our best efforts, an uncertainty must attach to all the details of the interpretation of the cosmogony of Genesis,—such as belongs to no other chapter of the Bible,—and jests at the elasticity of the Hebrew language will always find apparent justification in the hesitation of conscientious exegetes.

The value of the cosmogony is not therefore destroyed. In spite of the almost insuperable difficulties of translating popular language, so used, into its precise scientific equivalents, we may yet derive from it such right impressions of the order and method of creation as shall deliver us from superstition, and enlighten us as to the true relations of God and man and nature.

Coming, now, to the main question, and assuming only the privileges allowed by Dr. Driver to the "humblest layman," who "lacks all special knowledge" of the technicalities submitted to him, we also will take upon ourselves "to decide whether the sequence taught in a scientific manual agrees or not with the sequence of Genesis, and whether the advocacy of Professor Huxley and Professor Pritchard on the one side, or of Professor Dana and Sir J. W. Dawson on the other, is the more logical and conclusive" (p. 641).

Fortunately, we have a statement of the two important systems to be harmonized in small compass and accepted by both parties. The translation of the cosmogony of Genesis incorporated into Professor Dana's article in the *BIBLIOTHECA SACRA*, is endorsed by Dr. Driver (p. 641) as one with which he has "no fault to find except in one not very important particular." This translation, though appearing before the revised version of the Old Testament, substantially agrees with it in nearly every point, and exactly agrees with it in the point to which Dr. Driver would take some exception, Professor Ballantine and the revisers translating a phrase in the twentieth verse "in the open firmament" where Dr. Driver would translate "In front of the firmament." At the same time, also, as already remarked, the condensed statement of scientific facts bearing upon the question given by Professor Dana in the same number of the *BIBLIOTHECA SACRA*, we know to have been read and assented to by Professor Huxley, the chief counsel on the other side.

In approaching the subject, we do not, however, profess to be entirely unbiassed. We have long been familiar with the whole Bible—perhaps more familiar with it than with science. And we have learned to find the Bible very full of meaning. Indeed, by long familiarity we have come to be more and more deeply impressed with the pregnant character of its utterances, and with the majestic proportions of its system of doctrines, and with the frequency with which new light breaks forth from it when fresh combinations of its numerous elements are made, or when it comes into fresh contact with new facts in history or physical science. Doing, however, the best we can to divest ourselves of undue prejudice, and bearing in mind the charge of the judge, who, in this case, is none other than Dr. Driver himself, to be content with a *reasonable* amount of evidence, we will state in a few words how the matters at issue strike us.

As the conceptions of modern science have unfolded during the past half-century, the parallelism between them and the cosmogony of Genesis has certainly been very striking; and, strange to say, it has not grown less as science has extended its knowledge of nature. The lines of science, we grant, are not continuous; but at so many points is their parallelism with Genesis visible that we are not disturbed at there being certain places where the harmony is not yet seen. In the first place, it is surprising that in the unscientific age in which the book of Genesis was written, the creation of light should have been spoken of so long before the creation of the sun and the moon and stars. But this corresponds with the theory of the nebular hypothesis now pretty generally accepted, since light is the result of chemical action, and must have been one of the earliest accompaniments of the creative process. We do not see that there is anything in the nature of the case to have suggested this order in the creation of light. We might, indeed, suppose it to have been a happy guess if it stood alone. But it does not stand alone. And where a number of happy guesses follow each other in close succession, they cease to be guesses, and reveal an intelligent Designer as the producing cause.

Again, the second stage as mentioned by Genesis speaks in remarkable terms of the formation of the firmament subsequent to the formation of light and previous to the appearance of dry land,—a firmament separating the waters below from the waters above. It would be difficult to choose a brief statement which should more happily express in phenomenal language that stage of creation brought into view by modern science, in which the nebulous matter became localized and segregated into revolving systems such as the astronomer now delights to study. But, according to the writer of Genesis, as well as according to the dicta of science, all this was preliminary to those physical conditions which would render possible the existence of organic life.

Again, according to Genesis, the third stage of progress was marked by the formation of dry land. Upon the third day, also, close upon the appearance of dry land, occurred the beginning of vegetable life, in which the characteristics by which a living species are distinguished from an inor-

ganic substance are most clearly stated. Inorganic substances have no power of reproduction. But the writer of Genesis describes the species of the vegetable kingdom as those whose seed is in itself, yielding seed after its kind. This definition of plants is good for all ages.

If it is objected to this account of the creation of the vegetable kingdom upon the third day, that it describes the higher species of plants, which were introduced only at a much later period, namely, the grass and the fruit-trees, whereas the earliest plants belong to a much lower order of the vegetable kingdom, the same objection might be urged to the account of the creation of the dry land, since that has been going on ever since—new land being formed even at the present day. But we submit that, in so summary an account as this must be on account of its brevity, it is sufficient that the writer, in the words of an eminent Hebrew professor (Professor E. P. Barrows, *BIB. SAC.*, Vol. xiv. p. 91), "describes the establishment of the vegetable kingdom in its laws and general forms which are valid for all the subsequent geological eras. The grand fact revealed is that on the third day the vegetable world was brought into being under the immutable principles which now regulate its operations. . . . The two things made prominent in this account are law, as expressed in the formula 'after its kind,' and general forms,—grass, herb, fruit-trees yielding fruit, whose seed is in itself." Does not "the equity of common sense" admit of such an interpretation, and so affirm a substantial agreement between the two records of geology and Scripture in their account of the third stage in the creation of the world?

The fourth grand stage in the creative process, as described by the writer of Genesis, relates to the establishment of days and seasons upon the earth, through its relation to the sun and moon. They are then set in the firmament to give light upon the earth, and to rule over the day and over the night, and to divide the light from the darkness. Up to this point, we infer, from scientific data, that there was no darkness upon the earth; that though the earth was surrounded by clouds, they were luminous clouds, everywhere shining, like the aurora of the north, from the electrical disturbances which then must have been so abundant. The plants of the coal period were not necessarily dependent upon either the light or the heat of the sun. It is only the higher forms of plants and animals that are specially adapted to this periodicity in the return of both heat and light which characterizes the present order of things. When the earth's swaddling-band of clouds was all one blaze of electric light, the sun did not divide between the darkness and the light, and the moon and the stars did not rule over the night. This description of the sun and moon—as created not only after the creation of light, but subsequent to the creation of plants, both of which are to the common understanding dependent upon the sun—seems to us more than a happy guess, and a thing most unlikely to have occurred as the result of any ordinary motives under which authors write. We have already remarked upon the ground upon which Professor Dana is authorized to regard the description as that of the appearance rather than of the reality.

The fifth grand stage marks, according to Genesis, the introduction of animal life, being confined to fish and fowl; and here, too, the general correspondence with scientific inferences is marked, though we need not be compelled to suppose that every class of winged fowl, and every class of sea-monsters, was actually brought into existence during that period, since, as in the previous cases, the equity of common sense would permit, in so brief an account, some things of the same class genetically connected together to be mentioned by anticipation.

The sixth stage, according to the writer in Genesis, brings us to the introduction of those forms of life most closely connected with man, namely, the cattle and beasts of the earth. Here, also, was the appropriate place to mention the creeping things; since the age of reptiles is joined so closely to that of the mammalian forms of animal life. For brevity's sake and completeness, as Gladstone suggests, they are naturally referred to by *retrospect*, in order, so to speak, to glean the field, as the higher forms of fish are referred to by *anticipation* in the account of the fifth day.

This completes the parallel, and, with Mr. Gladstone, we may well ask in astonishment,⁴ "How came the Mosaic writer to place the fish and the men in their true relative positions not only to one another, and not only to the rest of the animal succession, but in a definite and that a true relation of time to the origin of the first plant life, and to the colossal operations by which the earth was fitted for them all?" "The five origins, or first appearances of plants, fishes, birds, mammals, and man, are given to us in Genesis in the order of succession, in which they are also given by the latest geological authorities" (p. 14).

In view of all these facts, we cannot believe that this extent of parallelisms between the cosmogony of Genesis and the cosmogony of modern science is the result of a series of happy guesses. Certainly no other ancient cosmogony presents any such parallelisms, or could endure any such comparison with modern science. It is true the evidence is not demonstrative, and the harmony is not so complete but that some objection may be urged to it, and some doubt be entertained concerning its reality at all points. But in the main the theory of reconciliation advocated by Professor Dana seems to have been proved beyond *reasonable* doubt, and to be so far proved in its main features as to shed much light even upon the interpretation of the obscurer portions of the record in Genesis. Our conclusion therefore is, as between these scientific experts whom Professor Driver brings forward as the representatives of the rival views concerning the harmony of Genesis and science, that Mr. Huxley's sneers are unworthy of him, and betray in his education an excess of physical and a lack of literary study; that Professor Pritchard's appreciation of the literary and rhetorical elements of the first chapter of Genesis is inadequate; while the views of Professor Dana and Guyot, though perhaps not perfect in every respect, combine that knowledge of science, that familiarity with literature, and that reverence for the grand scheme of revelation unfolded in the Bible, which must commend them more and more to the favorable consideration of the serious and thoughtful Christian public.

⁴ *The Nineteenth Century*, January, 1886, p. 11.