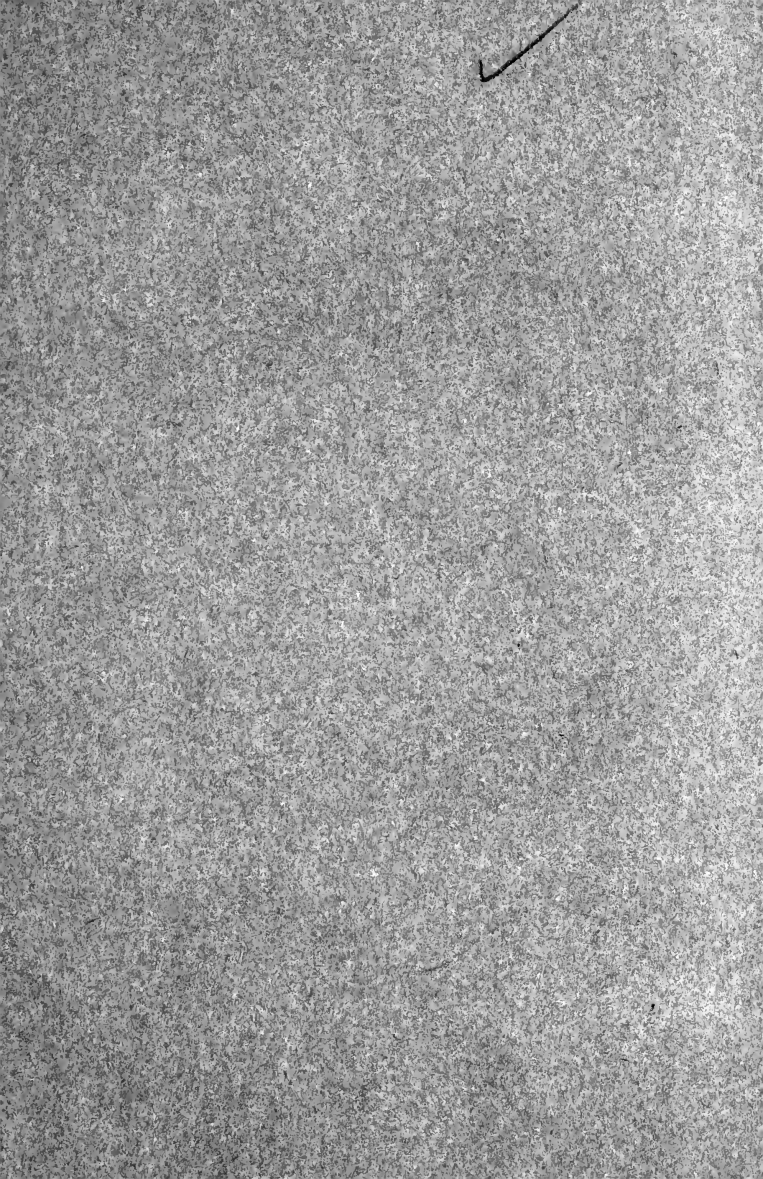




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THE ORIGIN OF THE WORLD

ACCORDING TO

REVELATION AND SCIENCE.

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REVELATION AND SCIENCE.

A LECTURE

BY

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ADVERTISEMENT.

THE following Lecture was composed at the request of the Committee of the Wakefield Church Institute; it formed one of a course, the subjects of which were suggested by the Committee. It was delivered at Wakefield on December 4, 1879, and subsequently at Halifax, Leeds, and Kendal. A rather strong wish having been expressed at several of the above-named places that the Lecture should be published, I thought that the best course open to me was to offer it to the Society for Promoting Christian Knowledge, as one of the Christian Evidence series of publications. It is printed almost verbatim as delivered.

H. CARLISLE.

ROSE CASTLE,
January, 1880.

THE ORIGIN OF THE WORLD
ACCORDING TO REVELATION
AND SCIENCE.

I AM not responsible for the phraseology of the title of this Lecture. I feel bound to admit that it is open to criticism ; and I propose for a moment to criticise it, not for the sake of finding fault, but because it appears to me that the remarks which I make upon the title of my Lecture will be a good introduction to the Lecture itself.

Take the words, " The Origin of the World according to Science." You may have heard of an author who wrote a famous treatise upon " The Natural History of Irish Snakes ;" the treatise was probably the most compendious and the most complete that was ever written ; and it was all compressed into this emphatic sentence, " There are *no* snakes in Ireland." In like manner it might be truly said with regard to the words which I have just now quoted, " There is *no* Origin of the World according to Science."

Science, that is Natural or Physical Science, treats of the laws which govern matter; it studies and arranges and explains material phenomena; it traces back the history of the material universe in the past, and it calculates not a little of that which will be in the future: but it never gets to the actual origin of anything; it works upon that which it finds ready-made to its hands; it is cognisant of no time when matter did not exist, and when the laws of nature were other than they are now. Science means *knowledge*; and it may be safely asserted that the origin of things, lying as it does absolutely outside our experience, belongs to the region of the *unknowable*.

If we consider the other portion of my title, "The Origin of the World according to Revelation," we cannot precisely assert that there is no such origin; but we may assert that even Revelation itself can assign no origin to the world of such a kind as can be brought into comparison with any alleged conclusion of science. What Holy Scripture says of the world is that God made it; and the assertion is a very important one; but it is not an assertion of the same kind as those which can be made concerning the material universe upon the strength of scientific investigations: these

investigations deal with what can be proved and known concerning the things which we see: they cannot by their very nature take any account of a divine hand acting below the surface; the moment they do anything of this kind they cease to be scientific. And therefore a scientific man, so far as he is only a scientific man, may believe in God or not believe in Him; he may be a devout worshipper of Him who has revealed Himself to us in Jesus Christ, or he may be a blank atheist; but whatever may be his belief or unbelief, it does not properly come into contact with his scientific investigations. You will see at once that this is true with respect to the pure sciences, such as geometry and algebra; it is really quite as true, though not perhaps so obviously true, in the case of physical science, which involves observation of facts, legitimate deductions from observations made, conclusions from these deductions, and nothing more.

Hence therefore, if I insisted upon construing my thesis literally and strictly, I might perhaps be led to say that there was no such thing as an origin of the world according to Science, and scarcely anything which could be called an origin of the world according to Revelation; and further, that even if any two things existed

which could be so described, they could not be brought into comparison one with the other, because they would belong essentially to different departments of thought.

And permit me to say that the view of the subject which I have thus brought under your notice is not altogether unworthy of consideration. Men's minds are sometimes perplexed when there is no cause for perplexity. They are told that Science says *this*, and that Revelation says *that*, and that *this* and *that* do not agree, and that therefore one of them must give way. Before however we come to this conclusion, which may possibly involve throwing away that which no wise man would willingly lose, there are three questions to be settled. First, is it quite clear that Science *does* say *this*? Secondly, is it quite clear that Revelation *does* say *that*? And, thirdly and principally, is it quite clear that the utterances of Science and Revelation are so entirely *in pari materie* that they can be brought into comparison with each other, and that they must necessarily impinge? Perhaps what I am going to say presently may illustrate the application of these cautions; anyhow I am sure that the cautions are useful, and also that they are not unfrequently neglected.

But I do not intend to construe the language of my thesis too strictly; and I will tell you what I understand it to mean.

I understand it as expressing the feelings of men who may be supposed to say to me something of this kind: "We have an uneasy feeling that what scientific books tell us about the early condition of the world does not agree with that which we read in the Book of Genesis. Can you tell us whether this feeling is a true one, or only a nightmare? Can you help to allay our uneasiness?"

Supposing this to be the real meaning of the thesis which I have undertaken to discuss, I would say at once that I think the subject is one upon which it is worth my while to speak, and that I will endeavour so to speak that it shall be worth your while to listen. After much careful consideration I have come to the conclusion, that the best course for me to follow will be this. I will endeavour to put side by side the history of creation as we have it in the book of Genesis, and the history of creation as we have it in a certain modern book. I should scarcely have thought that any scientific man would have ventured to describe a work as "The History of Creation;" but there is such a work, and it is by the hand of a man whose

name is well known in the scientific world, Ernst Haeckel, Professor in the University of Jena; the book is translated into English, and I shall refer to the English translation. This book furnishes me with exactly what I want for the purpose of this lecture, namely, a statement of the views of an eminent man of science expressed in a tone as hostile as can possibly be to every kind of religious belief. I shall take this book as representing not what I myself believe to be the "origin of the world according to science," but what might popularly be so described; and I take it as such for the purpose of this lecture, because I think the anti-revelation view could scarcely be put more decidedly or more bitterly. I thus reduce the question to be discussed this evening to that of "The History of Creation according to Moses," *versus* "The History of Creation according to Professor Ernst Haeckel." I shall take each of these books separately, making such remarks as seem to me to be necessary, and then I shall conclude my lecture with some observations which will arise from the comparison of the two.

I. *The "History of Creation according to Moses."*

In dealing with any book, or any document, it is highly desirable to understand in the first place to what class of writing it belongs. In the case of books and documents in ordinary use, this point is generally known without difficulty. If a person takes up the "Times" newspaper, or a number of "Punch," or a volume of "Tennyson," he knows at once what is the character of the writing he has in hand, and treats it accordingly. Without this kind of previous understanding with your author, you may easily get wrong. If you read what Lord Byron says of "solitude" in *Childe Harold*,—you will remember how he tells us that "to sit on rocks, to muse o'er flood and fell," without any companion but nature in her wildest forms, "is *not* solitude;" and that true solitude is to be found in the crowd and buzz of men, none of whom know you, or care for you, or pity you;—if you read this description of solitude, and then look into Johnson's dictionary, you will find that you have got somewhat contradictory definitions: why? because Johnson was a lexicographer, and Byron was a poet. Or, again, when Wordsworth writes so finely, "the

child's the father of the man," he gives an order of generation which would scarcely square with medical science. Nay, even in the case of such a plain-speaking author as the Editor of the "Times," I remember hearing of a foreigner living in England, but presumably not well acquainted with Shakspeare, who, on seeing a leading article one morning commencing with the words, "There's something rotten in the state of Denmark," rushed off to the Stock Exchange for the purpose of selling some Danish bonds before the collapse of such securities should take place.

I have said that with regard to ordinary literature you generally know to what class any book or writing you may take in hand belongs. But this is not so with ancient documents; least of all is it so with the first chapter of Genesis; I do not say that it is impossible to classify it, but I say that it is not obvious at first sight what its class is, and that great errors may arise from an erroneous classification.

(1) Is it scientific? Certainly not. There was no such thing as science, properly so called, at the time at which it was written. If any one should say that it *may* be scientific, because it is given by direct revelation of God, and is therefore independent of the condition of human

knowledge at the time when the revelation was given, I should reply that however supernatural the influence might be under which the document was written, still it must, in order to be intelligible, address itself to the condition of mind and knowledge in which those people were to whom it was addressed : and as the people to whom it was addressed did certainly not possess even the rudiments of science, it is inconceivable that a revelation addressed to them can be properly described as a scientific document.

Moreover, it should be observed, that the height of science of one century may be the depth of ignorance of the next ; at all events scientific conceptions rapidly change. In reality, science properly so called, I mean natural science, is not as yet much more than two hundred years old ; and it would be absurd to deal with a " History of Creation," which dates back some three or four thousand years, as a history to be examined and discussed upon principles which are only intelligible to people of quite modern times, and not even to all, or nearly all, of them.

Still further, there is not the slightest pretence in the " History of Creation according to Moses" to treat the subject scientifically. Wherever the word of God or the hand of God is introduced into any account of natural things,

there science cannot find a place. Every scientific man knows this; he says, "my business is to trace out laws and to go back from one cause to another, but I can admit nothing supernatural." Of course not: the *supernatural* does not belong to *natural* science, by the very force of the terms. This does not prove that the supernatural has no existence; it only shews that any document which involves it is not scientific, and must not be treated as such. Hence, I conclude that a document which is based upon the phrase, "In the beginning God created the heaven and the earth," cannot be regarded as in any proper sense of the word *scientific*.

(2) Is it historical? In a certain sense the name historical might be rightly applied, inasmuch as the first chapter of Genesis undoubtedly undertakes to record events, which actually happened "in the beginning:" in fact we have already described the document as a "*History of Creation*." But it should be observed that in using the epithet *historical*, we do so in a very different sense from that in which the word is applied to ordinary histories. For example, one of the most essential elements of history is *time*. "There was in the days of Herod, the king of Judæa, a certain priest named Zacharias," writes S. Luke in the open-

ing of his Gospel; *that* is the genuine historical style. You can compare such history with other history, examine its authorities, test its accuracy: you can do nothing of the kind with a document which opens with the words, "In the beginning," and then tells you what *God* did. The divine agent, the manner of His action, described as *creation*, and that by means (when any means are specified) of His *spoken word*, the time when the action took place, and the very nature of the action itself, all belong to a region which no history can reach. You may call it, if you please, *transcendental* history, or you may give it some other name of distinction; but you will make a great mistake, and one which may practically be very mischievous, if you sit down to the study of the Mosaic "*History of Creation*" with the same kind of thoughts and the same canons of judgment running in your mind, as those which have a right to find a place there when you read any other historical book.

(3) Is it poetical? This word describes the character of the first chapter of Genesis better than either of those which we have examined already. Hugh Miller has a very fine passage in his "Testimony of the Rocks," in which he treats the several creative days as visions vouchsafed to the eye of Moses in a condition of

trance¹; and Chateaubriand in his *Genie du Christianisme* deals with the whole opening of the Book of Genesis as if it were to be regarded as poetry². On the other hand, Professor Stanley Leathes assures us that the Mosaic history of creation is not poetry, but as genuine prose as ever was written³. It is difficult perhaps to give an absolute definition of poetry; but I think that this may be safely said, namely, that the basis of poetry is truth, but truth told from an imaginative, and not from a matter-of-fact, point of view. When Wordsworth writes "the child's the father of the man," he puts a profound truth in a most

¹ *Testimony of the Rocks*, Lecture IV: 'The Mosaic Vision of Creation,' a charming piece of reading, whether the reader be convinced by it or not.

² See vol. i, chap. v, *Jeunesse et vieillesse de la Terre*. A very curious chapter, in which the author represents the world as called into existence with the birds' nests in the trees, the lambs gambolling with their mothers, the nightingales singing, &c. Had it been otherwise, 'Une insipide enfance de plantes, d'animaux, d'éléments, eût couronné une terre sans poesie.'

³ 'It has been the fashion, with some persons of late years, to speak of the first chapter of Genesis as poetical. To regard it as such has appeared to offer a wider and more convenient latitude of interpretation than to take it for what it undoubtedly is, *plain and simple prose*.'—*The Structure of the Old Testament*, p. 123.

emphatic way, just because his words prosaically taken are a mere paradox. There are some things which can only be described poetically, and the written accounts of which can only be understood when their poetical character is recognised; and I venture to think that any account of that which took place "in the beginning," which involves the conception of "creation," of which we have no experience, which refers to the relation between the unseen God and the visible creation, must in the nature of things belong to this class; if creation, as the work of God, be described at all, it must be poetically, figuratively, imaginatively, by reference to processes of which we have experience, and by means of pictures drawn therefrom.

(4) But once more, has not the "History of Creation according to Moses" a character still more pronounced than the poetical? Is it not above all things moral and didactic? It seems to me quite obvious that the history of the material creation, of the formation of fishes and reptiles, and birds and beasts, and the rest, is merely the framework of the picture of the creation of man. It matters little or nothing what the process was by which the creation progressed from the chaos with which the earth commenced its existence to the settled cosmos in which it became the

home of plants and living things; nor does it matter how long a time the transformation occupied, whether ten thousand or ten million years; but it does concern us very much to know, that, when the earth had been so prepared, God made man "in His own image" and gave him the highest place and the command of all. When I find commentators and general readers troubling themselves about little points connected with the history of creation, and not fixing their minds upon the one great point which gives it all its interest, namely, the creation of man in the image of God, I cannot help comparing such treatment of the precious document with the conduct of a man who holds in his hand his father's will leaving him heir to a vast property, and who engages himself in examining whether the lawyer who drew the will had been particular to cross his t's and to dot his i's.

These remarks will be sufficient to indicate to you the manner in which, according to my judgment, the "History of Creation according to Moses" ought to be regarded. The document is not to be treated as scientific, or as historical, but as in a certain sense poetical, and still more emphatically as moral and didactic. I of course leave out of consideration all question of its character as given by divine inspiration;

the treatment of that question would lead me into a field upon which, for several reasons, I must not enter; all that I have said has been carefully put together for the purpose of being taken up and candidly considered by persons holding different opinions, or even no opinion at all, on the subject of divine inspiration. I trust that the man who is most firmly persuaded that the history of Creation which we have in our Bibles is given by inspiration of God, will have heard nothing from me tending to shake that belief; at the same time I shall be glad if my remarks, and those which are to follow, might prove helpful to those, who either are not so persuaded, or feel their belief in some way or other shaken and tending to slip from their grasp.

As I am going presently to put before you the "History of Creation according to Professor Haeckel," I should like to call your attention to the impression made upon his mind by the "History of Creation according to Moses." It should be observed that the Mosaic history is the only one belonging to ancient times which Professor Haeckel regards as worthy of notice: this in itself is somewhat remarkable; after referring to it in the passage which I am going to read to you, he passes over no less than three

thousand years, as containing no contribution to the history of Creation which would be of any interest, and he comes down with one great leap from Moses to Linnaeus, who flourished less than two centuries back! Now observe what Professor Haeckel says: I must trouble you with a somewhat long quotation:—

“The Mosaic history of Creation . . . has enjoyed, down to the present day, general recognition in the whole Jewish and Christian world of civilization. Its extraordinary success is explained not only by its close connection with Jewish and Christian doctrines, but also by the simple and natural chain of ideas which runs through it, and which contrasts favourably with the confused mythology of creation current among most of the other ancient nations. First, God creates the earth as an inorganic body; then He separates light from darkness, then water from the dry land. Now the earth has become habitable for organisms, and plants are first created, animals later; and among the latter the inhabitants of the water and the air first, afterwards the inhabitants of the dry land. Finally, God creates man, the last of organisms, in His own image, and as the ruler of the earth.

“Two great and fundamental ideas, common

also to the non-miraculous theory of development," [i. e. the theory which Haeckel himself adopts and expounds,] "meet us in this Mosaic hypothesis of creation with surprising clearness and simplicity,—the idea of separation or *differentiation*, and the idea of progressive development or *perfecting*. Although Moses looks upon the results of the great laws of organic development . . . as the direct actions of a constructing Creator, yet in his theory there lies hidden the ruling idea of a progressive development and a differentiation of the originally simple matter. We can therefore bestow our just and sincere admiration on the Jewish lawgiver's grand insight into nature, and his simple and natural hypothesis of creation, without discovering in it a so-called 'divine revelation.' That it cannot be such is clear from the fact that two great fundamental errors are asserted in it, namely, first, the *geocentric* error, that the earth is the fixed central point of the whole universe, round which the sun, moon, and stars move; and secondly, the *anthropocentric* error, that man is the premeditated aim of the creation of the earth, for whose service alone all the rest of nature is said to have been created¹. The former

¹ Does Moses say quite as much as this? "God saw *everything* that He had made, and behold it was *very good*" (Gen. i.

of these errors was demolished by Copernicus' System of the Universe in the beginning of the sixteenth century, the latter by Lamarck's Doctrine of Descent in the beginning of the nineteenth century" (vol. i, p. 38).

There is just one more sentence which I must quote :

"The Bible," writes Haeckel, "is not a scientific book, but consists of records of the history, the laws, and the religion of the Jewish people, the high merit of which, as a history of civilization, is not impaired by the fact that in all scientific questions it has no commanding importance, and is full of gross errors" (p. 39).

I think you will agree with me that, upon the whole, the "History of Creation according to Moses" comes very well and comfortably out of the critical clutch of Professor Haeckel. You will observe that he speaks of it in terms of high commendation, sees in it a remarkable conformity in certain general features with the teaching of exact science, thinks no other ancient cosmogony worthy of notice, regards it in fact as a lofty monument towering up above everything else, and finding no rival for three thousand years; and he specifies only two con-

31). The supremacy of man does not necessarily imply that all nature was created *solely* for him.

spicuous errors,—the *geocentric* error, which is of the same kind as that which we all commit day by day when we speak of the sun *rising*¹,—the other which he calls the *anthropocentric* error, and which is of a much more serious kind. It is an error, says Professor Haeckel, to make man the head of all, and to represent everything as being made subject to him. Is this an error? If so, it is certainly not an exploded one: we act upon it every day: to kill a thousand monkeys is at the most only *unjustifiable monkeycide*, but to kill a man is *murder*. And how has Lamarck exploded it? By the doctrine of descent; that is, by the hypothesis that man in his perfection was developed out of something else: he could not be developed out of anything more lowly and more vile than that which is assigned as his origin by Moses, namely, the dust of the earth. But if man had been developed—well, it matters not how,—what does it signify? the result is that which concerns us; and no doctrine of descent can ever make plain men believe, that there is not an essential dignity in man separating him from all other

¹ This kind of language, it is scarcely necessary to say, is used without offence in ordinary conversation and in popular books; but it may be worth while to add that it is so convenient that it is permitted freely in scientific treatises.

creatures, something corresponding to that which is so finely described by Moses, when he says that God "breathed into man's nostrils the breath of life," and so made him "a living soul!"

But observe that this *anthropocentric* error, if it be one at all, is a moral not a scientific error. It is the business of natural science to examine man's anatomy and the like, to compare his frame with that of other animals, to make out all that it can of his past history, and so forth; but a student of natural science, as such, has no right to intrude into the region of morals, and to speak of a doctrine concerning man's moral superiority as an exploded error on the ground of some physical hypothesis. What Haeckel calls the *anthropocentric* error is, if rightly understood, almost the highest truth that man knows, the truth without the existence of which all other truth would be unknowable. If man be not the centre, the crown, the end of creation, I do not know who or what is. To obliterate man would be not merely to detract something considerable from the glory of the world, but to sink the world into utter insignificance: it would be the drama of creation, with Creation's Hamlet omitted.

It is well, however, that Haeckel has made

the remark, because it really points out the reason why it is necessary to oppose the teaching of some of our modern scientific men. As long as they confine themselves to genuine scientific investigation, I, for one, would with all my might claim for them the utmost freedom of inquiry ; but when they pass into the region of morals, and make physical speculations the foundation of a battery for the destruction of moral truth, then I think we are bound to ask them to keep within their own boundaries, and not to encroach upon their neighbours.

Having now said all that I think necessary, at all events as much as my time will allow, concerning the "History of Creation according to Moses," I pass on to

II. *The "History of Creation according to Professor Haeckel."*

Let me remind you that the phrase "History of Creation" is Professor Haeckel's, and not mine. I should have been disposed to confine the term *creation* to, or at all events to make it include, the first act, whatever it may have been or however it is to be described, by which the germ of the present material universe came into being. But this is not what Haeckel means.

He says that "Creation in the sense of the coming into existence of matter does not concern us at all. This process, if it ever took place, is completely beyond human comprehension, and can therefore never become the subject of scientific enquiry." This is perfectly true; and he adds soon afterwards, "If any person feels the necessity of conceiving the coming into existence of matter as the work of a supernatural creative power, of the creative force of something outside matter, we have nothing to say against it." You see, therefore, that our author does not absolutely condemn us to atheism; he says, indeed, that "faith has its origin in the poetic imagination," (an assertion which we perhaps are not bound entirely to believe,) but when he tells us that "where faith commences, science ends," and that faith and science should be kept strictly apart from each other, he says what is quite true and very importantly true: one of my complaints against this author is that he has not acted up to the spirit of his own principles. He laughs to scorn, for example, the notion of beneficence as having anything to do with the arrangements of the world; he is not content to take matter as he finds it, without reference to its origin, and to work out such results as can be fairly worked out by observa-

tion and by inductive and deductive processes of reason, which is what the pure student of nature ought to do, but he goes out of the department of natural science altogether, and will not permit us to see in the most ingenious arrangements any manifestation of purpose or any testimony borne by nature to the goodness of God.

Let me quote a short passage from Professor Haeckel's book, which will give you the key to its general purpose :—

“The determination of the position of man in nature, and of his relations to the totality of things—this question of all questions for mankind, as Huxley justly calls it—is finally solved by the knowledge that man is descended from animals. In consequence of Darwin's reformed Theory of Descent, we are now in a position to establish scientifically the groundwork of a *non-miraculous history of the development of the human race*” (vol. i, p. 6).

Professor Haeckel lays great stress upon and repeats this phrase *non-miraculous history*, by which he means to say that Mr. Darwin's work “On the Origin of Species,” and his subsequent book on “The Descent of Man, and Selection in Relation to Sex,” are sufficient to explain, without the notion of any divine interposition,

the existence of you and me, such as we are and such as we shall be.

Let us examine this view of non-miraculous creation ; and in doing so let us grant all that Mr. Darwin wishes to be granted : and let us see how far the notion of non-miraculous creation can be sustained.

In the first place, it is as nearly sure as anything can be that this globe of ours was once a mass of matter in a condition of intense heat, possibly heat so intense as to make the whole mass gaseous. Nothing of which we know under the term *life* could possibly have existed in that very hot primæval mass ; consequently, when it cooled down there would be an absence of all life. Whence did the life come, with which the world now teems ? It may be said that matter naturally or spontaneously produces life ; but there is this great difficulty in the way, namely, that there is no single experimental result which at all favours the hypothesis ; nothing is more remarkable and more constant than the law, that life of all kinds proceeds from something living. It seems difficult therefore to understand how there could be a beginning of life without something supernatural ; if nature, examined with all the ingenuity and pertinacity of modern science, refuses to afford an instance

of life in its origin, it seems a necessary consequence that the origin should be *supernatural*:—I will not introduce the term miraculous, but *supernatural* seems to express precisely that which must have been.

But life came somehow: you have your protoplasm and your protoplasmatic cells, which develop into higher forms and generate plants and animals and finally man. I am not going to make any objection to Mr. Darwin's ingenious theories with regard to natural selection, the survival of the fittest, and selection in relation to sex; but I wish to impress upon you this point, namely, that there is in all these theories no real machinery (so to speak) for the improvement or change of species or races: supposing that you have got your improvement there is a reason assigned why it should become permanent, but no reason is assigned why it should in the first instance occur¹. If, for example, you have two sets of fowls which agree in every point except that one set has developed

¹ See *Mozley's Essays*, vol. ii, p. 396. "Natural selection is not an agent, but a result. . . . Natural selection only weeds, and does not plant; it is the drain of Nature carrying off the irregularities, the monstrosities, the abortions; it comes in after and upon the active development of Nature to prune and thin them; but it does not create a species; it does not possess one productive or generative function."

formidable spurs while the other has not, it is quite intelligible that the spurred variety will have the advantage over the unspurred, and that the latter will die out while the former will survive ; but this survival of the fittest, or of the strongest, does not in the least degree account for the development of the spurs ; the cause for that must be sought elsewhere.

Take an illustration from the works of man. If you visit the South Kensington Museum, you may see with other curiosities the earliest form of the locomotive engine ; it is strangely different from those which we see upon our railways now ; but the one has been developed out of the other by successive improvements and by the survival of the fittest. Let us see, however, what we mean, in this human case which we can thoroughly measure and understand, by development and survival of the fittest. We mean that a number of ingenious men have been constantly employing themselves to correct what has been found amiss in the earlier locomotive forms : whenever a real improvement has been devised, it has been seized upon and made permanent ; whenever a change has been proposed which has been found not to answer, it has been permitted to sink into oblivion. And thus our perfected locomotive is a distinct result of gradual de-

velopment and survival of the fittest ; but it is manifest that the power to which the improvement is really due is that supplied by the brains of the engineers, and is not anything inherent in the first locomotive engine. Of course this illustration does not at every point run parallel with natural development ; the human cannot completely represent the divine ; but I think it does clearly point out the confusion of thought, which is involved in supposing that a selection of the best and survival of the fittest supply any explanation whatever of the power, by which the development of improved forms is in reality effected.

You will, of course, observe that in what has now been said I am by no means denying the possibility, or even the probability, of evolution of higher forms of life from lower : I have already agreed to grant all that may be asked in this direction : what I insist upon is that the survival and perpetuation of a higher form of life, when it *has* appeared, affords no explanation whatever of the fact that it *did* appear. Suppose it to be true that the beauty of certain cock birds is to be accounted for by the preference of hens for mates with brilliant plumage ; this explanation manifestly only accounts for the favour bestowed upon the bearers

of fine feathers, but does not at all explain the existence of those feathers. Or, to take the highest example of all, supposing man to have been developed in the course of ages from some *ascidian* ancestor; the development is quite as miraculous in its character as the history, which simply describes man as having been made out of the dust. To regard it as a matter of chance whether an original piece of protoplasm became a man or a cabbage seems to me to be utterly unphilosophical, to say the least; and yet, unless we adopt some such course, I do not see how we can get rid of the conception of an intelligent Creator.

But there is another difficulty in what Professor Haeckel calls the *non-miraculous* theory of creation. It seems that not only do creatures rise from one level to a higher by the development of new members and new powers, but also the reverse process takes place: that is to say, certain creatures have got rid of members and powers which their ancestors possessed. Take one example. Certain snakes have rudimentary legs: these legs are of no use whatever; they merely exist as part of the skeleton, and are not perceptible at all in the living animal. We are told that the explanation of this curious fact in natural history is to be found in the supposition, that the legless snake is the descendant

of ancestors who possessed legs. "The different stages of suppression and degeneration of these organs," says Professor Haeckel, "are easily accounted for in such of the descendants as could not use them" (vol. i, p. 17). It certainly seems a tax upon our powers of belief, when we are called upon to accept the hypothesis of development towards perfection on the one side, and of degeneration with loss of members on the other. It seems difficult to suppose that a creature would have been developed from the original protoplasm up to the high level of legs, and that then its descendants should have found so little use for the legs which it had required millions of years to evolve, that they should have eventually disappeared altogether, or rather disappeared as useful members, and recorded their former existence in the curious manner described. Perhaps it is still more strange that certain animals should have got rid of their eyes, as visual organs, in the same manner. But I will grant the hypothesis of degradation, and suppose that snakes represent ancestors with legs; only I ask, is it to be believed that these creatures got rid of their legs by a "non-miraculous" process? There is something plausible, to say the least, in the notion of creatures surviving which developed new mem-

bers or new powers ; but it seems somewhat of a tax upon our powers of belief, to require us to suppose, that when animals began to slough off their members they still survived, and that there was no power superintending the transformation beyond what may be called the force of circumstances !

You will observe that it is not the evolution of high forms of life from simpler forms, which, to my mind at least, presents any difficulty. There is nothing in the abstract more marvellous, or more difficult to believe, in the conception of evolution than in that of the development of a bird from a little spot in the centre of an egg, or of a butterfly from a caterpillar ; but the conclusion which I find it impossible to accept is, that the whole supposed evolution of the living world, as we see it, out of chaos was not the work of an infinite mind, having some great purpose (I need not now discuss what) in view. Yet this is the conclusion which Professor Haeckel wishes us to accept, and which he presses with great earnestness. " I maintain," he writes, " with regard to the much-talked-of *purpose in nature*, that it really has no existence but for those persons who observe phenomena in animals and plants in the most superficial manner. Without going

more deeply into the matter, we can see at once that the rudimentary organs are a formidable obstacle to this theory. And indeed every one who makes a really close study of the organisation and mode of life of the various animals and plants, and becomes familiar with the reciprocity or inter-action of the phenomena of life, and the so-called *economy of nature*, must necessarily come to the conclusion that this *purposiveness* no more exists than the much-talked-of *beneficence* of the Creator" (vol. i, p. 19).

It seems therefore that any one who studies natural history is, according to Prof. Haeckel, unable to believe either in the *purpose* or in the *beneficence* of a Creator. This is a very terrible conclusion at which to arrive, and, thank God, all students of natural history do not seem to have adopted it. But it should be remarked that it is just this kind of representation of the results of the study of natural science, which causes thoughtful and good men sometimes to look upon science with suspicious, or more than suspicious, eyes. It is not the mere question of the possibility of putting a tenable interpretation upon the first chapter of Genesis, but it is the question whether we are living under a good God for any good purpose. It seems

to me not too much to say, that if it were generally held that the inevitable result of the progress of science was to make it impossible to believe in a wise and beneficent God, the necessary tendency of our race would be downwards, and that nothing would be able to avert our ultimate moral ruin. If you ask how it is that so clever a man as Professor Haeckel should have propounded a view, which I have ventured to represent as so monstrous, I should reply in the first place that a man may be a good observer of nature, and yet not a philosopher—in fact, it is not often that the two qualities of mind go together. But in the second place, and chiefly, I think it is not difficult to perceive in what manner Professor Haeckel has gone wrong. He sees certain things which he cannot reconcile with the idea of purpose, and certain things which he cannot reconcile with the idea of beneficence; and he rushes to the conclusion that there is *no* purpose and *no* beneficence, instead of adopting the safer and wiser conclusion that the system of the world is one only partially understood, and that there are anomalies which would cease to be anomalies if our vision was more perfect than it is.

. If you wish to know the really philosophical

view of the difficulties connected with the hypothesis of a wise and good Creator, I should refer you to Bishop Butler's *Analogy*¹; but I will quote here a short passage from a writer of a very different kind, one whom I think that Professor Haeckel would himself respect, because he is a careful and conscientious student of natural history—I mean Sir John Lubbock. In a lecture on “Plants and Insects” he discusses, amongst other things, the colour and marking of caterpillars; he gives ingenious reasons by way of accounting for some of the peculiarities of these humble members of the living family, and he concludes his lecture with these words:—“Here then, I think, we see reasons for many, at any rate, of the variations of colour and markings in caterpillars, which at first sight seem so fantastic and inexplicable. I should, however, produce an impression very different from that which I wish to convey, were I to lead you to suppose that all these varieties have been explained, or are understood. Far from it; they still offer a large field for study; nevertheless I venture to think that the evidence now brought forward, however imper-

¹ See Part I, chap. vii: “Of the Government of God, considered as a scheme or constitution, imperfectly comprehended.”

fectly, is at least sufficient to justify the conclusion, that there is not a hair or a line, not a spot or a colour, for which there is not a reason—which has not a purpose or a meaning in the economy of nature¹.”

You see that we shall not have all the students of nature against us, if we venture to believe that there is such a thing as purpose, even in the humblest department of the world in which we live. I have said, in order to partially ward off the tremendous assertion of Professor Haeckel concerning the impossibility of believing in *purpose* and *beneficence*, that observers of nature are not always philosophers. It seems to me so important that you should be assisted in setting at their proper value the sweeping assertions, which are sometimes made by men of whom Ernst Haeckel is a type, that I shall offer you, before leaving his book, a few remarks intended to show that he at least is not a trustworthy guide, when dealing with the philosophy of his subject.

These remarks will be based upon the comparison which the Professor draws, between Mr. Darwin's Theory of Descent and Newton's Theory of Gravitation. Listen to the following passage.

¹ *Scientific Lectures*, p. 66.

“Let us call to mind that theory which has ranked up to the present time as the greatest achievement of the human mind, the Theory of Gravitation, which Newton, two hundred years ago, established in his ‘Mathematical Principles of Natural Philosophy.’ Here we find that the object to be explained is as large as one can well imagine. He undertook to reduce the phenomena of the motion of the planets and the structure of the universe to mathematical laws. As the most simple cause of these intricate phenomena of motion Newton established the law of weight or attraction; the same law which is the cause of the fall of bodies, of adhesion, cohesion, and many other phenomena¹.

“If we apply the same standard of valuation to Darwin’s Theory, we must arrive at the conclusion that this theory, also, is one of the greatest achievements of the human mind, and that it may be placed quite on a level with Newton’s Theory of Gravitation, &c., &c.” (vol. i, p. 25).

I confess that my own belief is that Mr. Darwin would himself be the first to repudiate this estimate of his Theory of Descent; but anyhow, without any desire to speak slightly

¹ The language of this last sentence seems to me loose, if not incorrect; but I need not criticize it.

of Mr. Darwin's powers and achievements, which every reasonable man must rate very highly, I should like to put before you, if I may and can, in a condensed form, what is meant by Newton's having established the law of gravitation, so that you may be able to judge for yourselves whether there is any ground for speaking of Mr. Darwin's hypothesis of Descent as being an established Theory, in the same sense that Newton's hypothesis of Gravitation is unquestionably an established Theory.

Newton speculated that the force which kept the moon in its orbit was the identical force of attraction which causes a stone to fall to the ground. Other scientific men had speculated in the same direction; the difference between Newton and them was, that Newton proved his speculation to be true. He proved it thus. When a body moves in a circle round a centre of force, as for example when a stone tied to a string moves at a certain rate round the point to which the other end of the string is fastened, the force which acts upon the stone depends upon the length of the string and the rate of motion. This is a mathematical proposition concerning which there is no doubt whatever. Consequently, if the moon moves round the earth in a circle, at a certain distance from the earth, and at a

certain rate, (as she approximately does,) and if we know the distance and the rate, we know the amount of force which is acting upon the moon. Whatever be the cause or origin of that force, the amount of it is a simple geometrical result from the actual motion. Consequently Newton knew the exact amount of force acting on the moon. Then also he knew the amount of force which the earth can exercise at its surface, by observing the distance through which a stone will fall in a second. He made the hypothesis that this force decreased as the square of the distance from the earth's centre increased; in other words, that if at a given distance from the earth's centre the attractive force was measured by 1, then at twice the distance it must be measured by $\frac{1}{4}$, at three times the distance by $\frac{1}{9}$, and so on. This was pure hypothesis; but you will perceive that knowing the moon's distance, and knowing the earth's force of attraction at its surface, or at about 4000 miles from the centre, he could calculate what the force *ought* to be upon the moon, *if* his hypothesis was correct. He also knew, as already explained, what the force actually was from the known distance and rate of motion of the moon. Would the values of the force deduced by these two entirely different methods

agree? He made the calculation, and found that they actually did agree.

Having obtained this great result, Newton applied his principles to explain the various irregularities or *errors*, as they are technically called, in the moon's motion. Every additional step confirmed the correctness of his hypothesis; and the completion of the theory was effected when, by means of improved methods of mathematical calculation, the great French mathematicians Laplace and Lagrange reduced the entire motion of the planetary system to the most accurate investigation. Every successive problem confirmed Newton's original proposition; and the topstone was put to the edifice in our own times by the discovery of a new planet, not through the power of the telescope, but in consequence of the disturbance produced upon its next door neighbour by that planet, the cause being traced home to the unseen offender by the Theory of Universal Gravitation.

To speak of the *Theory of Gravitation*, to the nature of which I have thus briefly called your attention, and of the *Theory of Descent*, as two things to be placed on the same level seems to me to be most misleading. The Theory of Gravitation is undoubtedly one which can never be shaken, and which will never require amend-

ment ; the mind which rejects it may be, without want of charity, described as incapable of appreciating reasoning ; it is safe to assert, that there is no competent person throughout the whole world who does or ever will venture to question it. But how can such propositions be maintained concerning the Doctrine of Descent, — at all events as expounded by Professor Haeckel ? Do all observed facts fall into their places according to that doctrine ? Are there no unexplained phenomena ? Does every one in the presence of that doctrine feel himself under an intellectual necessity of abandoning the thought of *purpose* and *beneficence* ?

At this stage of my lecture I had intended to lay down the volumes to which I have been for some time directing your attention ; but, if you will not consider me wearisome, I should like to bring under your notice just one more point, which, as it seems to me, ought not to be omitted, if we would fairly compare the kind of science which those volumes contain with that to which we have been accustomed in the school of Newton.

Professor Haeckel gives us in the second volume of his “ History of Creation ” a complete pedigree of Man. The stages are as follows :—

I. *Monera*, which are described as “ simple

homogeneous, structureless, and formless little lumps of mucus or albuminous matter." These are supposed to have originated by spontaneous generation.

2. *Amœbæ*; these are simple cells, that is, "a little piece of protoplasm enclosing a kernel."

3. *Synamœbæ*, or a collection of *Amœbæ*. "They originated out of the single-celled primæval animals of the second stage by repeated self-division, and by the permanent union of the products of this division."

4. *Planœada*.

5. *Gastrœada*, or primæval "stomach animals."

6. *Turbellaria*, or worms of a very simple kind.

7. *Scolecida*, or worms of a higher class.

8. *Himatega*, or worms of a higher class still.

The preceding are the invertebrate ancestors of man; now we come to the vertebrate.

9. *Acrania*, or skull-less animals.

10. *Monorrhina*, or single-nostrilled animals.

11. *Selachii*, or primæval fish.

12. *Dipneusta*, or mud-fish.

13. *Sozobranchia*, or gilled amphibians.

Here began the five-toed formation of the foot.

14. *Sozura*, or tailed amphibians.

15. *Protamnia*.

16. *Primary Mammals.*
17. *Pouched animals.*
18. *Prosimiæ*, or semi-apes.
19. *Tailed Apes.*
20. *Manlike Apes.*
21. *Apelike Men.*
22. *Men.*

Now I am not going to find fault with this pedigree, except so far as it represents the transformation of a little piece of spontaneously generated protoplasm into a man, as having taken place without any external creative power or purpose; but I wish, granting all that it may be necessary to grant with respect to the possibility of evolution, to call your attention to the following feature in Professor Haeckel's treatment of his subject.

“For many and weighty reasons,” he writes, “we hold the monophyletic hypothesis to be the most correct, and we therefore assume a *single primæval home* for mankind, where he developed out of a long since extinct anthropoid species of ape” (vol. ii, p. 325). Where could this primæval home be? “We as yet know of no fossil remains of the hypothetical primæval man.” Will it be believed that the Professor actually invents a continent, which he calls *Lemuria*; and in the map of the world which

forms the frontispiece to his second volume, we find *Lemuria* connecting Africa with Asia, and upon it a spot marked *Paradise*, with a very necessary note of interrogation attached to it.

Pray observe that I do not deny the possible existence in past ages of a continent connecting Africa and Asia; there is nothing incredible in such a supposition; and undoubtedly enormous changes of land and water have taken place in geological time; but to introduce a creature described as having a very long skull, with slanting teeth, hair woolly, colour of skin dark and of a brownish tint, hair covering the whole body, arms comparatively longer and stronger than our own, legs on the other hand knock-kneed shorter and thinner, with entirely undeveloped calves, walking only half erect—to introduce a confessedly hypothetical creature of this kind, and then invent a continent upon which he may be supposed to have lived, is certainly science of a very different kind from that which Newton gave to the world. When I read this loose admixture of conjecture and hypothesis and observation, I cannot but recall the story of Newton in connection with his verification of his hypothesis concerning gravitation. I reminded you just now how it was that Newton verified his hypothesis, but I did not remind

you that when he first made the calculation the result was unfavourable. This was in the year 1665. He accordingly put his hypothesis on one side, as not being accordant with fact. In the year 1682—no less than seventeen years afterwards—he was attending a meeting of the Royal Society, at which a new measurement of a degree of the meridian, executed by M. Picard in 1679, became the subject of discussion. Newton made a memorandum of the result of the French astronomer's measurement, and having deduced from it the diameter of the earth, he resumed his calculations of 1665. In the progress of his work with the new data he saw that the expected result, which he had before failed to obtain, was likely now to be realised ; and he was thrown into such a state of nervous irritability that he was unable to carry on his calculation, which was accordingly handed over to one of his friends to be completed. His patience and perseverance were, as I have already said, and as we all know, crowned with complete success¹.

III. But the progress of time warns me that I must be thinking of bringing my lecture to a close.

¹ Brewster's *Life of Sir Isaac Newton*, p. 152.

I said in a former part of it that, after having spoken of the "History of Creation according to Moses," and of the "History of Creation according to Professor Ernst Haeckel," I should make such observations as might arise from a comparison of the two. I now proceed to do this.

The first remark which I have to make is very obvious, but also very important, namely, that the basis of the History of Creation according to Moses, and that of every scientific effort to trace out the early history of our globe, are essentially different, the one from the other. One is moral and the other physical. The purpose of the opening chapters of Holy Scripture is to assure us that we were made in the image of God, that we differ essentially from all other creatures, that we are placed here in a condition of trial or moral probation. I am not now saying whether this is the true view of man's condition or not; but I say that every one who reads the first two or three chapters of the Book of Genesis must confess that the promulgation of this view is undeniably the purpose of those chapters. Whereas on the other hand natural science has nothing whatever to do with the moral condition of man: natural science, so far as it deals with past history, has for its purpose

the determination of what has been from what is: and it is probable that scientific investigation will teach us much more in this direction than we know at present. I should like to indicate in a few words one or two points upon which science has already thrown some light.

Geology, as every one knows, has taught us much concerning the history of the past, and is yearly teaching us more. It reveals beyond all doubt a vast antiquity as belonging to our globe: it shews too that notwithstanding the great increase of the time which recent investigations assign to the existence of man, as compared with that which was assigned by scientific men not long ago, nevertheless after all man is, geologically speaking, a recent inhabitant of the earth. But geology in framing its conclusions is compelled to take into account the teachings of other sciences. If we felt disposed to give an indefinite amount of time for the evolution of cosmos out of chaos, as has sometimes been thought possible, the student of heat and mechanics comes in, and asserts upon the authority of his branch of science, that a limit must be put to the time available for the bringing about the present condition of things: he will grant from

100,000,000 to 300,000,000 of years, as the extreme allowance of time: if geologists cannot be content with this allowance, a distinguished professor has said "so much the worse for geologists, for more they cannot have¹."

But perhaps the most remarkable knowledge which we have concerning the primitive condition of our globe, is that which is derived from the investigation of the form of the earth, regarded as having been originally in a fluid condition. Few problems have given occasion for a more refined application of mathematical skill than this. I wish I could convey to you even the slightest conception of the beauty of the method by which the solution of the problem has been effected, so far as it has been effected: it must suffice to say, that, with very little of arbitrary assumption indeed, it has been proved that the form of the earth, regarded as a mass of fluid revolving at the rate at which the earth does actually revolve, would be precisely that which the earth possesses, that is, a nearly spherical body, flattened at the poles to the exact extent to which the earth is flattened².

¹ Professor Tait. "Lectures on some Recent Advances in Physical Science."

² I do not know that it is desirable in a note to a popular lecture to refer to mathematical treatises, but I will just

The coincidence is so remarkable that we may assert with considerable confidence that the earth was originally fluid and has cooled down ; I have already noticed the difficulty which such a supposition throws in the way of any spontaneous origin of life : but upon that I do not care to dwell now : the origin of life is a mystery, take it which way you will.

Go back however as you may in the history of creation, you come, sooner or later, to a limit beyond which no amount of research will carry you ; partly perhaps because you have not the elements of fact which are necessary for the conduct of the inquiry, partly because the problem to be solved essentially transcends the powers of the human mind. There are many things which you certainly know must have been, and yet you cannot conceive how. The origin of life is one of these things. Professor Tyndall has told us that he sees in matter itself "the potency of all terrestrial life." Professor Haeckel regards the doctrine of descent as the solution of all difficulties. I have unfeigned respect for the abilities of both of these eminent men ; but I confess that after every effort of mind that I have been able to make

mention Pratt's *Treatise on Attractions*, Laplace's *Functions*, and the *Figure of the Earth*." (Macmillan and Co.)

I have been unable to follow them in these conclusions. If matter be that which I understand by the term, it is to me absolutely incredible that there should be evolved out of it by any inherent potency beings capable of love, truth, faith, religion, and so forth. Yet this is the kind of being for whose existence we have to give an account, if we are going to establish anything which can deserve the name of a theory of Creation. I am not merely called upon to believe that the beauty of the vegetable kingdom, and the sweet concert of birds, and the sagacity of the ant, and the geometrical genius of the bee were evolved from matter by an inherent potency, but that I myself,—I who am conscious of personality, who am capable of discussing with you such solemn subjects as that with which I have been dealing this evening, I who can at least believe that I believe in a “Father Almighty, Maker of heaven and earth,” and who can at least dream of an immortality in which I shall be permitted to realize my Maker’s presence,—that I, being such as I feel and know myself to be, am after all not essentially different from my dog, or even from the grass which I trample under my feet.

And as for the banishment of all conception

of purpose and beneficence from creation, which Professor Haeckel seems to regard as such a triumph of science, I confess that not my heart only but my most thoughtful convictions rebel. I cannot bring my mind to conceive of the actual non-existence of a Creator; and, admitting the existence of a Creator, I am constrained to believe that He is both intelligent and good.

I do not say that I can account for everything that exists; I am far from being able to do that; but I can see so much of purpose in many things that I can easily believe that purpose is the guiding rule of creation. And I may not be able to reconcile all that I see with my own conception of perfect goodness; but I can perceive enough of beneficence in the arrangement of the world, to say nothing of deep-lying convictions which are independent of experience, to be able to believe that another guiding rule of creation is beneficence, and that phenomena which seem to contradict this view may fairly be left to the class of unexplained anomalies.

Therefore I cannot subscribe to Professor Haeckel's view of Creation, and I cannot advise you to adopt it. The view which commends itself to my mind as most reasonable I should express somewhat as follows.

The present material universe appears to me to be the outcome of an infinite mind. The phrase *infinite mind* is, of course, not a purely scientific term, and would be of no value in any attempt to give a scientific account of Creation : but what I mean by the term may be explained thus. I have a knowledge of what *mind* is from reflecting upon my own powers and those of my fellow-men. The mind exercises its powers in the case of a man through the instrumentality of the brain : but I can conceive of mind as apart from brain : and that power of thought, of purpose, of intention, which a man can exercise in a limited degree, I can conceive as existing in an unlimited degree. There are many arguments which lead me to think that there is in fact a Being, who does possess to an absolutely unlimited extent those powers which I am conscious of being able in a limited degree to exercise myself, and that my limited mind is an inspiration from His. I adopt the existence of this infinite Being, therefore, as what I may call the *great human hypothesis*. You may deny it, if you please ; but you will find that there is a great deal to be said for it, both on moral and philosophical grounds. So far, however, as we are concerned just now, what I wish to press upon you is that the hypothesis really commends

itself to us by its extreme simplicity and by its comprehensiveness. If I believe in one God the Maker of heaven and earth, then the scientific investigation of Creation and nature is as simple and open to me as it is to one who denies my hypothesis; while I have this great advantage over the Atheistic student, namely, that the universe presents to me a field for moral inquiry as well as one for scientific investigation. I find insoluble mysteries no doubt, —perhaps he does the same; but anyhow when I do come across a mystery, I am able to say that it is just what I should have expected to find in a universe representing the thoughts of a mind, which by hypothesis is infinitely above my own.

For, finally, to one who believes in the being of a God, who may also be described as an Almighty Father, it is impossible for a moment to leave out of view the grand purpose, for which we men exist upon this earth which God has made. Purpose! Ernst Haeckel tells us that there is no purpose in Creation, because there are some things which his investigations will not explain.

I think that any one who has studied the mechanism of the eye, who has kept company with the ant or the bee, who remem-

bers how almost day by day science brings to light ingenious contrivances, which have been performing their functions in the economy of the world from the beginning, but which human skill has only in these latter days detected in their beneficent operation, would be a bold man if he denied the existence of purpose, even in cases where the hypothesis of purpose might seem at first sight to fail: but when we speak of purpose in its highest sense, we put on one side the thought of ingenious contrivance and subtle combinations of machinery, and the adaptation of material means to material ends. We rise to the height of the great argument of the purpose of man himself. We hear much about the *beginning* of man; but what is his *end*? Surely it is not irrational to suppose that he has been placed here in a condition of trial, and that he is on his way to a better country!

I am not to preach a sermon to you this evening, and therefore I do not enlarge upon this topic; but I say that the History of Creation which represents man as created in the image of God, as placed here in a state of probation, and as having mighty issues dependent upon his conduct, in no way conflicts with science, is more reasonable and probable than

any other which has been yet propounded, is the safest foundation upon which to build a social system or a scheme of human government, and is the only one answering in any adequate manner to those aspirations and instincts, which are facts of humanity, and which belong to philosopher and to peasant alike.

THE END.

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