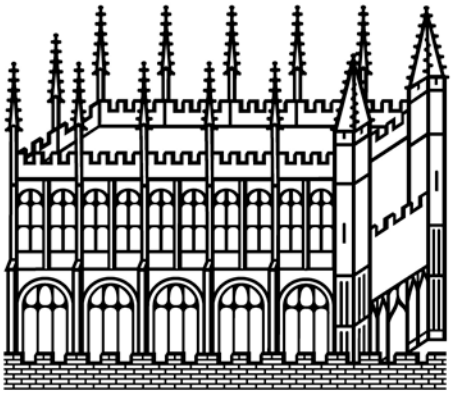

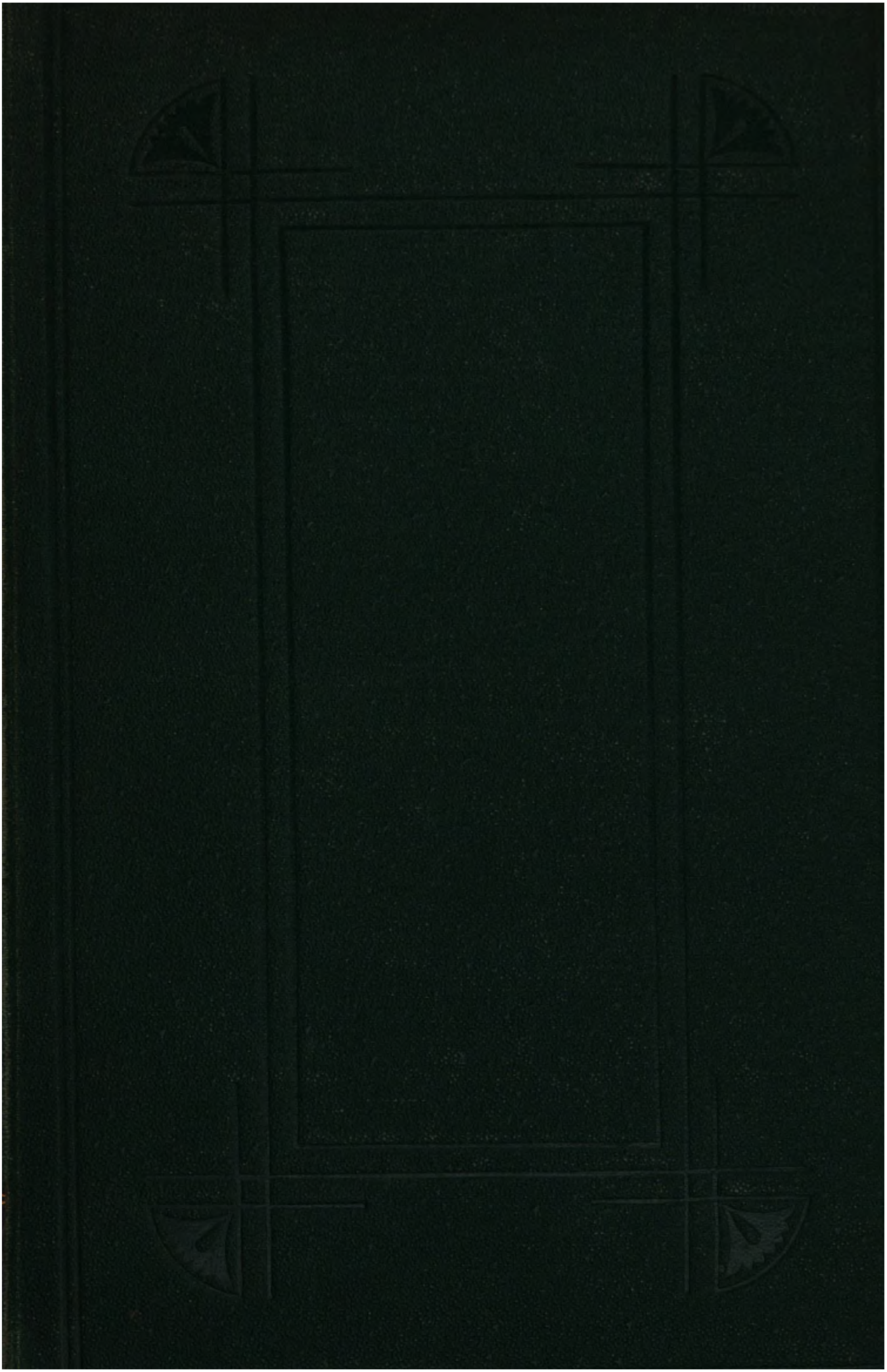

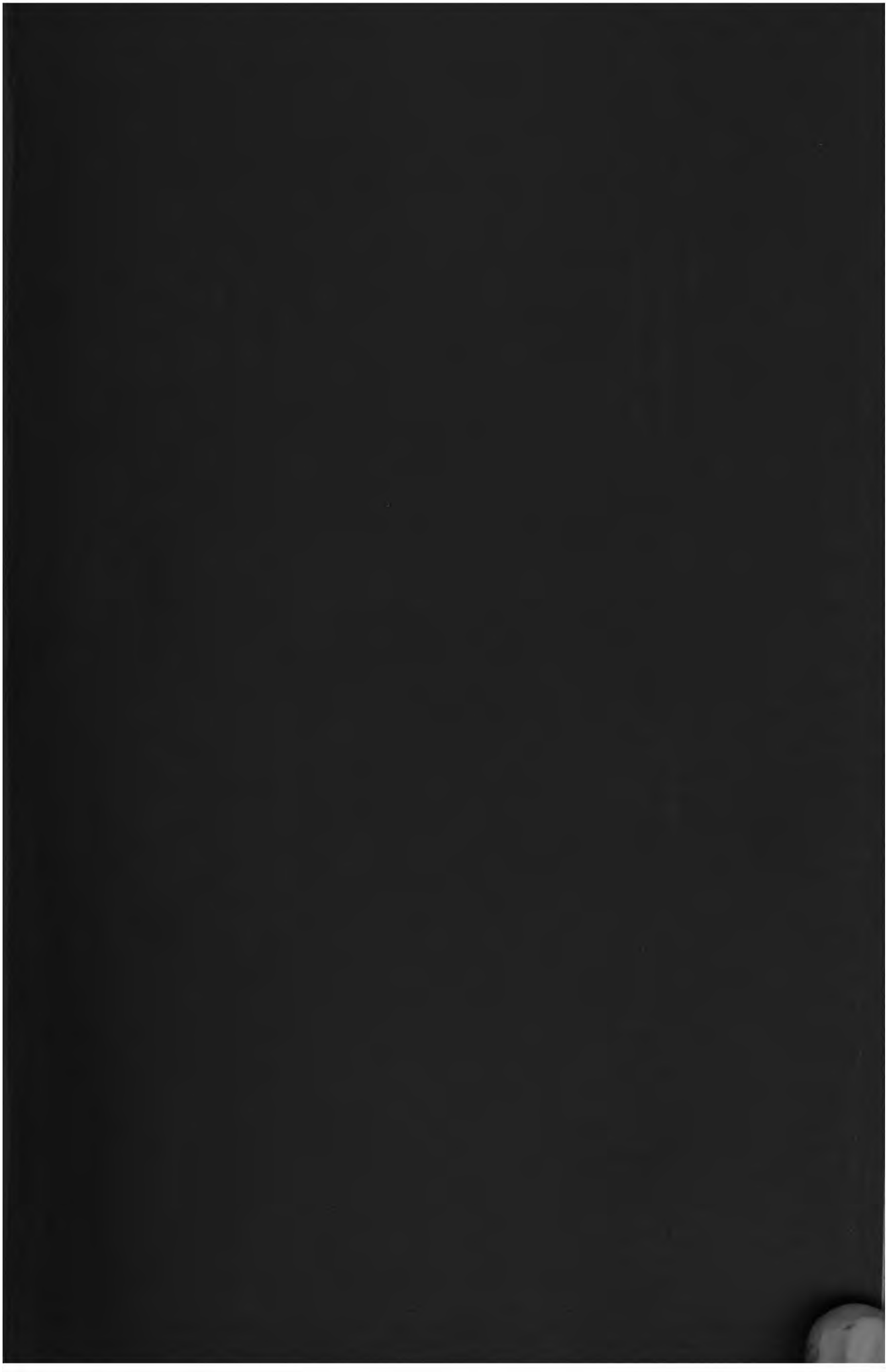

THE

SCRIPTURAL ACCOUNT OF CREATION

VINDICATED BY

THE TEACHING OF SCIENCE;

OR,

A NEW METHOD OF RECONCILING THE MOSAIC AND GEOLOGICAL RECORDS OF CREATION.

BY THE

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"The Word of the Lord abideth for ever."—1 PET. i. 25.

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PREFACE.

THE Author has ventured on the publication of a new Work on the relations of Religion and Science, because he has something to say upon the subject, which, in as far as he knows, has not yet been said. Having, with many others, failed to find full satisfaction in previous attempts to reconcile the Mosaic narrative of Creation with the discoveries of Geology, he anxiously sought, and believes he has found, a new track which will conduct to a more satisfactory result.

He is convinced that the Scripture Record, correctly interpreted, is not merely not contradicted, as has been assumed, but corroborated, by the teachings of Science. He accepts, on the one hand, the narrative of Moses, in its literal sense, as given in his own words; and, on the other, the admitted facts of Geology, as stated in the words of the most eminent Geologists; and he finds in these facts a confirmation of the Biblical history. If he is right, it will appear that Religion, so far from being endangered by Science, is indebted to it, not only for enlarging our know-

ledge of the works and wonders of the Lord, but—especially, through the striking analogies it shows between the last and previous creations—for strengthening the foundations of Revealed, as well as of Natural Religion.

The following is an outline of the Author's argument:—

He holds, with Chalmers, Buckland, and others, that the first verse of the first chapter of Genesis contains a distinct and independent record—altogether unconnected, in sequence of time, with the verses that follow—and marks out a period antecedently to which the heavens and earth had no existence. Of the history of the earth, after it came into being, down to that period which immediately preceded the creation he is about to describe, or of any of the previous geological systems or earlier creations, Moses gives no account whatever. The condition of the earth at the period described in verse second, the Author shows to harmonise with the geological epoch immediately preceding the existing creation, commonly called that of the Glacial or Boulder-drift formation. The low temperature of the earth at that period, and the extent to which its surface was covered with water, account very naturally for the extinction of the *flora* and *fauna* of the Tertiary epoch, to such an extent, at least, as to render necessary a new creation, and such a preparatory removal of the waters as is described by Moses. The Author believes that the correct interpretation of verse second, and its reference to the glacial and aqueous condition of the earth during the Boulder-drift formation, will throw great light upon a subject hitherto felt to be involved in great difficulty.

He shows that the creation described by Moses is in

strict analogy with the previous creations, evidenced in the Primary, Secondary, and Tertiary epochs, each of which in succession displays beings of a higher order than that which preceded it.

While he rests his case upon accepted geological facts, he does not commit himself to any of the hypotheses, or theories, by which these facts are accounted for. He refuses, in order to account for what are, as presented to our observation, manifestly *new creations*, to accept the Development hypothesis of Lamarck, or that of the Origin of Species by Natural Selection of Darwin, notwithstanding the favour with which the latter has been, for the present, received by some eminent men of science; and he does so simply because they are but hypotheses. A distinct chapter is occupied in showing the untenableness of the Darwinian Scheme, and its failure to account for the phenomena which it professes to explain.

The Author has shown that there is no such thing established by Geological Science, as a fixed perpetually self-evolving order of nature, in the sense understood by some scientific men. He finds, from the teaching of Science, that while laws of nature have been established for the propagation and support of organised beings, these laws cannot prevent the extinction of old, or provide for the creation of new races. In other words, he finds that Science is conversant not only with an established law of continuance, but also with direct and successive interpositions of creative power, *i.e.*, with what may be called miracles, in the formation of new orders, genera, and species. And, by the aid of scientific facts, he considers

he has shown the fallacy of all arguments raised against the miracles of Scripture, in as far as these arguments are based on the assumption of a fixed and invariable order of nature.

The chapter on the Darwinian Hypothesis is followed by two chapters on the Antiquity of Man,—the former exhibiting the teaching of Scripture, and the latter containing remarks on Sir Charles Lyell's work on that subject.

A very few critical observations on the Sacred Text have been, of necessity, introduced into the body of the work, which can be fully appreciated only by those acquainted with the Hebrew language; but they have been made with such brevity and plainness, as to be no bar to the understanding of the passages in which they occur by the general reader. They occur principally in the first chapter.

The Author has only to add, in conclusion, that should his work, in any degree, tend to clear up the difficulties with which the subject, of which it treats, has been hitherto surrounded, and thus to dispel the doubts, and strengthen the faith of any of his readers, it will be an ample and most gratifying recompense to him for the time and trouble bestowed upon it.

BANCHORY-DEVENICK MANSE,
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CHAPTER I.

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THE alarm raised some years ago by the discoveries of geologists, viewed in their bearings upon the truth of the Mosaic Record of the Creation, has now, in a great measure, subsided. Before the geological phenomena telling of the history and duration of the world, previously to the era of the existing creation, were brought to light, it was the all but universal opinion that it had not existed beyond six thousand years. And, consequently, when its age was proved to be immeasurably greater, there seemed to be a discrepancy between science and revelation upon this point, which, it was thought, for some time at least, admitted of no reconciliation. When the geological facts became firmly established, and had been generally accepted by geologists, they were still doubted by some theologians, and denied by others. A great portion of those who believed in the inspiration and authority of the Word of God, thought that what they had

considered to be truth, was brought into jeopardy, while those who had neither love nor reverence for God's Word, triumphed over the victory which, as they imagined, science had gained over revelation. Such being the case, attempts have been made, from time to time, with greater or less success, by men distinguished alike for theological and scientific attainments, to bring the Mosaic and Geological records into harmony. By these means much has been done to allay the alarm which the geological disclosures above referred to had created. Dr Chalmers, Professor Buckland, and others, have shown that the language of Moses does not require to be so interpreted as to tie down the age of the world to the period formerly assigned to it; that there is no connection of contemporaneity, or even of immediate sequence, between the great fact announced in the first verse of Genesis, that "In the beginning God created the heavens and the earth," and the statements in verse second; and that between the announcement in verse first, and the condition of the earth described in verse second, a period of time may have intervened sufficient to account for all the geological phenomena which have given rise to the objection in question. By this means the great seeming discrepancy regarding the age of the world has been removed.

But another difficulty still remains, which has not, as yet, as far as I have observed, been satisfactorily cleared up, that, namely, of showing the correspondence of the statements in verse second with the teaching of Geology; and it is the hope of doing so which has induced me to present my views to public notice. I am not deterred

from this attempt by what is said by Dr David Page in his excellent work on the "Past and Present Life of the World." "To attempt," says he, "reconciliations of Geology with Scripture, is to mistake the functions of both;—to confound what is ascertainable with what needed to be revealed—the physical with the spiritual —and reason with faith. Geology loses by such well-meant but ignorant attempts; Theology can be no gainer." In what follows I do not mean "to confound the ascertainable with what needed to be revealed." Geology is conversant with *facts*, and so is the Mosaic Record of the creation; and as it has been averred that the *facts* as exhibited by the one and by the other are contradictory, and that Geology is consequently at variance with Scripture, it is, I conceive, the duty of every one who desires to maintain the inspiration and authority of the Bible, to do what in him lies to show that the statements of fact are not in antagonism, and that Scripture and Science do not contradict, but, as might be expected, confirm and support each other. I have much pleasure in acknowledging my obligations to Dr Page for the confirmation, derived from his writings, of the views I have adopted; and I shall not fail to avail myself liberally of the fruits of his labours in establishing them. I shall lay him under contribution to the reconciliations which he so strongly deprecates; and I shall endeavour to do so without detriment either to Geology or Theology.

With the view of reconciling the apparent discrepancies between Geology and Scripture, in reference to the creation of the world, I propose to show, in the first place, what is

the teaching of Scripture; and, in the second place, what is the corresponding teaching of Geology.

Moses teaches us, in the first verse of the first chapter of Genesis, that "In the beginning God created the heavens and the earth." The word "beginning" here expresses a period antecedently to which the heavens and the earth had no existence. This verse contains a distinct and independent proposition, designed to teach mankind that the earth had a beginning and a creator. This proposition is the basis of all religious faith and obligation. In verse second, the sacred writer, in very brief and general terms, makes us acquainted with the condition of the earth at a period immediately preceding the creation, which he is about to describe in the subsequent verses. Between the first and second verses there is no connection of time, or immediate sequence. This I shall now endeavour to show. In doing so, it will be necessary to make certain emendations upon the rendering of the authorised version. There the verse stands: "And the earth was without form, and void; and darkness was on the face of the deep. And the Spirit of God moved upon the face of the waters."

The conjunction "and" at the beginning of this verse is the only particle in Hebrew for also expressing "but," "moreover," "now"; and of these three English particles, that can legitimately be used which best suits the sense of the passage. Accordingly, in the Septuagint version, the word is rendered δε, and in the Vulgate, *autem*, corresponding to the English *but, moreover, now.* The word rendered "was" in the English version is the only word in Hebrew for also expressing "*existed*," "*became*,"

for which likewise there are separate words in Latin, *fuit, factus est, extitit,* and in Greek, ἦν, ἐγένετο. It is also to be observed that the Hebrew verb has no pluperfect tense, and therefore, the past tense is used to indicate past or pluperfect time, according to the exigencies of the case. The first clause of the verse, therefore, may be rendered with as great propriety, "But the earth had become," as, "And the earth was." This will be acknowledged by every competent judge. It does no violence whatever to the original. Hence Dathe, a very learned and judicious critic, and translator of the Bible into Latin before the geological difficulty had been started, had rendered the words in question: "Terra vero facta fuerat:" "But the earth had become." But even if the authorised rendering is retained, it must still be observed that the particle "*and*" in our own language does not necessarily mark contemporaneity, or immediate succession of events preceding and following. It is used also to introduce additional facts and circumstances into the discourse in hand, without any reference to sequence of time. The word "*and*" simply announces that something is to be *added* to something that has preceded, without any necessary reference to their co-existence or immediate connection. This may be known from the context, or, when there is any risk of ambiguity, by some other word, which leaves the question as to contemporaneity free from all doubt. The difficulty which the authors of the authorised version had in deciding upon the connection or disjunction of the verses in regard to time, arose out of their own misconceptions respecting the age of the world, and their entire ignorance of what geological science has since

brought to light, in regard to previous conditions of the earth, and the consequent impossibility of giving any intelligent account of the phenomena referred to in verse second. This difficulty was farther increased by the poverty of the Hebrew language in conjunctive and disjunctive particles, and the consequent necessity of some knowledge of the bearing and connection of the context as to whether these particles are to connect or disjoin words, clauses, and sentences. For example, if the translators regarded it as a matter of faith that the world had existed only about six thousand years, they were necessarily led to connect the first three verses by a connection of time. In that case, they held that the first verse referred to the original creation of matter; that the second referred to the condition of the world immediately after it came into being; and that the third and following verses contained subsequent details respecting the first arrangement of inorganic matter, and the creation of the existing *flora* and *fauna*. Geological science has shown that such a view is untenable, and has thus aided in the criticism of verse second. The following instance is given by Mr Hugh Miller of the use of the particle "and," in introducing additional particulars without reference to time. "Take," says he, "the following passage: 'There went out a man of the house of Levi and took to wife a daughter of Levi; and the woman conceived and bare a son, and when she saw that he was a goodly child, she hid him three months; and when she could no longer hide him, she took for him an ark of bulrushes, and daubed it with slime and with pitch, and laid it in the flags by the river's bank.'—Exod. ii. 1–3. The

narrative here is quite as continuous as in the first three verses of Genesis, in the order of the relation;—the marriage of the parents is as directly followed by the birth of the son, as the creation of matter is followed in the other by the first beginning of the existing state of things. The reader has as slight ground to infer in the one case, that between the marriage of the parents and the birth of the child, the births of several other children of the family had taken place, as to infer in the other, that between the creation of matter and subsisting creation, there had taken place several other creations." Such are the grounds upon which it is maintained that there is no necessary connection of time between the statements in verses first and second; but what period elapsed between the creation of matter in verse first, and the condition of the earth in verse second;—how many distinct epochs intervened, or what was their duration;—what was the external appearance of the earth during these epochs;—what were its *flora* and *fauna*;—what changes took place in it;—to what convulsions, depressions, or upheavals it was subjected,—the sacred writer has furnished us with no means of deciding. After announcing that in the beginning God created the heavens and the earth, Moses gives intimation of *no other epoch or condition of the earth, but that which immediately preceded the existing creation, i.e.*, the creation described by him in the first chapter of Genesis.

In the authorised version, it is said that the earth was "without form and void." The words in the original, תֹּהוּ וָבֹהוּ *thohu vabhohu*, are very important. They furnish a key to the true meaning and elucidation of the verse.

The sense long popularly given to them on the apparent authority of the rendering in the authorised version, has proved a great bar to the right understanding of it. If the condition of the earth here described indicated a period, as the preceding remarks lead us to believe, which closed the preceding geological or tertiary epoch, what is meant by its being "without form and void?" Some understand this to be a state of *chaos;* but it is difficult to say what it means. The words in the original are nowhere else found *connected together,* but in the 23d verse of the fourth chapter of Jeremiah, which is thus translated by Dr Henderson:—

> "I saw the land
> And behold! it was waste and empty,
> And the heavens, and they had no light.
> I saw the mountains,
> And behold! they trembled,
> And all the hills shook vehemently.
> I saw, and behold! there was no man,
> And all the birds of the air had fled.
> I saw, and behold! the fruitful land had been turned into a desert.
> And all the cities were broken down
> Before Jehovah; before the fury of his anger."

In the above passage I understand the words תֹּהוּ וָבֹהוּ in verse 23d to express in general terms the completeness of the desolation occasioned by the devastation of Nebuchadnezzar's army, the details of which are briefly expressed in the subsequent verses, in very sublime and bold figures. It is said that the "mountains trembled" and "shook vehemently," that "there was no man or bird of the air;" that "the fruitful land had become a desert," and that "the cities were broken down." We know from the history of

the period referred to in the prophetic vision, that a great portion of the people perished during the war, or had been carried into captivity; that the fields had been laid waste and neglected, and had ceased to yield their increase, and that the very birds of the air had abandoned them. It will be observed that the expressions in the foregoing passage are not to be taken in their strictly literal acceptation, implying that every man and bird had been destroyed, or removed from the land, or that no grass, herb, or fruit, or any other kind of sustenance had been left in it.

The words תֹּהוּ וָבֹהוּ as applied to the earth previously to the creation described by Moses, must be expressive of its waste and desolate condition in regard to the creatures which formerly lived in it—in regard to the productions by which they were sustained—in regard to the darkness with which it was enveloped, and to the waters which covered its surface. It is implied that the previous *flora* and *fauna* had become extinct, at all events to such an extent that the creation of a new *fauna* such as is described by Moses, was necessary, and of a new *flora* suitable to the new circumstances of the earth, and to the new *fauna* to be created in it. The words תֹּהוּ וָבֹהוּ are rendered in the Septuagint version, which was translated from Hebrew into Greek about two hundred and seventy years before Christ ἀόρατος καὶ ἀκατασκεύαστος —"invisible and unfurnished"—"invisible" by reason of the water and the darkness; and "unfurnished," by the absence of the previous *flora* and *fauna*. The applicability of this rendering to the condition of the earth in the second verse of the first chapter of Genesis will afterwards appear.

The next clause, "And darkness (was) on the face of the deep" will be afterwards considered.

In the last clause, "And the Spirit of God moved on the face of the waters," I should prefer rendering the expression "Spirit of God" by "mighty wind." The word רוּחַ *ruach*, signifies "wind," and the addition of "God" in such a connection is, as is well known, one of the common methods by which superlatives are expressed in Hebrew. The following are the reasons which seem to justify this rendering. In the first place there is no article in the original, a fact important, although not of itself decisive. In the next place, the idea of the Spirit of God moving on the face of the waters amidst darkness and desolation, is not in keeping with the sublime notions, elsewhere expressed in Scripture, of the majesty and omnipotence of Him who said, "Let there be light and there was light,"—"who spake and it was done, who commanded and all things stood fast." This passage does not seem, moreover, to be capable of being adduced with any force, as an argument in favour of the personality of the Holy Spirit, while fortunately not merely the personality, but the divinity and the work of the Holy Spirit are elsewhere so clearly established as to be independent of any doubtful proof; and farther, it is of the Son, and not of the Holy Spirit, that it is said, "By him all things were made."—John i. 30. That the rendering "mighty wind" is consistent with the Hebrew usage and idiom, is beyond all doubt—as for example, "Cedars of God," *i.e.*, "very tall cedars;" "a prince of God," "a mighty prince;" "mountains of God," "very high mountains;" "wind of Jehovah," "a

strong and blasting wind."—Isa. xl. 7. "The grass withereth because a strong or blasting wind bloweth upon it," not "the Spirit of God," as in the authorised version. It is the "wind" and not the "Spirit of God" that is elsewhere said to blast the grass and flowers of the field.

But it is averred that "mighty wind" is unsuitable to מְרַחֶפֶת connected with it, which, it is said, expresses "brooding," "incubation," a "fluttering motion" as of a bird over her young. But, as the word is found in only two other passages of the Bible, the usage is too limited to justify any confident assertion that it must be here restricted to the meaning required in the other cases. In Latin the word "incubo" conveys the notion of "brooding over," or "incubation," both literally and figuratively. But it expresses likewise that of "violent motion." In *Virgil's Æneid*, I., 84–89, both notions are expressed in the same passage, and it is worthy of remark that the latter usage is applied to the wind sweeping over the sea, and raising the waves. The former sense is expressed in the words: "Ponto nox incubat atra"—"Thick darkness broods over the deep;" and the latter, that of the winds sweeping over the sea, and stirring it up from its lowest depths:—

> "ac venti, velut agmine facto
> Qua data portu ruunt, et terras turbine perflant
> *Incubuere mari*, totumque a sedibus imis
> Una Eurusque, Notusque ruunt, creberque procellis
> Africus, et vastos volvunt at littora fluctus."

Of the above passage the following is Davidson's rendering: "The winds, as in a formed battalion, rush forth at every vent, and scour o'er the lands in giddy whirls—*they ply the ocean furiously* (*incubuere mari*) and at once East, and

South, and stormy South-west, plough up the whole deep from its lowest bottom, and roll vast billows to the shores." Virgil has also: "Tempestas incubuit sylvis"—"The tempest swept over the woods." And in *Quintilian Inst.*, 5, 6, we find an expression which is exactly equivalent to the clause before us: *Magna vis venti in mari incubuit.*

In verse second the earth is said to be covered with water, and wind is an agent suitable, and constantly employed in nature, for its removal, and for the subsequent drying of land. It was the same agency that God employed for the removal of the waters of the deluge, and it is the same Hebrew word that is used. "And God made a wind רוּחַ *ruach*, to pass over the earth, and the waters were assuaged."—Gen. viii. 1.

Such, it is conceived, is the most correct meaning of the words rendered in the authorized version "Spirit of God;" but this rendering is by no means essential to the bringing out the sense which I attach to the verse, which I would translate as follows: "But the earth had become desolate and empty (*i.e.* emptied of its *flora* and *fauna*), and darkness (was) upon the face of the deep, and a mighty wind moved on the face of the waters." The connection between the second and the third and following verses, in point of time, seems to be beyond doubt. The condition of the world in verse second required the removal of the darkness, and of the waters that covered the earth, and also the creation of a new *flora* and *fauna*, all which are described in the third and subsequent verses.

Moses describes, in the third and following verses of this chapter, a series of facts all still palpable and apparent—

light and darkness—morning and evening—dry land visible, and the waters removed from its surface, and collected partly into clouds suspended in the firmament of heaven, and partly distributed into oceans, seas, gulfs, lakes, and rivers—grasses, herbs, and trees yielding fruit for the sustenance of man and beast—fish of the sea, fowls of the heaven, beasts of the field, and lastly man, formed after the divine image, with the earth as his habitation, and all the lower animals in subjection to his dominion. It will be here observed, that Moses describes the creation only of the *flora* suitable for the sustenance of man and the lower animals, which consisted of grasses, under which, as will be afterwards shown, are comprehended all kinds of grain; herbs yielding seed, viz. vegetables; and trees yielding fruit, whose seed is in itself.—Gen. i. 2–9, *et seq.*

Such, in general terms, is the teaching of Moses in reference to the creation of the heavens and the earth; in regard to the condition of the earth previously to the Adamite creation; to the means used for its restoration from that condition; to its present state of order and beauty; and to the creation of the existing *flora* and *fauna*. I shall afterwards refer to the difficulty raised against the creation of the heavenly bodies on the fourth day.

It only remains, in connection with the preceding division of the subject, to ascertain whether what is here stated by Moses, as above interpreted, is in harmony with what is elsewhere recorded on this subject in other parts of the Divine Word; whether it is elsewhere affirmed that God created the heavens and the earth; whether, at the era that immediately preceded the Adamite crea-

tion, the earth was covered with water, and enveloped in darkness; and whether a new *flora* and *fauna* were then created.

We repudiate the idea of the Mosaic creation being placed on the same footing with, and as possessing no greater authority, and as being no more an object of faith than the cosmogonies of heathen mythology.

The record of the creation in the first chapter of Genesis, is assumed, confirmed, and established throughout the whole of the Bible. It lies at the very foundation of our religious faith; it cannot be regarded as an isolated portion of the Word of God that might be cancelled, or abandoned without prejudice to our faith. What it contains is as much the Word of God as any other portion of the Scriptures, and rests upon the testimony of God Himself. The doctrine that God created all things is assumed throughout the whole of the Sacred Volume, and reference more or less direct is made to the record of the Mosaic creation, from the beginning to the end of it; and God's claim to reverence, worship, and obedience, is founded on His title, and relation to us, as our Creator. "It is he that made us," says the Psalmist. "and not we ourselves," and hence the duty and obligation to "enter into his gates with thanksgiving, and into his courts with praise, to be thankful to him, and to bless his name." In the following quotation, the Psalmist declares God to be the creator of the world, and also to be from everlasting to everlasting. "Before the mountains were brought forth, or ever thou hadst formed the earth and the world, even from everlasting to everlasting, thou

art God."—Ps. xc. 1. So also, "By the word of the Lord were the heavens made; and all the host of them by the breath of his mouth. He spake, and it was done; he commanded, and it stood fast."—Ps. xxxiii. 6, 9. "The sea is his, for he made it: his hands formed the dry ground."—Ps. xcv. 5. Of the same tenor is the teaching of the New Testament. "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear."—Heb. xi. 3. The angel in the Revelation is represented as holding up his hand and swearing "by him that liveth for ever and ever, who made heaven, and the things that therein are, and the earth, and the things that therein are, and the sea, and things that are therein."—Rev. x. 6.

As to the condition of the earth that preceded the creation of man, it is stated in Psalm civ. 6, that the Lord "covered the earth with the deep as with a garment; that the waters stood above the mountains; that at the voice of his thunder they hasted away; that they went up by the mountains; that they went down by the valleys to the place that he had formed for them."—Ver. 7, 8. In regard to the laws and uses of the heavenly bodies the Psalmist adds: "He appointed the moon for seasons, the sun knoweth his going down."—Ver. 19. And he then breaks forth in strains of exultation and praise, in the celebration of the other works of Jehovah: "O Lord, how manifold are thy works; in wisdom hast thou made them all. The earth also is full of thy riches; so is this great and wide sea, wherein are things creeping innumer-

able, both small and great beasts; there is that leviathan, which thou makest to play therein."—Ver. 24–26. The same sacred writer then speaks of their extinction, in language that might almost apply to the extinction of the *fauna* of the tertiary epoch: "Thou hidest thy face, and they are troubled; thou takest away their breath, and they die, and return to their dust."—Ver. 29. And he then speaks of a reproduction: "Thou sendest forth thy Spirit, and they are created; thou renewest the face of the earth." —Ver. 30.

That the Mosaic account of the creation is in harmony with what is elsewhere taught in the Word of God requires nothing further to be said by way of argument, proof, or illustration. I shall now, therefore, show, as I proposed, how far the teaching of Science is in harmony with that of Scripture, at the periods, and upon the subject, which have been already considered.

CHAPTER II.

THE TEACHING OF SCIENCE.

As regards the creation and age of the world, science teaches nothing whatever. It carries us through certain systems or epochs; it points out progression and change in regard to its inorganic structure, and organic remains, through periods, so vast in duration, as to be beyond all reliable calculation. It reaches at length back to an epoch, in which there are no indications of animal or vegetable life. The earliest phenomena which it brings under our notice are the primitive and metamorphic rocks, so called from being the earliest known, and from their appearance of having been brought from a previous to their present condition, by igneous, mechanical, or chemical action. These are represented as originally underlying all the stratified rocks, and as no fossil remains have been found in them, they are in consequence likewise called azoic and "unfossiliferous." The geologist, at his starting-point, finds a sea, and rocks; thither he goes back, and no farther. He

can give no scientific account of the origin of the world as it then existed. His business is to trace its history and progress from the period at which he starts, and there is nothing, as has been said, in his science to contradict Moses' grand proposition that, "In the beginning God created the heavens and the earth." "The primary epoch," says Mr Jukes, in his *Manual of Geology*, p. 430, "means simply that which preceded the secondary, —the first portion of time that we know anything of, not by any means the first time of all, since of that we know nothing. The primary epoch has no definite starting-point. Future investigations may show us formations lying below those, which are the lowest we have hitherto discovered, so that our chronological commencement is lost in the remote past. The geological history can only begin like a fairy tale: "Once on a time there was a sea, and in that sea certain rocks were formed, and so on."

The Scripture record, it hence appears, reaches beyond the most remote geological era. It reaches a period antecedently to which the earth had no existence. It accounts authoritatively for that upon which science could have thrown no light, for the creation of the earliest objects of which geology treats. Science has no other rational way of accounting for the creation of the heavens and the earth.

I shall now endeavour to show what is the teaching of science in regard to the condition of the earth, and of its *flora* and *fauna*, commencing at its starting-point.

The earliest or primary geological epoch or system referred to in the foregoing quotation from Mr Juke's work has been called *azoic*, because in the rocks of the sys-

tem there is little or no indication of animal or vegetable life.

The second is what is called the *Palæozoic,* or ancient life period, embracing the Silurian, the Old Red Sandstone, or Devonian, the Carboniferous, and the Permian systems. These systems comprehend different varieties of the stratified or sedimentary rocks, which are deposits formed by aqueous and other agency, containing organic remains of the earliest types, gradually advancing from humbler to more highly organised forms. That progress is clearly discernible throughout the whole of the Palæozoic epoch; the lowest forms commencing with the Silurian, and the highest extending to the Permian, which closes the epoch.

The fossils of the Silurian rocks are entirely of a *marine* character. The *fauna* consist, generally speaking, of Radiata, Molusca, and Crustacea, and are *all* of invertebrate types; the *flora* of sea-weeds. In this system there is no appearance of a terrestrial *fauna.* At the close of the Silurian, or rather at the dawn of the Old Red Sandstone system, the earliest traces of *vertebrate* life appear in the fossil fishes contained in the rocks of that system, where are found also distinct traces of terrestrial vegetation.

The grand feature of the carboniferous period, which succeeds that of the Old Red Sandstone, is its gigantic *flora,* which have now only distant representatives, in tropical swamps and jungles. The fishes are chiefly of a large size, and of a sauroid character. Notwithstanding the profuse vegetation of the carboniferous period, it was apparently unfitted for the support of either graminivorous bird or herbivorous quadruped. "So far as it appears,

neither flock nor herd could have lived in its greenest or richest plains."—*H. Miller.* Accordingly, it does not appear that any graminivorous bird or herbivorous quadruped existed during that period.

"Taking," says Dr Page, "the whole succession and alternation (in the carboniferous period), the sandstones, clays, shales, ironstone, and coal, and noting the peculiar fossils, the estuary character of the shells, and fishes of the middle group, with an excess of terrestrial vegetation throughout, we are reminded of conditions never before or since exhibited in our globe."—*Introductory Text-Book of Geology*, p. 88.

In the Permian system, the most recent of the Palæozoic group, are found fossils akin to those of the carboniferous era, with crinoids, shell-fish, fishes with heterocercal tails, *i.e.*, with unequal lobes, like the shark or dog-fish, and frog-like reptiles.

Here closes the Palæozoic period, the rocks of which contain fossil plants and animals, according to Dr Page, "of *species altogether different from those now existing.*"—*Ib.*, p. 37.

The Mesozoic epoch, or that of the secondary formations, embraces—1. The Triassic; 2. The Oolitic; 3. The Chalk or Cretaceous systems. The plants of the Triassic system that precedes resemble the Oolitic types that succeed them. The animal remains are corals, encrinites, shell-fish, fishes with homocercal tails (like the cod and salmon), amphibious reptiles, traces of birds and small marsupial animals.

"With the exception of the higher mammalia," says Dr Page, "almost every existing order is represented in the

fauna of the Oolite; but the forms are Mesozoic, and *died out at the close of the Chalk era.*"—*Id.*, p. 112. "The cretaceous system, so called from the chalk beds which form its most notable feature, is the last or uppermost of the secondary formations. All its types of life are strictly Mesozoic; and of the numerous species found in the Oolite and Chalk, few have been detected in the Tertiary *strata.* Palæontologically, its remains are eminently marine, and comprise numerous species of sponges, corals, star-fishes, sea-urchins, shell-fish, crustacea, fishes, and reptiles; remains of birds and mammalia have also been detected, but these are too imperfect and obscure to warrant any definite conclusion as to their character and affinities."—*Id.*, pp. 120, 121. Of the secondary formation Dr Page elsewhere says that it contains "*fossil plants and animals of species altogether different from those now existing.*"—*Id.*, p. 27.

The Mesozoic or Secondary is succeeded by the Tertiary formations, or Cainozoic epoch, *i.e.*, the epoch of new life. The Tertiary formations have been divided into four groups—1. The Eocene; 2. The Miocene; 3. The Pliocene; 4. The Pleistocene. These groups are founded upon the perceptible approach to existing species, taking the fossil shells for the index. By this grouping it is to be understood that a very small percentage of existing shells are found in the Eocene group, a larger in the Miocene, a larger still in the Pliocene, and the largest of all in the Pleistocene. By this I understand that some shells that came into existence during the Tertiary epoch survived conditions in the earth and seas, which led to the extinction of other forms of life. Generally speaking, it was only

during the first three periods, viz., the Eocene, the Miocene, and the Pliocene, that the fossils of the Tertiary epoch were deposited. There are no stratified rocks with fossil remains in the Pleistocene similar to those in the three foregoing groups. The abundance of shells in the Pleistocene or drift period arose from the overflowing of the sea; and the shells seem to be a portion of the superficial drift thereby accumulated. "We arrange these groups, Eocene, Miocene, and Pliocene under one head, because they are all evidently sedimentary deposits, resulting from the usual depositions of water, and because they are all less or more fossiliferous, and thus give evidence of the condition of the world during the period of their deposition. The case is different with the Pleistocene or Boulder-drift group, which is clearly not an ordinary sedimentary drift deposit, and which, with rare exceptions, is altogether destitute of fossils."—*Id.*, p. 123. Dr Page farther states, concerning the Tertiary rocks, that "they contain the remains of plants and animals, not *widely* differing in character from those now existing."—*Id.*, p. 27.

Such is the teaching of science up to the close of the Pliocene group of tertiary rocks, which brings us to the Pleistocene, or the last group of the Tertiary system. This Pleistocene group is all that separates the most recent fossiliferous rocks of the tertiary from the commencement of the post-tertiary epoch, which is signalised by the Mosaic or existing creation. In the previous geological epochs, there is an order of ascent from lower to higher forms of vitality,—the water-breather preceding the air-breather, the

cold-blooded the warm-blooded, the invertebrate the vertebrate, the fish the reptile, the reptile the bird, and the bird the mammal. In the same manner among plants the cellular precedes the vascular, the amphigen the acrogen, the acrogen the gymnogen, and the gymnogen the endogen and exogen.

It will be kept in mind that at the close of the Palæozoic and Mesozoic periods, previous forms of life became extinct, and new and higher ones succeeded. This extinction of previous *flora* and *fauna* must have been owing to some new conditions of the earth that made it unsuitable for their existence, and rendered new creations necessary. In accordance with the analogy of former extinctions and new and higher creations, we might naturally look for conditions of the earth between the close of the deposition of the tertiary fossiliferous rocks and the commencement of our own era, which might account for the disappearance of the previous *flora* and *fauna*, and require such a new creation as that described in the first chapter of Genesis. After the general announcement in the first verse that the heavens had a beginning and a Creator, Moses passes over without any mention (as has been already said) of epochs and systems, with fossiliferous remains of pre-existing forms of the earth's *flora* and *fauna*. It was unnecessary for him to do so, as they were recorded in the rocks, and destined to come to light in the fulness of time, without the aid of inspiration. All that Moses did was in very brief and general terms to make known to mankind the condition of the earth at the period immediately preceding

the creation described by him. He says that it had become desolate and empty (on account of the disappearance of its *flora* and *fauna*), that it was covered with water, and enveloped in darkness.

On the supposition, then, that Moses means in verse second to describe the condition of the earth that immediately preceded the existing creation, and on the supposition that the interpretation given of it is correct, it now becomes necessary to inquire whether the geological period, immediately preceding the existing creation, corresponds with the condition of the earth thus interpreted; whether the condition of the earth as described by geologists was so unsuitable to the continuance of past organic life as to occasion a disappearance of its *flora* and *fauna* similar to what took place at the close of the Palæozoic and Mesozoic epochs; and to require such a new creation of *flora* and *fauna* as occurred at the commencement of the Mesozoic and Tertiary, or Cainozoic systems. The probability that such was the case will appear from the consideration of the condition of the earth geologically considered during the Pleistocene, or geological period which immediately preceded the era of the Mosaic creation. This would be the case if it is found, for example, that the climate of the globe at the commencement of the Pleistocene period was changed from a tropical or subtropical to that of a boreal or arctic temperature—if the whole, or even the greater portion of the earth was covered with water, and enveloped in darkness. This period is called by geologists the Glacial epoch—or the Boulder

drift—or Boulder-clay formation; the phenomena of which, as will immediately appear, can only be accounted for by the presence of ice at one period—and subsequently of icebergs, transported over what was formerly dry land, but then covered with water.

CHAPTER III.

THE BOULDER-DRIFT FORMATION.

THE Boulder clay overlies the tertiary fossiliferous rocks, and is itself unstratified, and for the most part unfossiliferous. But although this is the period nearest to that of the existing era, "there is no class of rocks," says Dr Page, "so perplexing, or whose origin is involved in greater obscurity, than this drift or Boulder-clay formation, the diluvium of the ancient geologists." Certain important and most interesting facts, however, respecting it have indeed been brought to light, which have been generally accepted by geologists. But as to the cause, origin, and extent of the phenomena, there seems to be still greater uncertainty. Considering, then, the extreme brevity of the Mosaic record, and the imperfect knowledge that has, as yet, been acquired of the causes and extent of the Boulder-drift phenomena, it is not to be expected that all the light which is desirable has yet been obtained, to render the harmony between the two records complete.

But the geological phenomena, nevertheless, are, so far, in wonderful harmony with, and greatly contribute to confirm, the truth of the Mosaic record.

As it appears from the Mosaic record, that the earth at the period immediately preceding the Adamite creation, was covered with water, it is necessary to show that this condition of the earth corresponds with the phenomena of the "Boulder clay or drift formation," the contemporary geological period. And it will be seen, that geologists have been able to account for the phenomena of that period, only by the agency of ice and water.

Of the drift formation Dr Page says:—"After the deposition of the Pliocene (the most recent of the Tertiary fossil rocks) it would seem that the latitudes in the north of Europe underwent a vast revolution as to climate, and that some new revolution as to sea and land took place at the same period; at all events, the large Mammalia of the Tertiary period disappeared, and the land was submerged to the extent of several thousand feet, for we find water-worn boulders on the top of our highest hills." "Similar phenomena are also manifested in Canada, and in the Northern States of America. Again, when we turn to the Antarctic Ocean, analogous appearances present themselves in Terra del Fuego and Patagonia."—*Elem. Handbook of Geology*, pp. 132, 133. I quote with great confidence from Dr Page, on account of his thorough acquaintance with the subject, and because, from the elementary nature and object of the work referred to, it is his business not to deal with theories, but to set forth generally accepted geological facts. And if, by his means, I shall have contributed to

the "reconciliations" which he deprecates, without prejudice either to religion or geology, I am confident that he will not be dissatisfied with the result.

In a paper upon the Boulder-drift formation in Scotland, by Mr Thomas Jamieson, Lecturer on Agriculture in the University of Aberdeen, which was read, with much approbation, at the meeting of the British Association in Aberdeen in 1859, a number of most interesting facts were submitted to the meeting. In that paper Mr Jamieson says:—"Although no great thickness of drift is found much above 2000 feet, yet transported boulders occur at much greater height. For instance, there is a mountain near Ballater known by the name of Morven, the same that Byron calls the 'Mountain of Snow.' It is a high hill about 3000 feet, and stands many miles apart from any of the like elevation. All the upper part of the hill is confined to hornblende rocks, yet on the *very summit* I found several small boulders of granite and quartz rock that had probably been transported from the mountains to the west. And on the quartzy crest of Cairn-na-drochet, a hill near Braemar, at a height of 2700 feet, there rests a block of red granite, twelve feet in length; and many others abound all around its broad flat top. Still farther, there is a mountain of quartz rock to the south of Braemar, called Ben Uarn More, forming the culminating peak of that great ridge which divides the counties of Perth and Aberdeen. Its altitude is 3589 feet, and on the top of it I found pieces of Fellspar Porphyry, which certainly does not there occur *in situ*."

After mentioning facts of the same kind in other parts

of Scotland, Mr Jamieson adds:—"These boulders have been carried across deep valleys, and the phenomena seem best accounted for by the agency of floating ice. If these boulders therefore have sailed on the surface of a glacial sea to their present position, that sea must have overspread the whole country. The cliffs of Cairn-gorm and Loch-na-gar must have been washed by its billows, and *terrestrial life extinguished in these regions.* This is an important point to establish, for it involves, as a consequence, that the present *flora* and *fauna* date from the drift period;" and he adds, "and I think there is no escaping the conclusion that *the whole country was submerged.* The similar observations made in the south of Scotland, the north of England, in Wales, and in Ireland, all show that the submergence was not *local*, but *general over the length of Great Britain and Ireland.*"

Such are the phenomena exhibited in Britain and Ireland during the Geological period that immediately preceded the existing creation. It hence appears that their condition at that period is in wonderful harmony with the condition of the earth expressed in the second verse of Genesis—viz., "covered with water."

But more still remains than merely to indicate the state of Britain and Ireland at that period. It is still necessary to show the condition of the earth, at the same time, in other parts of the world.

De la Béche states, that there appears good evidence that a part of France adjoining England, to one thousand feet, and to a larger amount, was submerged. And he adds: "It would be instructive to consider the effects of

the submergence in that part of France and of England." —*De la Béche's Geological Observer*, p. 256. "The blocks on the Jura have always attracted much attention, from the circumstance that they must have been transported over the great valley of Switzerland, between that range and the Alps. The blocks of the Chasseron are estimated as rising to the height of about 3500 feet."

Vallisneiri, an old Italian writer, had been so much struck with the remarkable continuity of the more recent marine strata, from one end of Italy to the other, that he came to the conclusion, that the ocean formerly extended over the whole earth, and after abiding there for a long time, gradually subsided."—*Lyell's Principles*, p. 24. Lyell calls this an untenable opinion, without giving any reason for doing so.

"The summits of the Apennines are said to be filled with marine shells."—*Id.*, p. 41.

"The area over which these erratic blocks have been so distributed in Russia and the adjoining countries has been shown in a map by Sir Roderick Murchison, M. De Verneuil, and Count Keyserling, the boundary line exhibiting the southern and eastern limits of the erratic blocks, extending from Russia to Bornege, in Prussia, and thence northward to the gulf of Tcheskai in the North Sea. It is remarked, that, from the German Ocean and Hamburg in the west, to the White Sea on the east, which may be roughly estimated at 1,200,000 square miles, the country is more or less covered with loose detritus, amidst which there are blocks of great size, the whole derived from the Scandinavian mountains."—*De la Béche*, p. 275.

"During the same period (that of the Boulder drift)," says Sir Roderick Murchison, "the low countries of northern Europe were, it is well known, covered by an Arctic Sea. The Jura and the Alps having also then, as it is believed, been subtended by water, icebergs and rafts must have been detached from the higher range, carrying away blocks of stone northwards, to be dropped at intervals, just as it has been demonstrated that the Scandinavian blocks, which floated southwards, were dropped in Prussia, Poland, and the low lands of Russia, where all those were under the influence of an Arctic Sea. In short, Batavia, and the lower parts of the cantons Vaud, Neufchatel, and Berne, must have been covered by waters which, whether salt or fresh, bathed the foot of the Alps." "One of our great insulating dislocations was, I conceive, coincident with that striking phenomenon in the Alps, on which I have tried to rivet your attention, when the first glacial and icy period affected so large a portion of this hemisphere, and when large portions of our northern land formed the bottom of an Arctic Sea. But such tracts were bidden to rise again from beneath the waters, and constitute the present *continents* and *islands*, before man was placed on the surface. Our race, in short, was not created until the greater revolutions of which I have treated had passed away."—*Murchison's Siluria*, Appendix ii., pp. 502, 504.

"In Asia Dr Hooker has observed Boulder drift on Mount Lebanon, 6000 feet above the level of the sea;" and phenomena of the same kind are observable throughout the East.

It now remains only to notice some of the most remark-

able phenomena of glacial, iceberg, and aqueous agency, during the same period, in America. "From the eastern extremity of Nova Scotia to the Rocky Mountains, over a belt of several hundred miles wide, the surface is strewed with boulders, gravel, and sand, that have been carried in a southerly direction by the drift agency, from a few rods to a distance of six hundred miles. The rocks in place have been striated in the same direction."—*Professor Hitchcock's Geology of the Globe*, pp. 107, 108. "The distance to which this drift agency extended has not been accurately fixed. Indeed, it seems to have gradually died out, and in some places it extended much farther than others. South of the Ohio, not much coarse drift appears, and yet much farther south, in the valley of the Mississippi, pebbles occur, which had a northern origin. Perhaps the latitude of 40 degrees north is the southern limit of a decided drift agency, and consequently the lines that represent that agency on the geological map are terminated for the most part in that parallel."—*Id.*, p. 108.

"As to the height above the ocean to which the drift agency extended, we have only a single example, but that is a decided one. Mount Washington, the highest point in the White Mountains, about 6200 feet, does not show distinct marks of this agency much over 5000 feet elevation. Above this, the surface is covered by angular blocks, broken up by frost, but never removed,—a circumstance that rarely, if ever, occurs at a lower level. Between five and six thousand feet, then, may be assumed as the upper limit of this agency in North America. No organic remains have been found in the proper drifts of this country.

Recent species of shells have indeed been discovered in sand and gravel, which have been called drift, as at Brooklyn, Long-Island at Portland, Maine. But these portions were probably re-arranged, and modified drift, and were found at a period immeasurably posterior to that of the proper drift."—Pp. 108, 109.

In speaking of ancient sea-beaches, and terraces, and moraines, Professor Hitchcock remarks: "It seems to us that no one can examine these phenomena in New England, and Mr Chambers's recent work on 'Ancient Sea Margins,' shows the same, in regard to Great Britain, without being satisfied that water had been the main agent. For what other agent can set or arrange with a level top, and in horizontal layers, gravel, sand, or clay, over wide surfaces?" "If I mistake not, I have ascertained the existence of some of these sea-beaches in the Hoosac range of mountains, Massachusetts, not far from two thousand feet above the present ocean, and two thousand five hundred in the White Mountains; also some river terraces upon mountain streams, as much as eighteen hundred above the ocean; and around some of our lakes, Ontario for instance, distinct terraces as high as 996 feet above the sea, and 764 feet above the lake. As we descend from these highest points yet ascertained, we find beaches and terraces at various levels, till we reach the present sea level. It must have been the ocean therefore by which they were produced, and the inevitable conclusion is, that the *ocean at the close of the drift period did stand over this continent as high as we now find any terraces;* and that, *as it retired,* or the continent was lifted up, the terraces or beaches were formed,

excepting some of the river terraces, which may have been produced as above described."—*Id.*, p. 108.

Erratic blocks are also found in South America. "Mr Darwin discovered them up the Santa Cruz River, in Patagonia, about 50° 10′ S. Latitude, and about sixty-seven miles from the nearest Cordillera. Nearer the mountains (at 55 miles) they became extraordinarily numerous. One square block of chloritic schist, measured five yards, on each side, and projected five feet above the ground; another, more rounded, measured sixty feet in circumference. There were innumerable other fragments from two to five feet square. The great plain on which they stood, was 1400 feet above the sea, sloping gradually to sea cliffs of about one hundred feet in height."—*Quoted by De la Béche; Geological Observer*, p. 277.

It has been hitherto held that the phenomena of the glacial period do not extend beyond the latitudes 40° both north and south; and that in the zone comprehended within these parallels, no indication of glacial influence exists. But in the recent discoveries of M. Agassiz, contained in his recently published travels in Brazil, and in the valley of the Amazons, evidence has been furnished by that distinguished geologist, which is entitled to great weight, that the phenomena of glacial drift are conspicuous almost up to the equator. If M. Agassiz's testimony can be relied on, the generally adopted views of geologists in regard to the extent of the glacial influences over the earth's surface, must undergo a mighty change; and also their views in regard to the existence of the terrestrial *flora* and *fauna*, during the Boulder-drift Forma-

tion period. In a letter addressed to the King of Brazil, contained in the foresaid publication, M. Agassiz thus expresses himself:—

"Sire,—Allow me to give your Majesty a rapid sketch of the most interesting facts, observed by me since leaving Rio. The first thing that struck me, on arriving at Bahia, was the presence of erratic soil, corresponding to that of Tejuca and the southern part of Minas-Genäes, which I have visited. Here, as there, this soil, identical in its constitution, rests upon rocks *in place,* of the most diversified character. I have found it also at Maceió, at Pernambuco, at Parahybo do Norte, at Cará, at Maranham, and at Pará. This is a fact, then, established on the greatest scale. It shows that the superficial materials which, here as in the north of Europe and America, may be designated as drift, cannot be the result of the decomposition of underlying rocks, since the latter are sometimes granite, and sometimes gneiss, sometimes mica, or Talcose slate, sometimes sandstone, while the drift presents the same composition everywhere."—P. 100.

It is farther stated in the forementioned publication, which was written by Madame Agassiz, who accompanied her husband in the scientific expedition, for which the travels were undertaken, under the auspices of the King of Brazil: "The more he (M. Agassiz) considers the Amazon and its tributaries, the more does he feel convinced that the whole reddish homogenous clay, which he has called drift, is the glacial deposit brought down from the Andes, and worked over by the melting of the ice that transported it. According to this view, the whole valley

was originally filled with this deposit; and the Amazon itself, as well as the rivers connected with it, are so many channels worn through the mass, just as the Igarape now wears its way through the modern deposits of mud and sand."—*Journey through Brazil, by Professor and Mrs Louis Agassiz,* p. 250. Trübner & Co., London.

In a notice of the work above quoted, in the *Athenæum* of date 4th April 1868, the able and learned writer thus expresses himself, in reference to the author's observations on the drift formation, in the tropical regions of South America: "The most interesting and probably the most important results of Professor Agassiz's expedition are those relating to a new phase of the glacial period. One would hardly expect to find new facts relating to the movements of the icy masses, in one of the hottest parts of the tropics, and the author is quite aware that his statements with regard to them, will awaken among his scientific colleagues even more violent opposition than that by which his first announcement on the glacial period was met. But he is willing to bide his time, feeling that, as the theory of the ancient extension of glaciers in Europe has gradually come to be accepted by geologists, so will the existence of like phenomena, both in North and South America, during the same period, be recognised sooner or later, as part of the great series of physical events, *extending over the whole globe.* Indeed he argues, when the iceberg period shall be fully understood, it will be seen that *the absurdity lies in supposing that climatic conditions so different could be limited to a small portion of the earth's surface.* If a geological winter existed at all, it must have

been *cosmic;* and it is quite as rational to look for its traces, in the eastern hemisphere, to the south of the line, as to the north of it."

Such is the teaching of science, in regard to the earth's being covered with water, during the period that immediately preceded the Adamite creation. I have given the facts in the language of geologists of the highest name, without note or comment, and I feel entitled to maintain that the teaching of Scripture is confirmed by that of science, as far as I have hitherto proceeded. Before, however, taking leave of this branch of the subject, I shall make a few observations upon the causes, to which the Boulder-drift phenomena are considered by geologists to be attributable, and upon the extent to which, according to them, the earth was covered with water.

CHAPTER IV.

MODE OF ACCOUNTING FOR THE BOULDER-DRIFT PHENOMENA.

In accounting for the Boulder-drift phenomena, geologists suppose a period of intense cold *without* water, succeeded by a period of intense cold *with* water. The former is called the Glacial, and the latter the Iceberg period. During the former, it is generally understood that the countries in the higher, northern, and southern latitudes were sealed with ice, and the boulder drift of that era is ascribed to glaciers descending from higher to lower elevations, and discharging their burdens, like the Alpine glaciers of the present day, where the temperature became sufficiently mild for their deposition. Geologists, however, are of opinion that ice alone is altogether insufficient to account for the whole of the Boulder-drift phenomena; and they have in consequence had recourse to an aqueous, succeeding the glacial period, during which, icebergs in prodigious numbers, setting out from great altitudes, were floated over land, submerged to a great depth, and discharged their

burdens in those places where drift is now conspicuous. By this theory, they account for boulders on high mountains, in situations in which they could not be accounted for by means of glaciers, where the boulders deposited are different from the rock *in situ.*

From what has been said, it is evident that geologists consider the agency of water necessary to account, in part at least, for the phenomena of the boulder drift. But the water which the iceberg theory requires, demands also a theory to account for its own existence. This has been accounted for in either of two ways, viz., by the submergence and subsequent rising of the land, or by the rising and falling of the sea. The former is the theory accepted by most geologists; but some, as appears from the quotations adduced from Professor Hitchcock, adopt the latter. The former assumes the subsidence of the extensive districts of the earth, referred to in the foregoing quotations, and also their rising again in the same forms of mountain, plain, and valley, and containing the same fossil remains as at the time of their submergence. This theory of the subsidence of land, it would seem, does not assume likewise the subsidence of the surrounding seas; for if the subsidence of sea and land had been in the same proportion, the relative height of both would have remained unchanged, and there would, consequently, have been no *submergence* of the land. Geologists seem to think that the subsidence of the land, and its submergence, offer a more rational and philosophical theory, than the overflowing of the land, by the rising of the sea. But it may be asked, Are the subsidence and submergence of such an

immense extent of land, and its emergence bodily, analogous to any other phenomenon which science presents, which can justify, or even give probability to the theory? The rising of the land in a certain district in the west coast of South America to the height of a few feet, or the relative elevation of land and sea in Denmark within a comparatively recent period, do not warrant the theory of submergence, and emergence, demanded by that theory. Nor is this proved by raised beaches, as these phenomena may be accounted for by the rising and subsidence of the waters of the sea, as well as by the subsidence and emergence of the land. Earthquakes, volcanic eruptions, upheavals of mountains, are in no respect analogous to the quiet and equable subsidence and emergence of the vast tracts of land which, it is admitted, were submerged during the drift period. But supposing this to be a rational and tenable theory as regards the submergence of the vast extent of land admitted by geologists, is there any insuperable difficulty in the way of the supposition of the submergence of the whole earth? And if there is not, the statement of the Mosaic record, that the earth was covered with water, cannot be said to be at variance with the principles of science. But geologists do not aver that the whole earth was covered with water. They seem to infer that absence of drift indicates absence of water. But the absence of iceberg drift does not necessarily argue the absence of water. The deposition of drift will only occur at a temperature sufficient to detach the drift from the iceberg. Iceberg drift, therefore, will not be found in a colder or in a warmer atmosphere than is necessary for

this purpose. The course of transportation of icebergs, and their depositions, moreover, will depend also upon the prevalent winds and currents which they encounter during their transit. At present, there are immense depositions of drift from icebergs in the Bank of Newfoundland; but there is probably little elsewhere in the same latitude, or to the south of it. The reason of this is well known. A vast number of icebergs, with their burdens, are set in motion from the North Arctic Ocean, when the severity of winter abates, and transported southward by currents, and melted on their coming in contact with the Gulf Stream opposite Newfoundland. But should the bed of the Atlantic be converted into dry land, as other tracts of water have been, it would be incorrect to argue, at an immensely remote period from the present, that there had been no water where there is no appearance of drift. In the east coast of Scotland, there are certain districts that are literally paved with boulders, while in others of the same and lower elevations, there is not a boulder to be found; there cannot, however, be a doubt that, if there was water in the former, there must have been water in the latter localities. Immense tracts of sandy deserts in Africa, Asia, and elsewhere, are supposed to have been beds of seas, of the Boulder-drift period. That the earth was completely covered with water during that period does not seem to be at variance with science; that is, if the Mosaic record requires such an interpretation, it cannot be said that such interpretation ought to be discredited upon the ground of its being untenable on the principles of science, and irreconcileable with facts. There are geolo-

gists of eminence who affirm the submergence of the whole of the earth's surface to be at least extremely probable. In reference to the Noachian deluge, Mr Ansted says:—"The precise meaning of the sacred history in respect to that deluge, or its exact date, are subjects that we need not here discuss; but *one thing is certain*, namely, that a large part, perhaps the whole of the earth's surface, has been under water since man was among its inhabitants; and it is possible that many *similar*, and partial deluges have taken place at many periods during the earth's history."—*The Great Stone Book of Nature*, p. 116.

It has been seen, that all geologists acknowledge that, during the Boulder-drift formation, very extensive portions of the earth's surface were covered with water. It has also been seen, from the passages quoted from M. Agassiz's Travels in Brazil and in the valley of the Amazons, that the Arctic conditions of the earth and the Boulder-drift phenomena elsewhere observable extended to regions of which geologists had previously no conception of their reaching; and like phenomena may be conspicuous in other tropical regions, in the course of still farther scientific investigations. It is, however, by no means certain that the phenomena of water on the earth, during the Boulder-drift formation, is attributable to the subsidence of the dry land. Of this there is no satisfactory evidence; nor are there sufficient grounds for the averment, made by most geologists, that the absence of drift proves the absence of water during the same period. Professor Hitchcock is dissatisfied with the subsidence theory. "If," says he, "the United States were covered with the ocean so deeply at

the drift period, and if similar facts exist in Europe, there seems no small reason to believe, as some geologists have attempted to show, that the *ocean has retired from the land;* although also the land may have been lifted up. Yet if elevated from 1200 to 2000 feet, we might expect that some of the beaches and terraces would exhibit traces of the movement, *but they show none.* If the continent has been at all so recently raised, it must have risen bodily and very equably."—*Outline of the Geology of the Globe,* p. 108. The reconciliation between the Geological and Mosaic Records is consistent with either theory. All that is assumed in the second verse of Genesis is, that there was water on the earth; and that before the creation of the present *flora* and *fauna,* the water was removed, when the Lord said, "Let the dry land appear."—Ver. 9. It is with the fact we have to do, and not with the theory. There appear to be no greater difficulties in accounting for the subsidence of the land to the extent required by the Boulder-drift phenomena, than for the subsidence of the whole. If, on the other hand, the water in the Boulder-drift period is to be accounted for by the rising of the sea, the whole of the earth must have been overflowed. Sir John Herschel, in his work on *Physical Geography,* says that there is a sufficient quantity of water in the existing oceans and seas, to cover the whole earth to the depth of fifteen feet.

But, provided it could not be shown that the whole of the earth was covered with water, the extent to which it has been proved to be covered, might warrant the general terms in which the state of the earth is described in the very brief and concise narrative in the beginning of the

first chapter of Genesis. Positive assertion cannot be made, on this subject, either from the geological facts or Scripture narrative. The word *all* or *whole* is not used by Moses, in reference to the covering of the earth with water; and provided such was the case, it might, as in other parts of Scripture, be used to indicate only a part or the greater portion of the thing designated, by the grammatical figure *synecdoche.* This figure is employed in the use of words denoting universality or plurality, and in which the whole is used for a part. It is well known that the Bible is full of grammatical and rhetorical figures, which are so common that they enter into the commonest and least figurative subjects. From the commonness of this usage, borrowed from the language of Scripture, in ordinary conversation, grammatical and rhetorical figures are continually employed. Of the figure of *synecdoche* the following are examples, both from the Old and New Testaments. In Exodus ix. 6, it is said "that *all* the cattle of Egypt died" —with which compare ver. 25, when it appears that *part* of them was reserved for another judgment. In Exodus xxxii. 3, it is said that "*all* the people brake off the golden earrings that were in their ears, and brought them to Aaron," but it is afterwards said that the tribe of Levi did not do so. "Then went out unto him *Jerusalem,* and *all* Judea, and all the region round about Jordan."—Matt. iii. 5. "There were at Jerusalem devout men from *every nation* under heaven."—Acts ii. 5. See a number of additional examples in *Glassii Phil. Sacra,* p. 1244: *Ed. Dathe.* I do not insist upon any strained interpretation of the passage in question. There is no passage of

Scripture freer from grammatical or rhetorical figures than the first chapter of Genesis, and no interpretation is contended for, that is not in accordance with the acknowledged usage of the Hebrew language. In the present state of the question, it is unnecessary to contend for any such restricted interpretation, until geological science can establish more satisfactorily than has yet been done, that such interpretation is required. From the opinions of geologists already adduced, and from the latest investigations, which have come to light, it would appear that the evidence is bearing in the opposite direction, *i.e.*, towards a universal, rather than to a partial effusion of water.

In the records, both of religion and science, there is the presence of water at the same period, but neither the theologian nor geologist can tell how or whence it came. Geologists generally advocate the subsidence theory, which seems to have been adopted, because nothing more probable could be devised to account for the phenomena. Be it remembered, however, that this is but a theory. If it is averred that the phenomena are to be accounted for by the rising and retiring of the waters of the sea, that theory cannot be proved to be false. Notwithstanding all that science can achieve, and it has made vast achievements, it may be necessary to say of it in regard to some things, "Hitherto shall it go and no farther." There are certain secret things, which belong to God, that it may not please Him to reveal. The Lord may so far humble the wisest of mankind as to prevent their knowing the secrets of "His working." They have advanced far in discovering how He has worked in time past, but they may never

know how "He broke up the fountains of the great deep;" and how He afterwards "shut up the sea with doors, when it brake forth as if it issued from the womb." They may never be permitted to "enter into the springs of the sea, and walk in search of the deep." They may never be able to ascertain what quantity of water is concealed in the bowels of the earth; or by what outlets it might issue, and to what extent it might cover the terrestrial globe, or to what extent it might absorb the waters at present on its surface. In these and in many other respects, the most illustrious of the sons of science, even to the latest generations, may find it true to the letter, that "the Lord's ways are unsearchable."

CHAPTER V.

THE TEACHING OF SCIENCE IN REGARD TO THE FLORA AND FAUNA DURING THE DRIFT PERIOD.

It appears, from what has been already said in the preceding pages respecting the teaching of Science, that Geology and Scripture are in wonderful harmony, as regards the condition of the earth, during the period referred to in the second verse of the first chapter of Genesis and the Drift period, inasmuch as, in both cases, the earth is said to have been covered with water. It is now purposed to show the harmony between the two records, in regard to the *flora* and *fauna* of the same period. And here, as before, I shall, in the first place, adduce the opinions of scientific men, who have written upon this subject, in their own words.

While treating of the Glacial or Boulder-drift period, Dr Page says: "In process of time, our land was elevated to its present position; and her distribution of sea and land took place, and the glacial epoch passed away. A

new flora and *fauna*, suitable to these conditions, were established in Europe, and these, with the exception of a few that have become extinct, are the species that now adorn our forests, and people our fields."—*Elem. Handbook of Geology*, p. 133. To the same effect are the following quotations from Professor Hitchcock, a highly competent authority: "We cannot," says he, "hesitate to regard this tremendous agency of ice and water in northern and high southern latitudes, as decidedly beneficial in its influence. It must have spread terrible destruction over these regions. But it seems that a time was chosen for its operation when the globe was almost destitute of organic life, when a *new and nobler creature* than that previously occupying the earth was placed upon it."—*Religion and Geology*, p. 173. "All this while (during the same period) both the land and the water seem to have been for the most part destitute of inhabitants, but these were the very processes needed for man, and for his contemporary races, who were to appear during the latter part of the Pleistocene (Boulder-drift) period. In other words, the soils were got ready for nourishing the vegetation necessary to sustain the *new creation*, which would convert these desolate and deserted sea-beds into regions of fertility, and happiness to teeming millions."—*Id.* 171, 172. In another passage of the same work, Professor Hitchcock says: "Numerous races of animals must have occupied the globe, previous to those which now inhabit it, and have successively passed away, as catastrophes occurred, or as the climate became unfit for their residence. Not less than thirty thousand species have been dug out of the rocks, and excepting a

few hundred species, mostly of *sea-shells*, occurring in the uppermost rocks, *none of them correspond to those now living on the globe.* Indeed, so different was the climate at these times (it having been much warmer than at present in most parts of the world), that but few of the present races could have lived then. Still further, it appears that during the whole period, since organised beings first appeared on the globe, not less than four or five, probably more—some think as many as ten or twelve races—have passed away, and been succeeded by new ones; so that the globe has changed all its inhabitants half-a-dozen times." "These results are no longer to be regarded as the dreams of fancy, but the legitimate deductions from long and careful observation of facts."—*Hitchcock, The Religion of Geology,* pp. 58, 59. With regard to the fishes of the Tertiary epoch, says Professor Agassiz: "They are so nearly related to existing forms, that it is often difficult, considering the enormous number, about eight thousand living species, and the imperfect state of preservation of the fossils, to determine exactly their specific relations. In general, I may say that *I have not found a single species which was perfectly identical with any marine existing fish,* except the little species, Mullotus Villosus, which is found in nodules of clay of unknown geological age in Greenland."—*Quoted by Professor Owen and Dr Page.*

OBSERVATIONS UPON THE FOREGOING CHAPTER.

I must here premise, by repeating what has been already stated, that, in consequence of the brevity of the

Mosaic record of the creation, and the generality of the statements there made, and of the infancy of geological science, and of the doubtfulness of many of its results, and of the difficulty of assigning causes for the phenomena which are not doubtful, and of the extensive sphere of investigation, of the imperfection of fossil remains, and of the consequent difficulty, not to say impossibility, in many cases, of the identification of the present with past forms of life, it is not to be expected that complete harmony between the two records can be shown to exist. But what we *do* maintain from the account in the Mosaic record, taken in conection with the facts observable around us in existing nature, and from the phenomena of geological science, and the striking analogies of the present and past conditions of the world, and of present and past forms of life in it, and of the progression of forms of life from lower to higher types, in a gradually ascending scale up to the present era, is, that there is not only no such discrepancy between the records of religion and science as to render the former absurd or incredible, but that the two records are in as complete harmony as could in the circumstances be looked for, and that the record of creation in the Bible is not weakened, but confirmed and upheld by the teaching of science. The statements in the Mosaic record are very brief and general; and the phenomena of geology are as yet very imperfectly investigated. In regard to the condition of the world at different epochs, geologists are obliged frequently to have recourse to conjectures, and hypotheses, and theories, sometimes erroneous, and sometimes absurd and ridiculous. For example, Moses says

generally that there was water upon the face of the earth at a period immediately preceding the Adamite creation; and that before the creation of the present *flora* and *fauna*, the waters were removed, and the dry land appeared; it is not, however, definitely expressed whether the water extended over the whole, or only over extensive districts of the earth. The geological record bears that there was water upon the earth, and that too over an immense extent of its surface, but geologists cannot yet say with any certainty to what extent. The Mosaic record assumes the necessity of a new *flora* and *fauna*, which justifies my rendering the expression in verse second, "completely desolate and empty," and my interpretation, "without *flora* and *fauna*." But notwithstanding the general correctness of this view, it perhaps cannot be dogmatically affirmed that no *flora* and *fauna* of any kind outlived the Glacial and Drift period. Upon this I do not venture to speak with certainty; it may be that certain districts of the earth may not have been overflowed, and that some of the tertiary *flora* and *fauna* may have survived that period. There are many grounds for believing that such was not the case, but were it otherwise, such a fact would not be in contradiction to what is affirmed by Moses. It is only those who advocate the Development and Natural Selection hypotheses who deny a new creation of *flora* and *fauna* at the commencement of the post-tertiary epoch.

Having made the foregoing observations, I proceed to state the probable grounds that there was, during the Boulder-drift period, a complete, and not a partial, extinction of previous *flora* and *fauna*.

In the first place, this view is in harmony with what happened at the close of the Palæozoic and Mesozoic epochs; and if geologists are right in the supposition that the climate, at least throughout the greater part of the globe, during the Drift period, was of a boreal or arctic character, and unsuitable to the *flora* and *fauna* of the tertiary epoch, we may fairly infer that the extinction of the Palæozoic and Mesozoic *flora* and *fauna* was owing to similar conditions of the earth in which they could not exist.

In the next place, it is to be observed that during the part of the tertiary epoch that preceded the Glacial and Boulder-drift period, the climate in all the arctic and temperate portions of the globe must have been much more genial than at present. During that period there appears to have been, comparatively speaking, no climatic differences throughout the earth. In Britain, the *flora* and *fauna* of tropical climates are found in great abundance. Professor Heer of Switzerland, "shows, on apparently unassailable evidence, that forests of Australian, American, and Asiatic trees flourished during miocene times (the second group of tertiary rocks,) in Iceland, Greenland, Spitzbergen, and the Polar American Islands, in latitudes where such trees could not now exist, under any conceivable conditions or positions of land, or sea, or ice, and leaving little doubt that an arboreous vegetation once extended to the Pole itself."—*Dr Hooker's Opening Address to the British Association*, August 1868. During the geological epochs that preceded the tertiary system, the plants and animals in every region of the globe pre-

sented a much greater degree of sameness or identity than at present. It was only during the tertiary epoch that geographical distributions and separations began to prevail. There were, for example, during the tertiary period, animals in South America, but not in Europe, that *represented* its present sloths, ant-eaters, and armadilloes. But in Great Britain in that period, palms, cycuds, huge pachyderms, (including the elephant and rhinoceros, monkeys, and other animals and plants of a tropical *facies*) are found in abundance in the tertiary rocks, indicative at that period of a tropical or subtropical climate. Upon this point all geologists seem to be agreed.

Another fact, upon which all geologists seem to be agreed, is the boreal or arctic condition of the climate during the period that immediately succeeded the fossiliferous depositions of the tertiary rocks. It is quite evident that, however far this boreal climate extended, and to whatever extent the water prevailed by means of which the Boulder drift was transported, to the same extent the extinction of terrestrial life may be inferred. We have already adduced strong facts to prove that the water and cold, that then existed, were not local but universal. But if it is affirmed that absence of drift indicates the absence of water, as, for example, in parts of France where no drift is conspicuous, the *boreal* climate of the period would be as fatal to the *flora* and *fauna* that had previously existed in a tropical or sub-tropical climate, as the water. Under such conditions all vegetation must have been completely destroyed. Professor Agassiz affirms that the climate during the Boulder-drift period must have been of the

same boreal condition in the tropics as in the arctic and temperate regions. And according to his Reviewer in the *Athenæum*, in the passage above cited, he argues: "When the iceberg period shall be fully understood, it will be seen that the absurdity lies in supposing that climatic conditions so different could be limited to so small a portion of the earth's surface. If a geological winter existed at all, it must have been *cosmic;* and it is quite as rational to look for its traces in the western as in the eastern hemisphere, to the south of the Line as to the north of it." No higher authority upon such a subject can be adduced than that of Agassiz. And the foregoing is confirmed by another statement, that he has found no existing fishes identical with those in the tertiary rocks (with one paltry exception.) This phenomenon may be accounted for in consequence of the seas of the glacial period being of too low a temperature for their existence, although the cold may not have been fatal to marine *Testacea.*

The Drift period, or the period of the formation of the pleistocene group of the tertiary rocks, as the name implies, is intended to embrace all tertiary accumulations, the organic remains of which are chiefly referable to existing species. These remains, however, are chiefly the remains of marine shells, which are said to be identical with those of the latest tertiary rocks; and the group is called pleistocene, because the proportion of such remains is far greater than in the pliocene and miocene groups that preceded. Dr Page says that this group is said to be "for the most part unfossiliferous; marine shells being found, and that very sparingly, only in certain sands and clays, apparently be-

longing to the close of the epoch." The deposition of these shells can only be accounted for by debris from the sea that overflowed the land at the time. If terrestrial animals of the previous part of the tertiary epoch outlived the glacial period, we should doubtless have had fossil rocks as in other epochs in those parts of the world to which it is said that the submergence did not extend, of different ages and of different depths, reaching to the very commencement of the present era, from what is found in the districts admittedly subjected to submergence. I defer, at present, the consideration of facts bearing upon the antiquity of man, and of the phenomena of the bone caves, and superficial drift in which animal remains, and implements indicating the hand of man, have been found.

I feel that I have no right to speak dogmatically in regard to the investigations of geologists; and I have not done so. I am willing to accept those facts which they disclose in regard to the condition of the earth and its organic remains in times bygone, which are generally accepted. I do not question these facts; but I do not conceive myself bound to adopt the reasons assigned for the phenomena brought to light, or to accede to the theories, hypotheses, conjectures, or assumptions upon which these facts are accounted for.

I am aware that Geologists and Palæontologists who admit that there was a new creation of *flora* and *fauna* at the close of the drift period, maintain that there are some existing species identical with those of the preceding or tertiary epoch. Professor Owen tells us that certain quadrupeds found in the tertiary rocks, such as moles, and

shrews, and hares, rabbits, voles, and other rodents, are not distinguishable from the species that still exist. But he expresses himself with great hesitation and caution upon the subject of the identity of the tertiary with existing species. He does so in consequence of the meagreness of the data upon which such judgments are formed. The Palæontologist often forms his judgments of species without any more data to guide him than one or more of the bones or teeth; and the deductions thus made upon the principle of the correlation of parts are indeed truly wonderful. There is a correlation between the hoof and the tooth, and between the tooth and the food, and between the bones, teeth, hoofs, food, and forms of the species, which have guided Palæontologists to most important and wonderful results. Notwithstanding, however, the certainty of the principles, and the importance of the results, Professor Owen, with the modesty and caution peculiar to truly great and learned men, thus expresses himself:—"The determination of the remains of quadrupeds is beset, as Cuvier truly remarks, with greater difficulty than the organic fossils. Shells are usually found entire, and with all the characters by which they may be compared with their analogues in the museums, or with figures in the illustrated books of naturalists. Fishes frequently present their skeletons, or their scaly covering, more or less entire, from which may be gathered the general form of their body, and frequently both the generic and specific characters which are derived from such internal or external hard parts. But the entire skeleton of a fossil quadruped is rarely found; and when it occurs, it

gives little or no information as to the hair, the fur, or the colour of the species. Portions of the skeleton with the bones dislocated or scattered *pell-mell,*—detached bones or teeth, or their fragments merely,—such are the conditions in which the petrified remains of the mammalian class commonly present themselves in the *strata* in which they occur."—*Palæontology*, p. 297. In another passage, the same author says:—"The non-applicability of Cuvier's law in certain cases is not due to its non-existence, but to the limited extent to which it is understood." . . . "The consciousness of that limitation led the enunciator of the law to call the attention of Palæontologists expressly to the extent to which it could be then applied, as, for instance, to the determination of the *class*, but not to the *order, family, genus,* &c.; and to caution them also to the extent of the cases, in which the circumstances being only known *empirically;* he consequently enjoins the necessity of further observation and of caution in their induction. Cuvier, however, expresses his belief that such coincidences must have a sufficient cause, and that cause once discovered, they then become co-relations, and enter into the category of the higher law. Future comparative anatomists will have that great consummation in view, and its result, doubtlessly, will be the vindication of the full value of the law in the interpretation of fossil remains, as defined by the illustrious founder of Palæontology."—*Id.*, p. 313.

But if Geologists and Palæontologists must necessarily express themselves with great hesitation and caution in regard to the identity of the past with the present *fauna,* owing principally to the meagreness and imperfection of

the data upon which their judgments are formed, they must be still more cautious in deciding upon the identity of the present and past *flora.* In speaking of the accumulation of species of fossil plants, by certain eminent botanists, during the last ten years, and of the determination of their affinities, and the persistence of many *genera* and families throughout the tertiary *strata,* Dr Hooker, in his opening address as President of the British Association, thus expresses himself:—"Here, however, much value cannot be attached to negative evidence. Almost the only available materials for determining the affinities of the vast majority of these tertiary plants are their *mutilated* leaves; and, unlike the bones of vertebrate animals, and the shells of molluscs, the leaves of individual plants are extremely variable in all their characters."

"Furthermore, the leaves of plants of different natural families, and of different countries mimic one another to such a degree that, in the case of recent flowers, every botanist regards these organs as a most treacherous guide to affinity. Of the structural characters which are drawn from the internal organs of plants, and especially from their fruit, seeds, and flowers, few traces are to be found in the fossils, and yet it is from them exclusively that the position of a recent plant in the vegetable kingdom can be certified."

"An instructive instance of over-reliance upon leaves, and perhaps, too, on unperceived ideas, happened not long ago to a Palæontologist of such distinguished merit that his reputation cannot suffer by an allusion to it. In the course of his labours over some imperfect specimen from

a most interesting locality, he referred these associated impressions of fossil leaves to three *genera,* belonging to as many different families of plants, and was thus helped to what would have been some important conclusions as to the vegetation of the period in which they were deposited. A subsequent observer, who was a botanist but not a Palæontologist, declares these supposed *genera* to be three leaflets of one leaf of one plant, and this the common blackberry, which still grows on the spot. Which of the two is right I do not say. The fact shows to what opposite conclusions different observers of the same fossil materials may be led. In this most *unreliable of sciences,* fossil botany, *we do but grope in the dark.* Of the thousands of objects we stumble against, we here and there recognise a likeness to what we have elsewhere known, and rely on external similitude for a helping hand to its affinities. Of the great majority of specimens we know nothing for certain, and of *no small proportion we are utterly ignorant.*"

The reader that bears in mind the passage quoted from Professor Agassiz both by Professor Owen and Dr Page, without objection, in reference to the complete extinction of the tertiary fishes, will not probably consider it an unreasonable inference that, if the glacial epoch was fatal to the fishes in their own element, it is less likely that the terrestrial *flora* and *fauna* would survive conditions much more likely to prove fatal to them. The great probability is, that the condition of the earth, in the tertiary periods, was quite unsuitable to the *flora* and *fauna* of the new creation. In connection with Professor Agassiz's remarks

on the extinction of the tertiary fishes, Professor Owen makes the following interesting statements:—"Fossil fishes of the cod, millet, carp, salmon, and herring genera are found in the tertiary formations, but are distinct from all known species."—P. 150. And he gives as a reason of the extinction of former species, namely, that they appeared unsuitable for the sustenance of the human race. "One other conclusion," he says, "may be drawn from a general retrospect of the mutations in the forms of fishes at different epochs of the earth's history, viz., that those species, such as the nutritious cod, the savoury herring, the rich-flavoured salmon, and the succulent turbot, have greatly predominated at the period immediately before and accompanying the advent of man; and that they have superseded species which, to judge from the bony garpikes (Lepidosteus) were much less fitted to afford mankind a sapid and wholesome food."—*Id.*, p. 151.

DARKNESS.

The expression that "darkness was on the face of the deep" will not, I presume, be considered at variance with the teaching of science. It is quite consistent with that teaching that, from the waters covered with floating ice-bergs, or from water without ice, fogs of such density may have prevailed as to envelop the earth in darkness. In the following observations, Sir Charles Lyell adverts to the influence of icebergs in the production of fogs:—"It is a well-known fact," says he, "that every four or five years a large number of icebergs from Greenland double Cape

Langaness, and are stranded on the coast of Iceland. The inhabitants are then aware that their crops of hay will fail in consequence of fogs, which are generated there almost incessantly; and the dearth of food is not confined to the land, for the temperature of the water is so changed, that the fish almost entirely desert the land."—*Principles*, p. 97. "The phenomena of snow in the southern hemisphere," says the same author, "is, in this instance, partly due to the floating ice, which chills the atmosphere and condenses the vapour, so that the summer sun cannot force through the foggy air."—*Id.*, pp. 98, 99. "Further," adds Sir Charles, "if Africa and New Holland extended farther south, a diminution of ice would take place in consequence of the radiation of heat from these continents during the summer, which would warm the contiguous sea and rarify the air."—*Id.*, p. 99. Again:—"If ice-islands from the North Polar regions floated as far, they might reach Cape St Vincent; and these being drawn by the current that always sets in from the Atlantic through the Straits of Gibraltar, be drifted into the Mediterranean, so that the serene sky of that delightful region might soon be deformed by clouds and mists." We may thus see from the darkness on the face of the deep, as described in verse second, an argument may be adduced in favour of the geological theory of an arctic condition of the atmosphere during the drift formation, and of the iceberg theory.

As the description of the condition of the earth at the period immediately preceding the Adamite creation is comprehended in a few words, all that might satisfy curiosity cannot be attained. Desolation, emptiness, darkness,

water, is all that is mentioned; and this is interpreted by what follows,—light, dry land; grass, herbs, and fruit; marine animals, birds, terrestrial animals; and man, the greatest of all the Creator's works. The whole of the statements are very general, and consequently harmony in general is all that can be looked for at present. We do not dread further scientific investigations, or further light thence derived. Truth cannot hate the light:—the Word of God has given us all the light that is needed to establish the fact that God created all things; that it was He that made us, and not we ourselves, and that all reverence, love, and obedience are due to Him from His rational, intelligent, and responsible offspring.

CHAPTER VI.

INTERPRETATION OF THE THIRD AND FOLLOWING VERSES OF THE FIRST CHAPTER OF GENESIS.

FROM what has been said, it has, I trust, appeared that the records both of religion and science in regard to the condition of the earth at the period immediately preceding the existing creation are in wonderful harmony. It has also appeared that the condition of the earth, as described in both records, required the removal of waters from the earth, and the creation of a *flora* and *fauna* suited to the new conditions of the earth in the post-tertiary or existing epoch.

What has been said will facilitate the explanation of what is recorded in the third and following verses.

Verses 3–5: "And God said, Let there be light, and there was light. . . . And the evening and the morning was the first day."

There can be no doubt of the existence of light in the previous geological periods. The eyes of animals, and the

condition of the past *flora* unmistakeably prove this. The expression, "Let there be light," cannot, therefore, imply the creation of what did not before exist, but the removal of the medium that obstructed the transmission of light to the earth, whether by the sun or by any other means by which the earth was illuminated. If this is the case, and if the motion of the earth on its axis was the same as at present, there must have been day and night, while the earth was in the condition described in verse second, although the density of the atmosphere by fogs or otherwise may have prevented any visible distinction between them; and thus an evening may have preceded a morning of the first day. Several ancient nations made the evening precede the morning, in conformity, it is presumed, with early traditions founded on the Mosaic record. Many nations reckoned time, as Tacitus tells us the ancient Germans did, not by the number of days, but of nights.

The rendering of the expression "Spirit of God," in the authorised version by "mighty wind," will not, it is presumed, be objected to on scientific grounds. If the iceberg theory is tenable in order to the accounting for the drift formation, it is not only a reasonable, but a necessary supposition that winds and currents had a part in directing their movements. And this may likewise, as has already been suggested, account for the fact that drift is conspicuous in some places, and not so in others.

Verse 6.—"And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters" (which were not removed from the earth.)

The literal meaning of the word rendered firmament in the

authorised version, is "expanse." This word is used three times in this chapter, to express three different purposes. 1. It is the space in which the clouds charged with water are suspended. 2. The space in which birds fly. 3. The space in which the heavenly bodies appear. In verse 6th, I understand the "expanse" to mean the space in which the clouds are suspended, including that portion of it which separates the clouds from the earth. I interpret this verse by the visible phenomena. I see the earth separated, by a rare medium, from the clouds charged with water suspended in the same medium; and to me this interpretation is sufficient. "Let there be an expanse," seems to be nothing more than to say, Let the atmosphere previously involved in darkness, and now cleared, be a receptacle for clouds, and a medium of separating the waters in the clouds from the waters in the seas and elsewhere. It does not hence follow that there were no clouds in the preceding epochs, any more than it can be inferred from God's creating the present *flora* and *fauna*, that none previously existed.

Verse 9.—"And God said, Let the waters under the heaven be gathered together into one place, and let the dry land appear. And God called the dry land earth, and the gathering together of the waters he called seas."

It may be here observed that, according to the Hebrew usage, all collections of water of any size are called seas—as for example, the "Sea of Galilee,"—the Mediterranean is called the "Great Sea." It appears from this verse that the water that did not rise by evaporation, and that was not suspended in the clouds, was distributed into those

collections of water, which are called seas, firths, lakes, &c. How this was done I cannot tell. I observe the sea separated from the land and fixed with bounds that it cannot pass, and I see other existing collections of water. I perceive and know the facts, but I know of no other way of accounting for them than what I find revealed in God's word, and I only there find that it was the "Lord's doing." The fact is before me, and is an object of sight, the cause and mode a matter of faith. I dare set no limits to Almighty power and wisdom. I know nothing of the fountains of the great deep that may have been opened to cover the earth with water, at this or any other period; or of the store-houses, that God may have provided for containing the superfluous waters. Geology, however, gives reason to believe that the removal of the waters from the earth must have been very sudden and terrible. "The emergence of the land from this watery covering," says Mr Jamieson in the essay already referred to, "seems not to have been so gradual as its submergence. There are many striking facts which seem to indicate that the waters passed over more rapidly. The drift beds have been cut through, and almost entirely washed away, even in places where they can be shown *to have been several hundred feet thick—I say several hundred feet thick.* All the narrow parts of the valleys have been scoured bare to a most remarkable degree." —"This retreat of the sea has overspread the lower grounds with great sheets of rolled gravel and sand, *distinguished from the Glacial drift,* by their looser texture, the more water-worn aspects of the deposits, and the absence of the *striae* and polish on the pebbles. These

gravels are destitute of fossils, and seem to be the result of the denudation of drift beds. The retreating waters pouring off through the narrow passes, have scoured these bare, and shot out the contents into the wide valleys below, carrying off the finer mud and clay to the bed of the present sea."—*Essay on the Boulder Drift of the North of Scotland.*

We might suppose that so great and so rapid a draining of the waters as Mr Jamieson has described, might be accounted for, had they been accumulated, by the sudden retreat of the waters; but it is less easy to account for the phenomenon, by a sudden bodily elevation of the land. It is acknowledged that the configuration of the earth, and the relative distribution of land and water were the same at the close of the Boulder-drift period as at present. Professor Hitchcock, in a passage already quoted, states that the Drift period, by the depositions then made, was instrumental to the formation of soils for the production of the new *flora* and the sustenance of the new *fauna*, that were to occupy it. At the close of that period, the earth contained in its rocks all the remains of the *flora* and *fauna* of preceding epochs, and it is upon the most recent of these, the tertiary fossiliferous rocks, that the drift is deposited; so that the phenomena of the drift, and the condition of the world described in verse second, alike prepare us for the phenomena of the existing creation described in the subsequent verses. No new creation or configuration of the earth is required, and consequently no such statement is made. The condition of the earth described in verse second, requires the separation of the

water from the land, the removal of darkness from the earth, and the creation of a new *flora* and *fauna;* and these requirements are satisfied in the subsequent verses.

Verse 11.—"And God said, Let the earth bring forth grass; the herb yielding seed after his kind, and the tree yielding fruit after his kind, whose seed is in itself upon the earth, and it was so."

The purpose of this creation is apparent from verses 29 and 30. "And God said, I have given you (the man and the woman) every herb having seed which is upon the face of the earth, and every tree in which is the fruit of a tree yielding seed; *to you it shall be for meat;* and to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given *every green herb for meat;* and it was so." We hence see that the object of verse 11 is to give an account of the creation of grasses, vegetables, and fruit, suited to the new creation of terrestrial animals. With the above compare the following passage from Hugh Miller's work on the "Testimony of the Rocks," p. 48. "Not, until we enter on the tertiary periods do we find *floras* amid which man might have profitably laboured as a dresser of gardens, a tiller of fields, or a keeper of flocks and herds. Nay there are whole orders and families of plants of the very first importance to man which do not appear until late in even the tertiary ages. Some degree of doubt must always attach to merely negative evidence; but Agassiz, a geologist whose statements must be received with respect by every student of the science, finds reason to conclude that the orders of the *rosaceæ,* an order more

important to the gardener than almost any other, and to which the apple, the plum, the cherry, the quince, the peach, the apricot, the nectarine, the almond, the raspberry, the strawberry, and the various bramble berries, together with all the roses and potentillas, were introduced only a short time previous to the appearance of man; and the true grasses, a still more important order, which, as the corn-bearing plants of the agriculturist, feed at the present time two-thirds of the human species, and, in their humbler varieties, form the staple food of the grazing animals, scarce appear in the fossil state at all. They are peculiarly plants of the human period."

Ver. 14–19.—"And God said, Let there be lights in the firmament of heaven," &c.

"The most complete solution of this difficulty (of the fourth day) of which we know," says Dr Chalmers, quoted by Archdeacon Pratt, "has been furnished by Rosenmüller. He says that if any one who is conversant with the genius of the Hebrew, and free from any previous bias in his judgment, will read the words of this article in their connection, he will immediately perceive that they import a direction or determination of the heavenly bodies to certain uses which they were to supply to the earth. The words יְהִי מְאֹרֹת are not to be separated from the rest, or to be rendered 'fiant luminaria,' 'let there be lights,' that is, let lights be made, but rather, let lights be, *i.e.*, serve in the expanse of heaven, *inserviant in expanso cœlorum*, for distinguishing between day and night, and let them be or serve for signs and for seasons, and for days and years. For we are to observe that the verb הָיָה 'to be' in construc-

tion with the prefix לְ ('to' or 'for') is generally employed to express the direction or determination of a thing to an end, and not the *production* of the thing. For example, Numbers x. 31–viii. 19, and in many other places." He farther argues thus, "But the difference between the singular יְהִי and the plural וְהָיוּ in the 14th verse demands a corresponding difference in the interpretation; and, therefore, if we would make the difference literally apparent, we must thus literally interpret "*fiant luminaria in firmamento cœli ad dividendum inter diem et noctem, ut sint in signa et tempora, in dies et in annos, et sint ad illuminandum super terram,* i.e., *fiat ut luminaria sint in signa,* &c., *et ad illuminandum,* &c. The particle וְ signifies *ut* in three hundred passages, and וְהָיוּ signifies *ut, sint* in several of them. This interpretation therefore yields this literal sense in our language: "Let it be, that the lights in the firmament of heaven for dividing between the day and the night be for signs and for seasons, and for days and years," *i.e.*, finally "let the lights in the firmament of heaven for dividing between the day and night be for signs and for seasons, and for days and years; and let them be for lights in the firmament of heaven to give light upon the earth, and it was so." So that Rosenmüller's induction from the construction of this passage is, "*de determinatione astrorum ad certos quosdam usus, orbi terrarum præstandos, esse sermonem, non de productione,*" or that the narrative in these verses respects the determination of the heavenly bodies to the performance of certain uses to the earth, not to the production."—*Chalmers' Works,* vol. i., p. 253, Note.

This interpretation is perfectly legitimate, and is pro-

bably the best that can be given. The same word, the substantive verb הָיָה, is used in verse 3, in the expression "Let there be light;" and in verse 6, "And let there be an expanse." In neither of these cases, any more than in verse 14, is the word in question used to denote *production* of what did not previously exist; for there was light before, and there was an expanse before. Neither, therefore, can be called *a new creation.* In the former case, the density of the atmosphere, impenetrable by the light, was removed, and the air partially cleared. In the latter, the expanse between the earth and the clouds became apparent. In like manner, while the words יְהִי מְאֹרֹת are translated "Let there be luminaries," we infer that, as there was light before, there must have been luminaries also, and this expression, like the two former, must merely refer to their becoming visible at the period referred to; and the following words, "Let them be for signs," &c., mark the new purposes for which they were to be destined in a world to be peopled by intelligent and responsible beings. It will be perceived that the expression in verse 11, "And God said, Let the earth *bring forth* grass," &c., is different, and is clearly intended to mark *new production* or *creation,* and not merely destination to a new purpose as in ver. 14, *et seq.,* or to the visible appearance of what had a previous existence, as in ver. 3 and 6; for it is added in ver. 12, "And the earth *brought forth grass,*" &c. But the difficulty in ver. 16, that "God *made* two great lights," &c., as was usually believed, on the fourth day, is not noticed in Dr Chalmers' and Rosenmüller's criticism of the two preceding verses. The following is the solution of the difficulty,

furnished by Archdeacon Pratt. Speaking of the existence of light previously to the Adamite creation, he says: "But now proofs were adduced that light had existed for ages previous even to the first day. For the exhumed remains of animals belonging to ages long gone by, before man's appearance, had eyes, and it was agreed that eyes were for use, that light was necessary, and that lights must have existed. But all this seemed directly contrary to Scripture which thus spoke of the first day, 'And God said, Let there be light, and there was light,' (Gen. i. 3); and of the fourth day, 'And God made two great lights: the greater light to rule the day, and the lesser light to rule the night; (he made) the stars also; and God set them in the firmament of heaven to give light upon the earth, and to rule over the day and over the night, and to divide the light from the darkness.'—Gen. i. 16–18. So that the geological argument had increased the difficulties which had already existed, and which had been unsatisfactorily explained. But there is an answer to them all, although it is probable that there are some who cannot even yet divest themselves of their old prepossessions. In the first place, it is not said that light was created or made at all. It is called forth; it is commanded to shine out of the darkness which was upon the face of the deep. Nor, with reference to the second passage, is it said that the sun and moon and stars were created on the fourth day. The word is *made*;—God *made* two great lights. The original word for which is used in the sense of *did, appointed, constituted, set,* for a particular purpose or use, and never once in the hundred and fifty places where it occurs

in the book of Genesis is it used in the sense of created; and it is one service which science renders to point out which of the various meanings of the word should have been here applied."—Pp. 33, 34.

While I concur, as I have said, in the interpretation of verses 14th and 15th by Chalmers and Rosenmüller, I demur to the rendering of וַיַּעַשׂ by "and *appointed, constituted, set forth* for a particular use;" and to the Archdeacon's averment that never once in the one hundred and fifty places where עָשָׂה "*made*" occurs in the book of Genesis, is it used in the sense of *created.* It seems to me clear, that it is the intention of the sacred writer in verse 16th to state that "God had created the two great lights, and the stars also." The purposes for which the greater and lesser lights were created are also set forth—viz., "to rule the day and the night." It is farther intimated in verse 15th that God had set them in the expanse of heaven to give light upon the earth. In verse 18th, the purpose expressed in verse 16th is repeated, viz., "to rule over the day and the night," and, as it is farther said, "to divide the light from the darkness." Such must have been the offices of the sun, moon, and stars in previous epochs; if indeed light was then communicated by the same means as at present. The Archdeacon's averment, that never once in the hundred and fifty places where it occurs in the book of Genesis is it used in the sense of *created,* cannot but excite surprise. If the reader will turn to verse 20 of the first chapter, he will find it said: "And God said, Let the *waters* bring forth abundantly the moving creature," &c. Ver. 21. "And God *created* great whales, and every living creature

that moveth, which the waters brought forth abundantly," &c.—with which compare ver. 24. "And God said, Let the *earth* bring forth the living creature after his kind," &c. Ver. 25. "And God *made* the beast of the earth after his kind," &c. I acknowledge that I cannot see the slightest distinction between *created* in ver. 21 and *made* in ver. 25; though in the former case the sacred writer uses בָּרָא *created*, in the latter עָשָׂה *made*, as in ver. 16. See also ver. 26: "And God said, Let us *make* man in our image," &c.—and ver. 27: "So God *created* man in his own image," &c. The difficulty might be removed, if, while adhering to Dr Chalmers' rendering of ver. 14 and 15, we translate the clause in ver. 16, "And God made," as a pluperfect—"*For God had made,*" and embrace ver. 16–18 in a parenthesis. The object of ver. 14 and 15 is to show the purposes which the previously existing luminaries were to serve *to the new creation*—to divide the day from the night and to give light to the earth. These offices they had to fulfil as in times past; but they had other important ends to serve in the new creation, in a world peopled by rational and intelligent beings, viz., the marking of "signs and seasons, and days and years." In other words, these luminaries were to be used in the existing creation for the purpose, all important to intelligent beings, of computation of time,—of which no account was taken in previous epochs. The sacred writer adds parenthetically, in ver. 16, and by way of explanation: "For God had created (at some previous period), *the* two great luminaries (then existing), the greater luminary to rule the day, and the lesser luminary to rule the night, and (had made) the stars also."

The article *the* at the commencement of ver. 16 is improperly omitted in the authorised version. It was before mentioned that the Hebrew verb has no pluperfect, either in a simple form like the Latin and Greek, or by means of auxiliary verbs, as in English, French, and other languages. And what is obviously past time must be rendered as pluperfect, whenever such time is required by the necessities of the case. I have only to make this further observation, that in ver. 16 to 18, where, according to the preceding view, intimation is given of the pre-existence of the luminaries, and of their previous uses, viz. to give light, to rule over the day and night, and to divide the light from the darkness, as might be expected in a world without intelligent beings, there is no repetition of their uses for "times and for seasons, for days and for years."

I submit the foregoing criticism and view of ver. 14–18 to the judgment of the learned reader, as the most probable that occurs to me, which gives a fair and legitimate rendering of the original, and which the exigencies of the case demand, *i.e.*, if it is certain that light was communicated to the earth by the same luminaries, and in exactly the same way as at present.

It ought not to be overlooked, however, that there are geological phenomena which point to a different explanation. It seems to be clearly established that the general temperature of the earth was different in the preceding geological epochs from what it is at present. It is clearly proved that, in the British Islands and in other districts of the same latitude, and also in the Arctic regions, the climate was much warmer than it is at present; and it

appears that in the preceding and even in the tertiary epochs, there must have been comparatively little climatic variation throughout the whole earth. I submit to the reader Mr Jukes' observations on this subject, and the arguments by which they are established.

"It is almost solely from the nature of the animals and plants, that have left their remains in the rocks, that we can draw any certain conclusions on the kind of climate possessed by different parts of the earth, where these animals and plants lived. When we find in the British Islands the remains of crocodiles, turtles, large nautili, and monkeys, together with palm fruits, and other tropical-like plants, we cannot resist the conclusion that the climate of the British Islands must have been formerly more like that now found within the tropics than that which they at present possess. It is true that the plants and animals are *all of different species* from those which now exist, and we are taught by the fact that the mammoth or fossil elephant and one of the fossil rhinoceroses having been provided with woolly coats covered with long hair, were therefore fitted to live in much colder climates than any existing species of elephant, or rhinoceros, not to rely too implicitly on mere analogies of form; still the fact of the whole assemblage of the fossils of great groups of rocks being stamped with a tropical facies is very strong evidence in favour of their having enjoyed a *tropical* climate."

"But," continues Mr Jukes, "we may extend this argument to still higher latitudes. By the zealous and enlightened labours of our arctic navigators, especially those of Sir Leopold M'Clintock, Sir E. Belcher, and others of

late, and of Parry formerly, we have been put in possession of the very remarkable fact, that, in latitudes where now sea and land are buried in ice and snow throughout the year, and there are several months of total darkness, there formerly flourished animals and plants very similar to those living in our own province at that time; and that it would appear, that similar animals and plants were then widely spread over the whole world."—P. 420.

"These facts, all pointing in the same direction, compel us to believe that, at least during a part of the primary, secondary, and tertiary epochs, the general climate of the globe was higher and more equable than at the present day." "The existence of the plants, in such high latitudes, seems inconsistent not only with our present cold temperature, but also with the three or four months' darkness which must have prevailed there, so long as the axis of the earth has retained its present inclination to the plane of its orbit, or anything approaching to that inclination. If, on the other hand, we had any warrant for supposing that the earth's axis was formerly perpendicular to that plane, and that the plane of the equator consequently coincided with that of the ecliptic, the difficulty as regards light in the polar regions would vanish, since there would then be eternal sunshine near the poles, and alternations of day and twilight, with no real night down nearly to the arctic and antarctic circles, with equal day and night over the rest of the world. It remains for astronomers to decide upon the probability or otherwise of such a supposition. It does not appear that any such shifting of the direction of the earth's axis would at all account for changes of

climate in the opposite direction, of which there is nevertheless good proof, both palæontological and petrological."

In corroboration of Mr Juke's observation of the difference of climate from the present, in the arctic regions during the tertiary system, I subjoin the following quotation from Dr Hooker's speech already referred to: "Heer's labours, on the miocene and pliocene floras especially, are of the highest value and interest. . . . . And his more recent 'Flora Fossilis Arctica,' threatens to create a revolution in tertiary geology. In this latter work, Professor Heer shows, on apparently unassailable evidence, that forests of Australian, American, and Asiatic trees flourished during Miocene times in Iceland, Greenland, Spitzbergen, and the Polar American Islands, in latitudes where such trees could not now exist under any conceivable conditions or positions of land, or sea, or ice, and leaving little doubt but that an arboreous vegetation once extended to the pole itself. Discoveries, such as these, appear at first actually to retard the progress of science, by confounding all previous geological reasoning as to the climate and condition of the globe during the tertiary epoch."

Referring to the Glacial and Boulder-drift period, Mr Jukes adds: "It appears certain that not only over the northern temperate regions, but as far as the Himalayan Mountains, at least, the climate was once more cold and severe than it is at present, the sea being encumbered with icebergs, and the land with glaciers, far beyond the limits which glaciers and icebergs now extend."—P. 421.

Mr Jukes gives Sir Charles Lyell's theory in regard to the change of temperature in the following passage: "Sir

Charles Lyell showed that so far as temperature is concerned, a great effect would be produced by shifting the positions of the present lands and seas of the globe. If the land which now circles round the North Polar regions would be raised, in consequence of the sea there not being so cold as land is, while if the central portions of the great Pacific and Indian Ocean were occupied by nearly continuous but not very high land instead of sea, their temperature would be raised in consequence of low land under the vertical sun becoming hotter than the sea does. The opposite effect would be produced by clustering still more land about the poles, and diminishing that which now exists in the equatorial regions of the earth." "Lyell says, that a great summer and winter of the earth's climate might be thus produced by shifting the place of our present continental lands."—Pp. 421, 422. "If we supposed these lands broken up into islands, when they were congregated in the tropics, instead of remaining as continents, so as to allow open passages for the ocean currents in all directions, and a free circulation of the warmer surface waters to be sent up, we might *possibly* have ice entirely removed from the low lands of the whole earth, and existing only in the loftiest mountain summits." (See Professor Hennessy's "Remarks on Terrestrial Climate.") Atlantis, January 1859. —*Jukes' Manual*, p. 422.

Such are the accounts of the temperature of the atmosphere during the tertiary epoch, and of the distribution of the same species of *flora* and *fauna* throughout the earth at that time; and of the subsequent Boulder-drift or Glacial epoch. The facts do not seem to be disputed;

they are universally accepted by geologists. Sir Charles Lyell, it has been seen, has attempted to account for the difference of the temperature of the tertiary epoch from that of the present period, by supposing a different distribution of land and water from that at present existing. But, in the first place, there appears to be no evidence that the relative extent of land and water in the Arctic regions was materially different during the tertiary periods from what it is in the present day; or that any of the continents within the tropics were so broken up into islands as to allow a freer passage of the warm seas than at present into the Arctic Ocean. Nor is it at all certain that, were the conditions such as Sir Charles describes, the high temperature of the tertiary epoch could be thus accounted for. It seems highly improbable that a different distribution of land and water would convert the Arctic into temperate, or the temperate into tropical or subtropical climates. According to Sir Charles' theory, the cold at present ought to be much more intense in the Arctic, than in the Antarctic regions, because the proportion of land to water is much greater in the former than in the latter. It is quite clear that at present the difference of temperature in different climates depends mainly upon the relation of the sun to the different parts of the earth, and that whatever might be the distribution of land and water, the mean temperature of the Tropical must be much higher than that of the Arctic regions. According to Lyell's theory, the distribution of land and water must have been very different in the sub-tropical tertiary from the Glacial period, and in the latter from the present. Is there

evidence of such a difference of distribution as to account for the phenomena? If not, how are the facts to be accounted for? It is said by some, that the earth was at one time a ball of fire, and by others, that it contained a great deal more internal heat than at present, and has been cooling down for millions of years. There is, no doubt, internal heat in the earth at present, but what evidence is there that it was so much greater in times past as to account for the phenomena in question? At the starting-point of their science, geologists find rocks and a sea. They ascribe the formation of some of these rocks at least to the action of fire; but they suppose their constituent parts to have previously existed in some other form, and hence they are called igneous and metamorphic. But can they prove, upon the principles of the cooling-down theory, that the seas of the azoic were as much warmer than those of the tertiary epoch, as the space of time allowed for cooling might justify us to expect; and did the *flora* and *fauna* assume a less and less tropical *facies* from the Silurian to the close of the deposition of the tertiary fossiliferous rocks? The next question is, Can the high temperature of northern and southern latitudes, during the periods of the tertiary epoch that preceded the Glacial period, be satisfactorily accounted for on the supposition that the sun's position in reference to the earth was then the same as now? Such satisfaction has not been hitherto given by geologists. May not light and heat have been, at the periods in question, diffused more equably over the whole earth, by other means than by radiation from the sun? And may it not have been

concentrated in the sun, then an opaque body, between the tropical period of the tertiary and the present epoch? The Glacial epoch is said to have been of great duration, and the new arrangement for giving light to the earth may only have been completed at its close, *i.e.*, at the commencement of the present epoch. It may thus be, after all, that the appearance of the sun and other luminaries on the fourth day, proves Scripture and not science to be the true teacher in this disputed question.

The only unquestionable acts of production in this chapter subsequent to verse first are those described in verses 11 and 12, of the *flora* of the existing creation; and those in verses 20–27, of the *fauna*, embracing man in the image of God, to whom all the inferior animals were subjected.

I have already shown that the great proposition set forth in verse first of the first chapter of Genesis is not contradicted by any light derived from science. I have also shown that what is taught respecting the condition of the world described in verse second is not controverted but confirmed by science. I have also shown that there is no antagonism between Scripture and science in the account given of the earth's luminaries and their offices, and I have also shown that the creation of the *flora* and *fauna* described in this chapter are in harmony with the analogies and express teachings of science.

Little now remains but to give a brief account of Mr Miller's theory for the reconciliation of the Mosaic and geologic records. Such a reconciliation he attempts by

ascribing the knowledge which Moses possessed of the creation to a revelation, made to him in a vision, of previous successive conditions of the earth, represented by geological epochs, which harmonise, as he imagines, with the phenomena of the six days of the Mosaic record. According to this theory, Moses is supposed to have had the whole of the phenomena of the previous geological epochs shown in a vision, which Mr Miller calls "The prophetic pre-Adamite past;" and he regards the six days in the first chapter of Genesis as periods corresponding to these epochs. I quote his own words:—"Respecting the work of at least the first and second days, more especially that of the second, we can still but vaguely guess. The science necessary to the right understanding of the prophetic record has still, it would seem, *to be developed, if, indeed, it be destined at all to exist,* and at present we can indulge in but doubtful surmises regarding them. What may be termed the three *geologic* days, the third, fifth, and sixth, may be held to have extended over those carboniferous periods during which the great plants were created; —over those Oolitic and cretaceous periods during which the great sea monsters and birds were created;—and over those tertiary periods during which the great terrestrial mammals were created. For the intervening or fourth day, we have that wide space represented by the Permian and Triassic periods, which, less conspicuous in their *floras* than the period that went immediately before, and less conspicuous than the periods that came immediately after, were marked by the decline and ultimate extinction of the Palæozoic forms, and the first partially developed

beginnings of the secondary ones. And for the *first* and *second* days, there remains the great Azoic period, during which the immensely developed gneisses, mica schists, and primary clay slates were deposited; and the two extended periods represented by the Silurian and Old Red Sandstone systems. These, taken together, exhaust the geological scale, and may be named in their order, as, *First*, the Azoic day or period; *Second*, the Silurian and Old Red Sandstone day or period; *Third*, the Carboniferous day or period; *Fourth*, the Permian and Triassic day or period; *Fifth*, the Oolitic or Cretaceous day or period; and, *Sixth*, the Tertiary day or period." Mr Miller then attempts to conceive, "how these might have appeared pictorially, if revealed in a series of visions to Moses, as the successive scenes of a great air-drawn panorama."—*Test. of the Rocks*, pp. 174, 175.

In regard to the *First*, the Azoic day or period, and to the *Second*, the Silurian and Old Red Sandstone day or period, I must direct special attention to what has already been quoted from Mr Miller. "Respecting the work of at least the *first* and *second* days, more especially the *second*, we can still but vaguely guess. The science necessary to the right understanding of the prophetic record has still, it would seem, to be developed, if indeed it be destined at all to exist, and at present we can indulge in but doubtful surmises regarding them."

If it was the object of Moses in the first chapter of Genesis to describe the successive scenes of the great *air-drawn panorama* revealed to him in a series of visions, he seems, according to Mr Miller, to have been unsuccessful

in rendering the description intelligible to scientific men. Science seems to teach nothing respecting the Azoic period, but that it bears no evidence of organic life; and that it contained a sea and rocks. If the interpretation which I have given of verse second is right, Mr Miller's theory must be wrong. If I am right, everything that is described in the third and following verses, must be of post-tertiary date, and subsequent, of course, to the Boulder-drift period. The whole of the *flora* and *fauna* of the Mosaic creation are distinct and separated by the Boulder Drift from the tertiary fossils. It might be averred with more probability that there is a correspondence between the condition of the earth described in verse second, with the Azoic epoch; but I trust I have shown there is no ground for such conjecture. And Mr Miller does not claim identification of the Azoic epoch with the condition of the earth in verse second, but with that of the earth in the first Mosaic day, described in the third, fourth, and fifth verses. Moses says nothing of rocks, and geologists say nothing of darkness or light in the Azoic day. Upon these grounds, I acknowledge that I am utterly unable to discover any correspondence between the first Mosaic and the Azoic day.

Mr Miller's second geologic day, which is to correspond with the second Mosaic day, is the Silurian and Old Red Sandstone day or period. The Silurian epoch or system comprehends stratified or sedimentary rocks formed by aqueous agency, and containing organic remains of marine, vegetable, and animal life of the earliest type. Traces of fishes are found in the uppermost verge of the system, but there is as yet no evidence of terrestrial *fauna*.

The phenomena of the Old Red Sandstone epoch have been already described at p. 19, to which the reader is referred. Both that and the Silurian were of immense duration, and embrace two distinct and well-defined geologic systems, which, as it has been seen, Mr Miller comprises in one geologic day to harmonise with the second day of the Mosaic record. The sacred writer there makes mention of the removal of the waters from the earth;—the appearance of dry land, and the collection of the waters into one place. The Mosaic record, moreover, makes no mention whatever of the existence of any *flora* till the third, or of *fauna* of any kind till the *fifth* day. The harmony, therefore, between the second geologic and the second Mosaic day, as Mr Miller observes, "if it exists, is still to be developed, if indeed it be destined at all to exist."

The Carboniferous or Coal-formation epoch is what, according to Mr Miller, corresponds with the third Mosaic day. The phenomena of that epoch are described at pp. 19, 20; and it is only necessary here to quote Dr Page's summary of the phenomena of it: "Taking the whole succession and alternations of strata—the sandstones, clays, limestones, ironstones, and coal,—and noting their peculiar fossils, the estuary character of the shells and fishes of the lower and upper groups, and the marine character of the coals, encrinites, shells, and fishes of the middle group, with an excess of terrestrial vegetation, we are reminded of conditions never before or since exhibited on our globe."—*Page*, p. 88.

Such are the phenomena of the *third* or Carboniferous day or period. The phenomena of the third Mosaic day

are the production of grasses, of herbs yielding seed, and of trees yielding fruit. In verses 28th and 29th we are told that God had assigned the herb yielding seed, and the tree yielding fruit—*i.e.*, vegetables and fruit—as food for man; and the green herb,—*i.e.*, the grasses—as the food of the inferior animals. According to the Mosaic record, no living creature was in existence during the third day. The geologic and Mosaic *third* days do not correspond in these two respects. In the first place, there existed animals in the former, but none in the latter; in the second place, as Mr Miller himself expresses it, the *flora* of the Carboniferous period was utterly unfitted for food either for man or beast:—the whole of it had become extinct previously to the existing epoch; and, as has been already shown on Mr Miller's own authority, the grasses, fruits, and plants adapted to man and the existing animals, were unknown till the post-tertiary or human period. "Judging," says he, "from all that we yet know, the earliest terrestrial *flora* may have covered the dry land with its mantle of cheerful green and served its purposes, chemical and others, in the well-balanced economy of nature; but herb-eating animals would have fared but ill even where it throve most luxuriously; and it seems to harmonise with the fact of its non-edible character, that, up to the present time, we know not that a single herbivorous animal lived amongst its shades."—*Id.*, pp. 24, 25, 26.

I must acknowledge that I cannot see the slightest evidence of correspondence between the Oolitic and Permian day or period, with the *fourth* Mosaic day. The supposition seems quite arbitrary and unfounded. Mr

Miller gives no reason at all for his conjecture, that the sun, moon, and stars either then became visible or were created, or were made to answer any purposes different from what they served at any former period.

Mr Miller's fifth is the Oolitic or Cretaceous day or period, "during which the great sea-monsters and birds were created."

In the fifth Mosaic day God said, "Let the waters bring forth abundantly the moving creature that hath life, and let fowls fly above the earth, in the open firmament of heaven; and God created great whales (or sea-monsters), and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind; and God blessed them, saying, Be fruitful and multiply, and fill the waters in the seas, and let fowl multiply in the earth." We have here an account of the creation not only of great sea-monsters, but of every description of living creatures that are produced and live in the waters. We have here the first intimation of the creation of animal life in the existing epoch—with which the waters were to be filled, in lieu of former species that had become extinct. In order, therefore, to the correspondence between the Geologic and the Mosaic days, it must be shown that the former exhibited the first appearance of animal life, which, according to geologists, was at the commencement of the *Silurian* day. Dr Page states that, "with the exception of the higher mammalia, almost every existing order is *represented* in the *fauna* of the Oolite, but the forms are all Mesozoic and died out at the close of the Chalk (cretaceous) era."—*Id.*, p. 113. Moses

tells us that on the fifth day God created "every winged fowl after his kind." Professor Owen says that "indications of the existence of birds are impressed in sandstones of the Liassic period, (the lowest group of the Oolitic system) long before any evidence of them was obtained from actual or recognisable fossil remains." He adds, that "fossil bones of birds have not been found save in strata of much later date than the impressed sandstone remains."—*Palæontology,* p. 286. And in speaking afterwards of the fossil bones of birds, he says, "Certain it is, that the major part of the remains of extinct birds that have as yet been found, are those of birds that were deprived of the power of flight, and were organised to live on land."—*Id.*, p. 287. The earliest evidence of birds, indicated by fossil remains, is derived from the Cambridge Greensand, in the Greensand group of the Cretaceous system, and which Professor Owen says indicates a bird "about the size of a woodcock." —*Id.*, pp. 290, 291. The only indications of birds therefore that are found in the Oolitic and Cretaceous systems, are footprints of birds in the Lias or lower group of the Oolite, some of them twenty inches in length, extending through a great part of the valley of the Connecticut River, North America, first discovered by Dr Hitchcock; and that in the Cambridge Greensand already referred to. There is a fact, however, that deserves attention in regard to birds in the Oolite and Cretaceous systems, that they are contemporaneous as in the Mosaic record with aquatic *fauna* and preceded the creation of the true *mammalia.* And in this there is a striking analogy between the Mosaic and Geologic records. The only mammalian remains that

have been found in the Cretaceous system (the more recent of the two), Professor Owen surmises to have been those of *quadrumana* or monkeys. It cannot, I think, be doubted that it was the design of the sacred writer to give an account of the existing *fauna* of the fifth, and not of the extinct *fauna* of what Mr Miller calls the Oolitic or Cretaceous day. Nor can it be doubted that there are analogies between the Palæozoic, the Mesozoic, and the Cainozoic or tertiary creations, and that which now exists. There is a progressive advancement in pre-Adamite creations from lower to higher forms, till the introduction of the last and highest races of species. But these earlier creations were all distinct and separate, and ought not to be jumbled together, according to the requirements of Mr Miller's hypothesis. It is true that there is a closer connection between the *fauna* of the tertiary and the Mosaic or post-tertiary sixth day, and that of the more remote epochs. But the reason of this is simply because the one system directly succeeds the other; but, as it has been said, the *fauna* of Moses' sixth day is a *new fauna*, which it is his business to describe, and not that of Mr Miller's tertiary or sixth day. It does not seem necessary to say anything more regarding Mr Miller's method of reconciliation between the Geologic and Mosaic records. It does not seem to be possible to identify his Geologic with the sixth day of the post-tertiary creation, either as to the number, or the phenomena of the periods. Had a reconciliation been possible in this way, no one would have been more successful in effecting it than he; and his failure is the best proof of the untenability of the hypo-

thesis. His powerful and logical understanding, thorough acquaintance with geological science and Divine truth, clearness of perception, and admirable vigour and perspicuity of expression, would have qualified him beyond most other men for such a task. I cannot help thinking that he was misled by the rendering of the Hebrew words in the second verse, "without form and void," which, as they stand, are unintelligible. If verse second, and the third and following verses are connected together by a relation of time, the earth, at the commencement of the Mosaic era, must have contained in its crust all the fossiliferous rocks of former systems, and all the evidences of power, design, wisdom, and goodness manifest in previous systems; and its desolation, and the absence of *flora* and *fauna* was such as might have been expected from its subjection for a vast period of time to the agency of ice and water, during the aqueous and glacial period that immediately preceded the existing creation.

We have seen that Moses accounts for the existing creation by a direct interposition of Almighty power; and science has no other way of accounting for it. The geological phenomena that preceded the post-tertiary era, in preceding creations, demand such direct interposition. There was no Moses to describe the original creation of the *flora* and *fauna* at the commencement of the Palæozoic epoch; or the new creations of the Mesozoic and Cainozoic epochs, after their extinction at the close of the epochs that preceded them. Of these creations the fossiliferous rocks are the historians. They tell the tale, in language that cannot be misunderstood, of the extinction

of the old, and of the production of new species of a higher order, and they thus "declare the glory of God, and show forth His handywork." Moses' history of the creation is told in words inspired by the Holy Ghost; which, like the fossils in the everlasting rocks, abide for ever. We thank the great men who, by the light of science, have "sought out the works of the Lord" in rocks and stones, and have shown Him in ages long gone by to be "infinite in counsel and wonderful in working, and the same yesterday, to-day, and for ever." And we magnify the name of the Lord, who was pleased to reveal, in terms more clear still, that it was "He that made us, and not we ourselves;" that it was "by His wisdom and power, and for His glory, that all things were created." Creations past and present are in strict analogy and harmony. As in the old, so in the new creation, we have only the facts set before us; but there is much about both, of which He has told us nothing.

Under what is called a fixed order of nature, time is necessary for the production of the phenomena presented to us. But when God executes His decrees in creation and providence by direct interposition, who can assign time or limits to His working? "He speaks, and it is done; He commands, and all things stand fast:"—a truth which science cannot gainsay. And can any one venture to affirm, and establish his affirmation, that what is described in the first chapter of Genesis, either in regard to the work done, or the period of its accomplishment, is incompatible with infinite power and wisdom? Such being the case, it ought not to stagger a believer in the God of the Bible that the work of God in creation, as described in

the first chapter of Genesis, was accomplished in six days. I acknowledge that I have no other interpretation to suggest of the word *day* in that chapter than the natural day of twenty-four hours. We are not entitled, in violation of the ordinary laws of rhetoric and grammar, to give a figurative interpretation of the word day which the context and the whole strain of the narrative imperatively forbid, for the purpose of removing a difficulty which may have no existence but in our own ignorance. If such were the case, the Scriptures might be made to say or teach anything. The principal use of figurative language is to supersede the unnecessary multiplication of words, and to give energy, vivacity, and variety to the writer's style; but it is obvious that the literal meaning of words cannot be abandoned, unless where the passage requires a figurative sense, and this can be ascertained in the works of good authors with a precision that excludes all doubt. Were it otherwise, the use of figures would destroy all perspicuity and precision in language, and introduce ambiguity, perplexity, and confusion. I therefore agree with the younger Rosenmüller, whose authority, as a Hebrew philologist and critic, is entitled to the highest respect, who says, "That it could scarcely be more clearly expressed than by this formula, that the natural day is to be understood, and not a space consisting of more days or years."—*Scholia*, Gen. i. 5. But should it be held on any probable grounds that the length of the Mosaic was greater than that of ordinary days, to me it seems beyond all doubt that they must be post-tertiary periods, and not portions of any preceding epochs.

CHAPTER VII.

THE DARWINIAN HYPOTHESIS.

THE metamorphic rocks, as has been already said, are the starting-point of geological science. Thither it reaches, and no farther. In these rocks there are no traces of organic life; the earliest fossil remains being found in the lowest groups of the Silurian system. The *fauna* there contained are of a marine character, and consist, generally speaking, of the orders of the *Radiata*, *Mollusca*, and *Crustacea*. The rocks of the Silurian system are, as stated by Sir Roderick Murchison, singularly complete, and extend through periods of incalculable duration. In consequence, geologists speak of their era, formation, and fossils without any doubt or hesitation. How then, it may be asked, are these fossils to be accounted for? To this question science can give no satisfactory answer. It comes in contact with no previous forms of life, from which they could have proceeded by the law of generation, or by which they could have been developed by what is called natural law. It is

inconsistent with the known properties of matter that they could have originated from matter by natural law. There is no evidence of the existence of monads or primary germs of life with self-evolving powers out of which they could have originated; their existence therefore must be attributed to the agency of some efficient cause. This is not only a doctrine of revelation, but a deduction of reason, with which science must rest satisfied, as it has no other rational account to assign for it. The phenomena of the creation of the earliest *flora* and *fauna* found in the Silurian rocks is the commencement of a great divine plan carried on and extended throughout the whole of the geological epochs. As the earth became suitable for new species of ancient forms, or for new forms of different orders, these forms were introduced in the furtherance of that plan. In process of time terrestrial *flora* and *fauna* were introduced, and also marine *fauna* of a higher order. The Silurian *fauna* were all invertebrate; but at the close of that system vertebrate animals were introduced in the form of fishes; afterwards of sauroids of a smaller, and afterwards of a larger size, afterwards of birds, afterwards of marsupial, and afterwards of placental mammals, and last of all, of man, the noblest of all the Creator's works. The introduction of new orders, and of new species of old ones, is attributable only to creative acts of omnipotence; in other words, to direct interposition. Geologists tell us without any hesitation at what eras each of these orders was introduced. They tell us that there were no fishes or other vertebrates in the Silurian system; no sauroids in the Old Red Sandstone or Devonian; no birds

till the Oolite; no mammals till the Tertiary; no traces of man till the post-Tertiary system. The creation, therefore, of the earth's *flora* and *fauna* was in accordance with a divine plan, and their preservation and continuance with a divine law. There is no such thing as natural law in the sense in which it is used by some philosophers. Law must have its origin in the mind of the lawgiver; it implies a lawgiver and subjects to be governed. Without these adjuncts we have no notion of law, moral or physical. We may therefore speak of laws of preservation and continuance of species, but not of a law of creation. Creation is a direct act, in conformity with a divine plan; and the direct interpositions of creative power conspicuous from time to time throughout the geological epochs do not bespeak want of forecast in the divine mind, or a supplement of unforeseen omissions in the works of creation, but the evolution of a plan which appears from the earliest to the latest ages to have been progressive, and to have kept pace with the advancement of the physical condition of the earth. What pertains to the preservation and continuance of species may be called natural law; but that law operates only within certain limits. Notwithstanding that natural law, species became extinct; and it being contrary to natural law that an old should propagate a new species, there is no other means of accounting for the origin of new species but by a creative act, in other words, by a direct interposition of divine power, or what is called in Scripture a *miracle*. It hence appears that the doctrine held by Professor Baden Powell and others, of a fixed order, is expressly contradicted by the facts of geological science.

The mode of accounting for the origin of life conspicuous in the oldest Silurian rocks, and the subsequent introduction from time to time of new forms and species of organic life, which has just been given, was in accordance with the all but universal opinion of scientific men up to a very recent period. The development hypothesis of Lamarck and of the author of the *Vestiges of Creation*, met with little favour. The hypothesis, however, which has been adopted within the last few years by Mr Darwin, on the subject of the Origin of Species by Natural Selection, and supported so ably by that distinguished naturalist, has met with such countenance from several eminent men of science, as to render it necessary to direct special attention to it. Instead of stating the hypothesis in my own words, I shall give the substance of it, from Sir Charles Lyell's work on the Antiquity of Man, that I may run no risk of stating it incorrectly. "Mr Darwin begins by applying to the animal and vegetable worlds the Malthusian doctrine of population, or its tendency to increase in a geometrical ratio, while food can only be made to augment, even locally, in an arithmetical one. There being, therefore, no room, or means of subsistence for a large proportion of the plants and animals, which are born into the world, a great number must annually perish. Hence there is a constant struggle for existence among the individuals, which represent each species, and the vast majority can never reach the adult state, to say nothing of the multitude of *ova* and seeds which are never hatched, or allowed to germinate." "The trial of strength, which must decide what individuals are to survive, and what to succumb,

occurs in the season when the means of subsistence are fewest, or enemies most numerous, or when the individuals are enfeebled by climate, or other causes, and it is then, that those varieties which have any, even the slightest advantage over others, come off victorious." "As breeders of domestic animals, when they choose certain varieties in preference to others to breed from, speak of their method as that of 'selecting,' Mr Darwin calls the combination of natural causes, which may enable certain varieties of wild animals or plants to prevail over others of the same species, *natural selection.*" "By the multiplying of slight modifications in the course of thousands of generations, and by the handing down of the newly acquired peculiarities by inheritance, a greater and greater divergence from the original standard is supposed to be effected, until what may be called a new species, or, in a greater lapse of time, a new *genus*, will be the result."—*Lyell, Antiquity of Man*, pp. 409, 410, 411.

In answering an objection that Mr Darwin's hypothesis of natural selection was a thing of the past, Dr Hooker, in the address to the British Association, already referred to, tells us that, "Since Mr Darwin's work on the Origin of Species appeared ten years ago, it has passed through four English editions, two American, two German, two French, several Russian, a Dutch, and an Italian;" while of the work on Variation ("Variation of Species under Domestication"), which Dr Hooker calls "a *pièce justificative* of the former work," which first left the publisher's house, not seven months ago, two English, a German, Russian, American, and Italian edition, are already in cir-

culation. "So far from Natural Selection being 'a thing of the past' (as, Dr Hooker said, had been averred by a learned Reviewer in the Athenæum, who, on his part, has shown that he said no such thing), it is an accepted doctrine with every philosophical naturalist. Reviews on the Origin of Species are still pouring in, from the Continent, and Agassiz, in one of the addresses which he issued to his collaborateurs, in their late voyage to the Amazons, directs their attention to this theory, as a primary object of the expedition they were undertaking. I need only add, that of the many naturalists, who have accepted it, no one has been known to abandon it; that it gains adherents steadily, and that it is, *par excellence*, an avowed favourite with the rising school of naturalists." One cannot be surprised that a work, by such an eminent naturalist as Mr Darwin, propounding so novel and so startling an hypothesis, should be much read, and pass through all the editions mentioned by Dr Hooker, and it is not surprising that the first of his *pièces justificatives* of the Origin of Species should have been read with equal eagerness, as it was long looked for with intense anxiety and interest. It must, however, have been a disappointment to the readers, that the work in question did nothing to establish his doctrine of the Origin of Species, or show that any one of the varieties of species under domestication, how interesting soever the facts advanced, ever passed into a new species. This *pièce justificative* has done nothing whatever to establish his views of the Origin of Species. Notwithstanding the varieties of breeds of pigeons, and other animals under domestication, every pigeon continues a

pigeon, and so of all other species, according to an in variable law of generation, that no new species can be procreated from species of a different kind. And Mr Darwin has not yet proved, in a single instance, that a species advanced by natural selection to the highest possible perfection of which it is susceptible, can, by reason of that perfection, merge into a new species. Dr Hooker, as we have seen, states that M. Agassiz directed the attention of his collaborateurs to Mr Darwin's theory as a primary object of the expedition they were undertaking. It might be thought, from the connection in which the passage above quoted was introduced, that M. Agassiz had adopted Darwin's hypothesis, and commended it to his collaborateurs. What M. Agassiz meant by his address to his collaborateurs is obvious from what follows: "I am often asked," says he, "what is my chief aim in this expedition to South America? No doubt, in a general way, it is to collect materials for future study. But the conviction which draws me irresistibly, is, that the combination of animals in this continent where the *faunæ* are so characteristic, and so distinct from all others, will give me the means of showing *that the transmutation theory is wholly without foundation in facts.*" In the following strong and unanswerable manner, this distinguished naturalist and geologist of world-wide reputation, lifts up his testimony against every phase of the transmutation hypothesis. Speaking of the different sets of inhabitants that have peopled the earth at successive periods, and that have each a character of its own, he says: "The transmutation theory insists that they owe their origin to

gradual transformations, and are not therefore the result of distinct creative acts. All agree, however, that we arrive at a lower *stratum*, where no trace of life is to be found. Place it where we will, supposing that we are mistaken in thinking that we have reached the beginning of life with the lowest Cambrian deposit; suppose that the first animals preceded this epoch, and that there was an earlier epoch to be called the Laurentian system, besides many others older still, it is nevertheless true, that Geology brings us down to a level at which the character of the earth's crust *made organic life impossible.* At this point, wherever we place it, the origin of animals by development was impossible, because they had no ancestors. This is the true starting-point, and until we have seen facts to prove that the power, whatever it was, which originated the first animals, has ceased to act, I see no reason for referring the origin of life to any other cause. I grant that we have no such evidence of an active creative power, as science requires for positive demonstration of her laws, and that we cannot explain the processes which lie at the origin of life. But if the facts are insufficient on our side, they are absolutely wanting on the other. We cannot certainly consider the development theory proved, because a few naturalists think it plausible. It seems plausible only to the few, and it is *demonstrated by none.* I bring this subject before you now, not to urge upon you this or that theory, *strong as my own convictions are.* I wish only to warn you, not against the development theory itself, but against the looseness in the methods of study, upon which it is based. Whatever may be your

ultimate opinions upon this subject, let them rest on facts, and not on arguments, however plausible. This is not a question to be argued; it is one to be investigated."—See *Athenæum*, April 4th, 1869. Mr Darwin's first *pièce justificative* of his hypothesis, is the work already referred to, on the "Variation of Plants and Animals under Domestication," but there is a wide difference between the "Origin of Species" and the "Variation of Plants and Animals under Domestication." Mr Darwin, however, has promised a second work on the "Variability of Organic Beings in a state of Nature." In a third work which he is to publish, he says, "I shall try the principles of natural selection, by seeing how far it will give a fair explanation of the geological succession of organic beings—their distribution in past and present times—and their mutual affinities and homologies." "The principle of natural selection," he himself says, "is a mere hypothesis, until he explains these and other large bodies of facts;" "that is to say," says his learned reviewer in the *Athenæum*, February 15th, 1868, "at least for a very long time to come." Mr Darwin's third work, it is obvious, must not be published until after the students of the "Remains of Ancient Life" shall have discovered the "Geological Succession of Organic Beings," —a thing which the past generation of them believed they knew, and the present generation are sure are not known. If Mr Darwin's supposition is to be deemed a mere hypothesis, until it shall satisfactorily explain what is not known, the discussion of it is adjourned *sine die*. Long before the conditions of proof shall have been complied with, the author of it, and the opponents of it,

will have passed away, and their controversies with them."

Mr Darwin is quite alive to the weight of the objections that may be urged against his hypothesis, and of the difficulties of satisfactorily establishing it. In the recapitulation of these difficulties at the end of his work on the "Origin of Species," p. 465, he says, "With respect to the absence of fossiliferous formations beneath the lowest Silurian *strata*, I can only recur to the hypothesis given in the ninth chapter. That the geological record is imperfect, all will admit; but that it is imperfect to the degree which I require, few will be inclined to admit. If we look to long enough intervals of time, geology plainly declares that all species have changed; and they have changed in the manner in which my theory requires, for they have changed slowly, and in a graduated manner. We clearly see this in the fossil remains from consecutive formations invariably being much more closely related to each other than are the fossils from formations distant from each other in time." After having summed up the several chief objections and difficulties which he says "may justly be urged against his theory, and having briefly recapitulated the answers and explanations which can be given to them," he adds, "I have felt these difficulties far too heavily, during many years, to doubt their weight. But it deserves especial notice, that the more important objections relate to questions on which we are confessedly ignorant; nor do we know how ignorant we are. We do not know all the possible gradations between the simplest and the most perfect organs; it cannot be

pretended that we know all the varied means of distribution during the lapse of years, or that we know how imperfect the geological record is. Grave as these several difficulties are, in my judgment, they do not overthrow the theory of descent from *a few created forms* with subsequent modification."—Pp. 465, 466. It hence appears that he assumes at his starting point the existence of some created forms of life, with self evolving powers, which, upon the principle of natural selection, and without any farther intervention of the Creator, were developed into all the classes, orders, genera, and species of the *flora* and *fauna* that are found in the rocks of previous geological systems, and which exist in the present day. Mr Darwin acknowledges the operation of a first cause in the creation of the primary forms, and in the innate self-evolving power, by which they advance from the lowest to the highest types of animated being. The agency of a personal God being accordingly acknowledged in the creation of the primary forms of life, with self-evolving powers sufficient to explain all the phenomena which Mr Darwin's hypothesis demands, he and the advocates of the hypothesis are entitled to hold that their assumptions do not lower our notions of the power, wisdom, and providence of the Great First Cause, though the hypothesis necessarily implies unbelief in the Scriptural account of the creation. No one is warranted to affirm that what Mr Darwin's hypothesis demands is impossible for God to accomplish; for nothing is impossible with God. But the question is not what it was possible for God to do, but what God has actually done. A scientific hypothesis that cannot be supported

by facts, may excite curiosity and interest, but cannot challenge conviction. Mr Darwin seems to be painfully aware of this, and he states the objections to his hypothesis in such a candid and manly way, that one cannot but regret that his distinguished attainments in natural history, and on all the subjects bearing upon its illustration, had not been employed in a better cause.

I shall now as briefly as possible state the objections to Mr Darwin's hypothesis as they occur to one who makes no pretension to scientific attainments, but who may without presumption give his judgment upon the accepted facts of geological science, and upon hypotheses and reasonings that are based upon them.

In the first place, I observe that Mr Darwin does not adopt the *flora* and *fauna* of the lowest Silurian rocks as the primary creations, which his hypothesis demands; and that there is no foundation in fact for the assumption of earlier creations, with self-evolving and self-developing powers. This is but an unsupported conjecture.

In the second place, supposing that his primary creations were admitted, his hypothesis would not be greatly forwarded. The lowest Silurian *flora* and *fauna* would mark but a stage in the progress of development of his original creations. When we come to this stage, we have facts for our guidance. We there find in great abundance humble types of a marine *flora*, and of an invertebrate marine *fauna*.

We know from the testimony of the fossil rocks, in their progress upwards from the lowest of the Silurian, that the *flora* and *fauna* continued through countless periods of time, with no visible change of form or species, till they

all became extinct. In the secondary rocks there are new and more advanced species of the earliest *Radiata, Crustacea,* and *Mollusca,* which, in their turn, became extinct, and were succeeded by new and more advanced species; and in the present day, there are species of these three orders, which, it seems, have been persistent throughout all the systems of geological science. It is admitted on all hands that, from time to time, the species of these orders, in the course of the different geological periods, have become extinct. And it is likewise admitted that no instance has been brought to light of the introduction of a new from an old species. The origin of new, by the instrumentality of old species highly improved, upon the principles of natural selection, cannot therefore be admitted according to Mr Darwin's own acknowledgment, "until the phenomena are established by facts." But supposing it to be admitted that the existing advanced species of *Radiata, Crustacea,* and *Mollusca,* generally speaking the earliest known forms of animal life, passed through the progressive changes which science points out, upon the principles of natural selection, and without the intervention of divine agency by creative acts, this would go but a little way to the establishment of Mr Darwin's hypothesis of natural selection. His hypothesis aims at much higher results. It is, as he himself says, "a theory of *descent from a few created forms by modification;*" that is, as I understand it, that all the classes, orders, genera, and species of the earth's *flora* and *fauna* that have appeared since the conclusion of the Silurian system, owe their origin to descent from these few created forms, upon

the principles of natural selection. But, as has been already remarked, the *fauna* of that system have, in new and advanced species, after the extinction of old species, been perpetuated up to the present era, as *Radiata*, *Crustacea*, and *Mollusca*. Can Mr Darwin then show that some of these, at the close of the Silurian system, continued to be *Radiata*, *Crustacea*, and *Mollusca*, and that others were converted into fishes? It is admitted that he has been unable to show in the Silurian rocks any of these orders in their transition state into fishes; and yet Sir Roderick Murchison says that these rocks are singularly complete. There is in these rocks, at least in as far as has been yet discovered, no progressive transition of any kind from invertebrate to vertebrate forms. Fishes appear there in a perfect state, without any previous intimation of their origin. Can Mr Darwin tell us from which of the three orders above referred to the earliest fishes originated? Or can he show in the rocks any specimen, towards the close of the Silurian system, so far surpassing the rest of the species by natural selection as to raise the expectation that it would become a fish? Can he tell us which of his earliest created forms became fishes, and which of them continued as they were, and remained so, changed only in species, throughout the whole of the subsequent geological systems? One might have expected that upon the principles of natural selection, the *fauna* of the highest Silurian rocks would have been so much superior to those of the lowest, that they would all have merged into something different from themselves, and would have entirely disappeared. We might not, accordingly, have expected to see the fishes as vertebrates, and

their ancestors and nearest of kin as invertebrates, existing at the same time. In like manner, if gorillas have become developed into man, upon the principle of natural selection or development, I am puzzled to understand *why they did not all do so.* If we had found gorillas in the tertiary rocks, and transitions towards the human species in subsequent rock formations, and mankind as their representatives in the *post-pliocene* period, from which Sir Charles Lyell dates the antiquity of man, the hypothesis would have been clear of one of its absurdities. But why one set of gorillas were so far honoured as to become the ancestors of mankind, and the others remained natural gorillas, surpasses my comprehension; nor can I understand why the gorilla that remains in a state so degraded as compared with his brother man, should live at such enmity with so near a kinsman, unless it is out of jealousy that his kinsman has got so far ahead of him. The same difficulties and absurdities occur in the transition from fishes to sauroids, from sauroids to birds, and from birds to mammals.

Such are the objections that lie in the way of the acceptance of Mr Darwin's theory, without saying anything of its utter incompatibility with the teaching of Scripture. As Professor Agassiz justly says: "The difficulties connected with Mr Darwin's hypothesis are far greater than those they profess to remove;" and there is no reason to apprehend that the hypothesis will shake the faith of any earnest searcher after truth, or of any one gifted with common sense, in the teaching of God's Word on the subject of creation.

Mr Darwin accounts for the origin of species by natural selection. But a question naturally arises, whether there is such a thing as natural selection; whether there is any evidence of this in the preceding geological epochs; whether from their first appearance till their disappearance, and their re-appearance in a new species, there is any evidence that the smaller and weaker forms were extruded, in a struggle for existence, by the larger and stronger, and eventually perished; and that, at the close of each epoch, when an old species was about to disappear, it had advanced to its highest state of perfection in size, strength, and beauty. It may be asked whether there are phenomena or analogies in the present epoch which give probability to the hypothesis, not of origin of species by natural selection, but of natural selection itself, at all events, such as to warrant the rearing of Mr Darwin's hypothesis upon it. We know that many animals, which either are in being, or came into being at the commencement of any one year, die before its close; but though their continuance may to a certain extent depend upon vigour of constitution, size, strength of individuals, and other favourable circumstances, it may be doubted whether their continuance, or discontinuance, is the result of a trial of strength or struggle for existence. Can it be proved that species of either *flora* or *fauna* in the wild state, irrespective of human agency, has during the historic period been surpassing that which preceded it? It has been a tradition from the earliest periods that our race is deteriorating in strength and longevity. Be this as it may, it is very doubtful whether the race has physically improved since the commencement of the

historic period. There are the strong and the weak, the large and the small, the robust and the sickly, amidst the *flora* and *fauna* of existing creation, including the human species; and it might naturally be supposed that at the close of a year, the great proportion of deaths would be among the weak, the small, and the sickly. But it does not seem consistent with natural law, or with the wise arrangements of Providence that the strong should in the long run have such an advantage over the weak as Mr Darwin supposes. It does not necessarily follow, that in the struggle of life those varieties which have any, even the slightest advantage over others, should come off victorious. "They may often owe their safety to what would seem to a casual observer, a trifling difference, such as a darker or lighter shade of colour, rendering them less visible to a species that preys upon them, or sometimes to attributes more obviously advantageous, such as greater cunning, or superior powers of flight or swiftness of foot." —*Lyell, Antiquity of Man,* p. 409. The *fauna* of the lower creation have the stunted, the small, the weakly and sickly among them, as is the case with the human species. God careth for them all, and their existence and continuance are consistent with the wise arrangements of His providence. Without His permission the meanest of them cannot fall to the ground. There is no evidence whatever either in regard to the lower animals or mankind, that the annual production of weakly animals is decreasing, and that there is a steady improvement of species. Mr Darwin asks time to establish his hypothesis, and avers that time would effect all that he desires. Archimedes wanted but

a fulcrum to enable him to move the world, but he asked for what he could not obtain. One would imagine that Mr Darwin cannot reasonably complain of want of time, which extends from the lowest Silurian rocks to the present epoch, but still his Silurian *fauna* are *Radiata*, *Articulata*, and *Mollusca*, altered in species only to a certain extent, and that not to be accounted for according to the hypothesis of natural selection. The extinction of species in their case cannot be accounted for by a continual progression of old into new species, by which the one gradually merged into the other; but must be ascribed to changes in the earth's condition, suitable to the newly created, but unsuitable to the continuance of old species.

If there had been such a thing as natural selection, we might have expected to see it exemplified under the guidance of reason in the case of the human species. We might have supposed that the strength, stature, beauty, and intellect of the human species would have been improved by intermarriages of the tall, the strong, the healthy, the handsome, and the intellectual. This might be considered a very plausible hypothesis, had we no facts to disprove it. We find mankind generally regardless of such law of selection in their intermarriages. In this most important of all steps to the health, comfort, and happiness of mankind, they frequently act in the most capricious and unaccountable manner. In this matter they are guided by likings, caprice, or interest, which overpower all rational considerations. The robust and the weak, the tall and the short, the strong and the weak-minded, the handsome and the plain, intermarry in a

manner which could not have been anticipated beforehand by the most ingenious philosopher. The Lord has established diversities of intellect, stature, health, appearance, condition, and comfort among mankind, with a view to the good of the whole, and these diversities it seems cannot be altered by any law of selection either natural, or under the guidance of reason. But it may be said that the general tendency of the vigorous, intellectual, and handsome man, is to the healthy, intellectual, and handsome woman; and thus natural selection is here the *rule* or *law*, although it is often violated through the influence of other considerations. To this it may be replied that these other considerations are not accidental, but established, it may be for the counteraction of a law of natural selection that would traverse the divine plan and purposes, according to which, the present arrangement of His providence and grace are carried out. In like manner, God has not allowed the reason of man or the instincts of the brutes to interfere with the order, harmony, beauty, and symmetry of the animal and vegetable kingdom by reversing His laws in the production of new species. Were it otherwise, who can say what would be the consequence? Breeds of monsters might be formed with such fierce instincts, and of such strength, as would exterminate other races. Such mixtures of species and species, or of genera and genera, genera and species, might render the *fauna* and *flora* at present suitable for food to man and beast, unwholesome and noxious.

We have thus seen that in the creation of the world the Almighty acted upon an original plan, commencing with

small beginnings, and advancing by slow degrees, to its present state of perfection. Our ideas of the divine perfections are not in the slightest degree shocked by the fact that the creative plan was carried out by direct interpositions of creative power. Nor is it inconsistent with our ideas of infinite power and wisdom to imagine such direct interposition necessary, if such interposition was contemplated in the original plan, and formed part of it. Were we to reason *a priori* on the subject of the divine attributes and perfections in the works of creation and providence, could the wisest of mankind have imagined that the *phenomena* in the earth's crust would have been such as geological science discloses? And had the phenomena of geology been still unknown, what would scientific men have thought, had the facts disclosed by science been anticipated by a divine revelation? There cannot be a doubt that those who disbelieve the Mosaic account of the creation, found in the Bible, would have held up to scorn and ridicule such an account of it as geology teaches. And had Moses propounded as a revelation from God such an account of the creation as that suggested by Mr Darwin's hypothesis, is it likely that such a revelation would have met with the same favour from scientific men as that hypothesis? There can be little doubt how it would have been estimated had it rested upon no other authority than the word of God.

The late Professor Baden Powell, in his "Essay on the Study of the Evidences of Christianity," published in the work intituled "Essays and Reviews," denies direct interpo-

sition of Almighty power altogether in accounting for the origin of life. He says:—"It has been the unanswered and unanswerable argument of another reasoner that new species must have originated either out of their organic elements or out of previously organised forms; either development or spontaneous generation must be true." The essayist is certain that new species must have originated either in the one way or the other, but he does not tell us which, although he avers that the argument is "unanswered and unanswerable." I acknowledge I cannot imagine upon what grounds Professor Powell can call an argument unanswered and unanswerable which is based upon a hypothesis, unsupported by a single fact. It does not reach the dignity of a theory; and it is not only at variance with the phenomena of geology, but with the analogies of providence, and the experience and common sense of mankind. A direct denial is therefore all that the hypothesis merits. The development hypothesis reminds one of the anecdote of the Irishman who, having been asked by his Judge what he had to say for himself, on his having been found guilty of stealing a gun, replied that he had bought the gun when it was a pistol, and that he was going to keep it till it became a cannon. The following passage from Mr Miller's "Testimony of the Rocks" expresses, I believe, the almost universal opinion of geologists on the subject of development:—"Let me," says he, "briefly remark, respecting this development hypothesis, with which I have elsewhere dealt at considerable length, that while the facts of geologists are demonstrably such, *i.e.*, truths capable of proof, the hypo-

thesis is a mere dream, unsupported by a shadow of evidence."—P. 198.

If by a fixed order of nature, in as far as organic life is concerned, is understood its progression and development from monads or primary forms of life, brought into being by a *vis vivifica* inherent in matter, or by divine creative acts, with self-evolving powers, sufficient, without any subsequent interpositions of divine power, to account for all the phenomena of organised life up to the present time, then there is no such thing as a *fixed order* of nature. The teaching of geological science is as conversant with miracles, *i.e.*, with direct interpositions of divine power at variance with natural law, as is the teaching of divine truth in the word of God. In both science and religion, what is called natural law is insufficient to carry out the divine plans in providence and grace; and in both there are evidences of the evolution of the divine plans by direct interpositions of Almighty power. This ought ever to keep us in mind that it is not natural law, but the Lord that reigneth. It is this consideration that fills God's people with faith and hope amidst all the vicissitudes of life, and encourages them amidst all their trials to seek help from above.

It is almost impossible to over-estimate the indebtedness of this country to the labours and discoveries of scientific men. It is to science, in a great measure, that we ascribe our national power, greatness, and prosperity; and in no other country are men of science so greatly honoured. But to honours and rewards they are entitled only when their hypotheses and theories are established by facts.

Until that is the case, what is called science can claim no authority over us. When scientific hypotheses are, like those of Lamarck and Darwin, not only unsupported by evidence, but at variance with scientific facts, and repugnant to the common sense of mankind, such hypotheses are of no value whatever. And that man must be prejudiced against the teaching of divine truth whose faith in that teaching is shaken by such baseless conjectures, whatever countenance they may receive from other great names in the scientific world. The advocacy of such absurd and wild hypotheses tends to bring science and scientific men into disrepute with the sensible, thoughtful, and candid. When men of highly gifted minds prostitute God's gifts, yielding to the temptations which allure them from the study of facts to the framing of baseless hypotheses, He may convert their wisdom into foolishness. When they combat the clear declarations of His blessed Word, He sends strong delusions upon them that they should believe a lie. In such cases, the extremes of unbelief and credulity readily meet; and thus the most sceptical become the most credulous of mankind. Of this Professor Baden Powell and his *unanswerable reasoner* are notable examples.

CHAPTER VIII.

THE TEACHING OF SCRIPTURE RESPECTING THE ORIGIN, ANTIQUITY, AND CIVILISATION OF MANKIND.

THE Scriptures teach us that man, the last of God's works, was created in the divine image, endowed with the faculty of speech, capable of communion with his Maker, and possessed of dominion over the lower animals; that, before his creation, herbs and fruit had been provided for his sustenance; that he was afterwards placed in a garden to dress it and keep it; that he was subjected to a trial of faith and obedience; that he fell, and incurred the threatened penalty, from which, however, he had a promise of deliverance. The account of the creation of man, and of God's earliest dealings with himself and his posterity, is assumed, repeated, and confirmed in other parts of God's Word, and forms the basis of the religious dispensations subsequently introduced. If there ever existed a pre-Adamite race of men, Scripture makes no mention of any such race, any more than it does of the *flora* and *fauna* of previous geological systems.

The Scriptures farther teach us that, at a very early period of the world's history, the earth became corrupt before God, and was filled with violence; the consequence of which was the destruction of all flesh, with the exception of a single family, by a specially inflicted judgment; and the confounding of their language, after the re-population of the world, and their dispersion throughout the earth, for their impious attempts to set the Lord at defiance. It is maintained that these facts furnish the most rational and satisfactory *data* for accounting for the origin of man, of language and its varieties; for the origin of sin, and for the mode of its expiation; and for the causes of the degradation, and the means of the renovation of mankind.

The origin of man is accounted for in the Scriptures in the same way as that of the *flora* and *fauna* of previous systems, viz., by an act of creation, or direct interposition of Almighty power, and not by spontaneous generation or development. And the analogy of God's works, in the perfection of all the lower orders of creation, naturally leads to the inference that man was originally formed with faculties adapted to answer the ends for which he was made. While the lower animals are created with instincts suited to their natures, and the conditions of their existence, guiding them in the search of suitable food, and with means of protection and defence, it was not to be expected that man would be created without protection to his body from the severity of climate; without the natural means of aggression or defence with which the lower animals are furnished; without communicated or intuitive knowledge of the food that was wholesome or noxious; without the

means of social intercourse by speech; without the knowledge of his Creator, or of the ends and purposes of his being; in short, an ignorant and barbarous savage. The existing savages are in far more favourable circumstances than man would have been had he been created in the condition of a savage. They have learned to express in articulate language their feelings and their wants; they have learned by experience how to warm, clothe, and shelter themselves; how to capture the animals used by them as food; and how to distinguish what is salutary from what is noxious. The savage state of mankind, as it at present exists, is attributable either to their having been originally created in that state, and to their never having been raised above it; or to their having fallen into it from a condition of knowledge and civilisation. If the former alternative is the true one, then, as regards a considerable portion of the human race, they are now but little superior to what they were at the remotest period which some geologists claim for the antiquity of man; and this proves, so far at least, that man cannot raise himself above the barbarism of savage life. If the latter is the true one, it is accounted for in the Word of God in a manner which is confirmed by the testimony of history, tradition, and experience.

In the Word of God there are no indications of savage life either before or after the fall. There is no intimation that man lost the knowledge along with the righteousness and holiness that he possessed before he sinned. Much is said of his corruption of heart, of his violence and of his vices; but no traces of savage life appear in the antediluvian history. Before the fall, God placed Adam in the

garden of Eden, to dress it and keep it. The tilling of the ground and the keeping of sheep were the separate occupations of his sons, Cain and Abel, which marks considerable advancement in civilisation. In the lowest conditions of savage life, neither of these occupations exists. In the antediluvian history mention is made of the building of a city by Cain; of the working in copper and iron, and of the invention of the harp and organ, by his immediate descendants. At and before the era of Abraham, the Egyptians, the Canaanites on the coast of Phenicia, and in the central districts of Palestine, and the nations in the surrounding countries, had made such advances in civilisation as cannot fail to strike us with astonishment. What is stated in the Word of God on this subject is in accordance with the most ancient traditions, monuments, and historical records of heathenism. The possession of knowledge, and of the arts of civilised life, can only be accounted for by divine communication originally made to the founders of our race. Had man been created ignorant of God, of speech, and of the most common arts of civilised life, there is good reason to believe that he would have been a savage still; and the existence of savage life in the present day is corroborative of the testimony of Scripture on this point. That mankind would never have attained to a correct knowledge of the true God, and of the duties required by Him, and of the worship to be rendered to Him, without special revelation, is manifest from the state of religion throughout all the ages of the world, and from the fact that all those who possessed that knowledge declared that they obtained it by immediate revelation. The knowledge

of the true God possessed by the wisest of the ancient sages was mixed up with much error. Even Socrates, who was distinguished above all his countrymen by his acquaintance with the nature and perfections of the Deity, after reasoning with his friends, immediately before his death, upon the being of God, and the immortality of the soul, told them that he owed a cock to Esculapius, and took a promise from them that the cock should be duly sacrificed. It is well known that the Grecian sages travelled to the East and to Egypt in quest of knowledge, and it is impossible to say how much of the religious knowledge which they possessed was derived from the traditions of early revelations, mixed up in the course of its transmission with heathen errors and superstitions. The Scriptures, both of the Old and New Testament, assume and declare that all the knowledge of religious truth possessed by patriarchs and prophets was communicated by revelation; and it is impossible to account for its possession otherwise. Infidels may scoff at the teaching of Scripture in regard to man's state before he sinned, and of his changed condition afterwards; but the belief and acknowledgment of these facts are the only key to the right reading of the history of the world, both in its religious and moral aspects. Had man been created without the knowledge of God, and of his duties, and responsibilities, there is good reason to believe that he never would have acquired it; and had he continued in the state in which it is said in the Scripture he was created, there is as good reason to believe he never would have lost it. Man's nature, as well as his condition, was altered by the

fall. The doctrine of innate tendency to sin is ignored, it is true, even by many who profess the Christian religion. But this is not merely a doctrine of religion established upon divine authority, it is a fact patent to every man who will turn his eyes inwards or outwards. Without the acknowledgment of this doctrine, the phenomena of the world's history are unintelligible, viz., the universal loss of the knowledge of the true God, excepting where it was specially revealed; the universal prevalence of idolatry and superstition, with all their consequent corruptions and vices; the worship of the sun, moon, and stars by the Chaldeans and Persians, along with idolatry of a grosser kind; the worship of birds, and beasts, and creeping things, and even vegetables, by the Egyptians; the worship of Moloch by the burning of their children by the Ammonites, and of Baal by other Canaanitish nations; by the slaughtering of human victims, and by the mutilation with knives and lancets of the bodies of the priests. In many respects, the Greeks and Romans, with all their boasted civilisation, were little superior to the idolaters of Canaan, Egypt, and the surrounding countries. Side by side with the proneness to sin of the Israelites, and with the accounts given by their own prophets of their idolatries and corruptions, accounts are given throughout the whole of the Old Testament Scriptures of the idolatry and vices of the surrounding nations, which are confirmed by the testimony of profane history. The history of the world, from its earliest period, is a history of wars and contentions; of sins and crimes; of mankind, originally created after the image of God, hateful and hating,—biting and devouring

one another. The innate tendencies to sin in the heart are conspicuous in the present day in our own land, notwithstanding all our advantages of a high civilisation, and the light, the privileges, and the influences of Christianity. Whence the tendencies to sin in children displayed from their earliest years; whence their waywardness, disobedience, insubordination; whence the difficulties of their godly-upbringing; whence the want of love and fear of God, and relish for His service, that keeps young and old so greatly estranged from Him in their natural state, and renders them so prone to sin against and provoke their kind and loving Father in heaven, and so unwilling to glorify Him in their bodies and their spirits which are His? Whence the need of parental restraint and warnings; of the discipline of schools; of the enactment of laws; of the expensive establishments of police for the detection of crime; of judges and magistrates for the conviction of offenders; and of prisons, and other means for their punishment? From all this, it might be imagined that God's service was a yoke of bondage; that mankind cannot be happy in the life to come without being miserable in the present; that a life of sin is a life of unbounded enjoyment; and that if it has not the promise of the life that is to come, it has, at least, the promise of the life that now is. But the very reverse is the case. The denunciations against sin in God's laws are executed to a greater or less extent in His providential dealings with His rational creatures, by means of which a man's wickedness corrects him, and his backslidings reprove him; and by which he finds that it is indeed a hard and a bitter thing to forsake the Lord his God. His

reason, his conscience, and his interest point to the service of God as the only means of rendering him truly happy, and of enabling him to act the part of a rational and immortal being. *Meliora videt, deteriora tamen sequitur.* He feels a law in his members, warring against the law of his mind, and bringing him under captivity to the dominion of sin. These facts can in no other way be accounted for than by the doctrine of inherited and inherent corruption. The Scriptures give us a rational account of what man was when he was created, of what he retained, and of what he lost after his fall. And this accounts also for the necessity of his instruction in divine things by special revelation, and of his loss of the knowledge of God without that revelation, and for his consequent idolatry, superstition, vice, and degradation, and for his degeneracy into savage life, otherwise unaccountable.

The creation of man, and his state when created, and his changed condition after his fall, have been hitherto viewed from the *stand-point* of Scripture, because this appears to be the only means by which the phenomena of history can be explained. Scripture, it is true, recognises direct interposition of the Divine Being both in his works of providence and grace; in other words, recognises and affirms miraculous agency, from its beginning to its end; and science does the same in its province. Science tells us of primary creations, and reproductions of the earth's *flora* and *fauna*, and of the extinction of old, and of creations and reproductions of new orders, genera, and species. It accounts for the formation of mountains by

means of unknown subterraneous agency; but this indeed might have happened from some general law exerted in such a way as to raise the mountains and mountain chains conspicuous on the earth's surface. These we know are raised by means of subterranean disturbances of some kind or other. But the important ends that they serve in reference to salubrity and diversity of climate, diversity of surface, to the yielding of water for the fertilisation of the soil and for the supply of its inhabitants, and to the forcing up of the lower strata to the surface, and bringing within the reach of man, the various metals and minerals with which the earth's crust is stored, cannot be attributed to any random agency. It cannot be ascribed to any fixed order of nature, but to the working of a personal God, directing everything for the happiness and comfort of the workmanship of his hands. As it has been already said, the sciences both of Geology and Palæontology are conversant with an order of nature, and also with direct interpositions of divine power, for the carrying out the plan of creation. There seems therefore to be nothing inconsistent with the teaching of science in reference to direct interposition of divine power in creation; or with the analogy of the creation of other animals, that man was created by a direct act of divine power; and that when he was created he possessed the faculty of speech and the knowledge of divine truth and duty, and the means necessary for providing for his necessities, comfort, and safety. All the inferior animals were perfect at their creation and capable of advancing its ends; is it to be held then that man was created a savage, and in a different condition

from other animals? Neither science nor history has established the fact, that, if man had not originally possessed the gift of speech, he would ever have acquired it; or that, if he had been created in the condition of a savage, he would have ever emerged from that condition. It must therefore be assumed that man was endowed with the gift of speech till the contrary has been established; and that the confounding of language, or introduction of new languages, is to be otherwise accounted for than it is in the 11th chapter of Genesis, viz., by a direct divine interposition or miracle. Philologists form conjectures of the time necessary for the formation of the existing languages of the earth, and upon the calculations formed, Palæontologists and Geologists form *data* for the computation of the era of the creation of man. But they have never been able yet to show that any nation in the world ever formed a language for itself. The early chronology of Scripture rests upon the authority of the 5th chapter of Genesis, which differs to the extent of several centuries from that of the Septuagint or Greek version. As the Scriptures are not miraculously guarded against interpolations, glosses, or errors of transcribers, it is acknowledged that such are found in the Scriptures, but not to such an extent as in any way to corrupt or invalidate the truth, or weaken the authority of God's Word. The great fundamental truths of religion do not rest upon single passages, but are incorporated into the Word of God, and pervade the whole of it. The accuracy therefore of the chronology of the 5th chapter of Genesis, ought not to be regarded as an article of faith. But until there is better proof to the

contrary than has hitherto been adduced, there is no reason to question the Scripture chronology as it stands. If man was created in the condition which has been described, that would account for the progress of arts and civilisation in the antediluvian age; and likewise for the rapidity of their progress in the kingdoms of Egypt, Canaan, Syria, and elsewhere. And the change of man's nature and condition, after the fall, will account for the extinction of the knowledge of the True God, and of his worship, except where directly communicated and kept up; and for the rise and progress of idolatry, and superstition, moral corruption, and degradation, and for the existence of savage life. One thing is certain, viz., that the account given of these nations in Scripture is the earliest on record, and that it is consistent with what is found in their earliest monuments, and subsequent historical accounts; and there is no sufficient reason for questioning the sufficiency of the time assigned in Scripture for their reaching the civilisation attained by them in the time of Abraham; while the period assigned for their reaching that condition, by those who discredit the Scriptures, is mere matter of conjecture. Tradition, ancient monuments, and early heathen historians, confirm the Scriptural accounts of the great centre of radiation, from which emanated the founders of the great nations of antiquity, which became new centres from which over-populated countries were compelled to eject their superabundant population, and to compel them to seek new habitations. And these, according to the new circumstances in which their lot was cast, flourished or degenerated. The advantages of climate, soil, commercial

intercourse, native energy of character, means of aggression and protection, contributed to raise some nations above others in civilisation; while extremes of temperature, sterility of soil, isolation by war, distance, difficulty of communication with civilised nations, and other causes, tended to the degeneration of others to a certain extent from the civilisation of their parent states; and of others into the ignorance and barbarism of savage life. Fallen man has the elements of degradation within him, which have only been prevented in all cases from degenerating into the condition of savage life, by special interpositions for his enlightenment, and by various restraints imposed upon the progress of iniquity by the laws of God's moral government, and by the necessities of civilised life.

CHAPTER IX.

THE ANTIQUITY OF MAN, AS TAUGHT BY SIR CHARLES LYELL AND OTHERS.

In the preceding chapter, the antiquity of man, and the leading points of his history from the period of his creation, as taught in the Word of God, have been laid before the reader. And it must be acknowledged that the facts recorded in Holy Writ, in regard to this subject, do not correspond with the account given of the antiquity of man, and of his condition during the periods of his existence which preceded the ordinarily acknowledged era of the creation, by Sir Charles Lyell. As it has been stated, Scripture is silent in regard to pre-Adamite man, if any such man existed. If there ever was a pre-Adamite race, it was left to men of science to read their history in the rocks, as they read the history of the *flora* and *fauna* of by-past systems, and to publish and interpret it to others. The phenomena disclosed by Sir Charles Lyell and his collaborateurs, in this field of scientific inquiry, cannot

be yet regarded as accepted geological facts, at least as regards the dates assigned to them, and the causes which produced them. The facts have to be still farther investigated and verified. The field that is to be gone over is so extensive, and the portion of it that has been examined is so inconsiderable; the rocks of the period are so obscure as to the time of their appearance, and the dates at which the causes of their accumulation ceased to operate, as to justify the believer in God's Word in requiring evidence of far greater weight, before he can become a convert to the new opinions referred to in regard to the antiquity of man.

The grounds upon which Sir Charles Lyell and others found their arguments in proof of a far higher antiquity of man than is consistent with the Mosaic record, are:—

1. That human bones and rude implements of human manufacture in stone, arrow and spear heads, and hatchets, have been found in caves along with bones of extinct species of the elephant, rhinoceros, cave-bear, hyæna, &c.

2. That in river gravel or drift, said to be of great antiquity, as compared with the scriptural era of man's creation, are found at a considerable distance from the surface, arrow and spear heads, and hatchets of stone of very rude formation, along with bones of elephants, rhinoceroses, and other animals of extinct species.

The following are taken from Sir Charles' work on the "Antiquity of Man," as samples of his facts and conclusions. I quote his own words in as far as is necessary for my purpose, and must refer for further information to the work itself. The reader's attention is directed in the

first place to the investigations of MM. Tournal and Christol, of fossil remains found in alluvium and the mud of caverns in the south of France.

M. Tournal stated in his Memoir, "that in the cavern of Bize, in the department of the Aude, he had found human bones and teeth, together with fragments of rude pottery in the same mud, and breccia cemented by stalagmite; in which land-shells of living species were embedded, and the bones of mammalia, some of extinct, others of recent species. The human bones were declared by his fellow-labourer, M. Marcel de Serres, to be in the same chemical condition as those of the accompanying quadrupeds."—*Lyell's Antiquity of Man*, p. 60.

"Speaking of these fossils of the Bize cavern five years later, M. Tournal observed, that they could not be referred, as some suggested, to a 'diluvial catastrophe,' for they evidently had not been washed in suddenly by a transient flood, but must have been introduced gradually, together with the enveloping mud and pebbles, at successive periods."

"M. Christol, who was engaged at the same time in similar researches, in another part of Languedoc, published an account of them a year later, in which he described some human bones, as occurring in the cavern of Pondres, near Nismes, in the same mud with the bones of an extinct hyæna and rhinoceros. The cavern was, in this instance, filled up to the roof with mud and gravel, in which fragments of two kinds of pottery were detected, the lowest and rudest near the bottom of the cave, below the level of the extinct mammalia."

"It has never been questioned," says Sir Charles Lyell, "that the hyæna and rhinoceros found by M. Christol were of extinct species; but whether the animals enumerated by M. Tournal might not all of them be referred to quadrupeds which are known to have been living in Europe in the historical period, seems doubtful. They were said to consist of a stag, an antelope, and a goat, all named by M. Marcel de Serres as new, but the majority of Palæontologists do not agree with this opinion."—*Id.*, p. 61.

In his "Principles of Geology," ninth ed., p. 739, Sir Charles Lyell stated that M. Desnoyers, an observer equally well versed in Geology and Archæology, had disputed the conclusion arrived at by MM. Tournal and Christol, that the fossil rhinoceros, hyæna, bear, and other lost species, had once been inhabitants of France contemporaneously with man. The flint hatchets and arrow heads, he said, and the pointed bones and coarse pottery of many French and English caves, agree precisely with those found in the *tumuli* and under the dolmens (rude altars of unhewn stone) of the primitive inhabitants of Gaul, Britain, and Germany. The human bones, therefore, in the caves, which are associated with such fabricated objects, must belong not to antediluvian periods, but to a people in the same stage of civilisation as those who constructed the *tumuli* and altars."—*Id.*, p. 61.

"After giving no small weight," says Sir Charles, "to the arguments of M. Desnoyers, and the writings of Dr Buckland on the same subject, and visiting myself several caves in Germany, I came to the opinion that the human bones, mixed with those of extinct animals in *osseous breccias* and

cavern mud, in different parts of Europe, were probably not coeval. The caverns having been at one period the dens of wild beasts, and having served at other times as places of human habitation, worship, sepulture, concealment, or defence, one might easily conceive that the bones of Man and those of animals, which were strewed over the floors of subterranean cavities, or which had fallen into tortuous rents connecting them with the surface, might, when swept away by floods, be mingled in one promiscuous heap in the same ossiferous mud or *breccia*.

"That such intermixtures have really taken place in some caverns, and that geologists have occasionally been deceived, and have assigned to one and the same period fossils which had really been introduced at successive times, will readily be conceded. But of late years we have obtained convincing proofs, as we shall see in the sequel, that the mammoth and many other extinct mammalian species, very common in caves, occur also in undisturbed alluvium, embedded in such a manner, with works of art, as to leave no room for doubt that Man and the mammoth co-existed." Sir Charles, in the next place, directs attention to the researches in 1833–4 of Dr Schmerling in the caverns near Liége. "At a very early stage of his investigations, Dr Schmerling found the bones of Man so rolled and scattered, as to preclude all idea of their having been intentionally buried on the spot. Of the accompanying animals, some, like the cave-bear, hyæna, elephant, and rhinoceros, were extinct; others, like the wild cat, beaver, wild boar, roe-deer, wolf, and hedgehog, are still extant."—*Antiquity of Man*, p. 63.

"In the Engis cavern, distant about eight miles to the south-west of Liége, on the left bank of the Meuse, the remains of at least three human individuals were disinterred. The skull of one of these, that of a young person, was embedded by the side of a mammoth's tooth. It was entire, but so fragile that nearly all of it fell to pieces during its extraction. Another skull, that of an adult individual, and the only one preserved by Dr Schmerling in a sufficient state of integrity to enable the anatomist to speculate on the race to which it belonged, was buried five feet deep in a *breccia*, in which the tooth of a rhinoceros, several bones of a horse, and some of the reindeer, together with some ruminants, occurred."—*Lyell, Antiquity of Man*, p. 65.

"Schmerling observed that although in some forty fossiliferous caves explored by him, human bones were the exception, yet these flint implements were universal, and he added that 'none of them could have been subsequently introduced, being precisely in the same position as the remains of the accompanying animals.' 'I therefore,' he continues, 'attach great importance to their presence; for even if I had not found the human bones under conditions entirely favourable to their being considered as belonging to the antediluvian epoch, proofs of man's existence would still have been supplied by the cut bones and worked flints.'"—*Id.*, p. 67.

"Before I speak," says Sir Charles, "more particularly of the opinions which anatomists have expressed respecting the osteological characters of the human skull at Engis, near Liége, mentioned in the last chapter, and described

by Dr Schmerling, it will be desirable to say something of the geological position of another skull, or rather skeleton, which, on account of its peculiar conformation, has excited no small sensation in the last few years. I allude to the skull found in 1857, in a cave situated in that part of the valley of the Düssel, near Düsseldorf, which is called the Neanderthal. The spot is a deep and narrow ravine, about seventy English miles north-east of the region of the Liége caverns, treated of in the last chapter, and close to the village and railway station of Hochdal, between Düsseldorf and Elberfeld. The cave occurs in the precipitous southern, or left side of the winding ravine, about 60 feet above the stream, about 100 feet below the top of the cliff."—*Id.*, p. 75.

"In the limestone are many fissures, one of which, still partially filled with mud and stones, is represented in the section as continuous from the cave to the upper surface of the country. Through this passage the loam, and possibly the human body to which the bones belonged, may have been washed into the cave below. The loam, which covered the uneven bottom of the cave, was sparingly mixed with rounded fragments of chert, and was very similar in composition to that covering the general surface of that region."—*Id.*, pp. 76, 77.

The Engis and Neanderthal skulls were submitted by Sir Charles Lyell, with the view principally of ascertaining to what races they belong, to Professor Huxley, whose report will be found in Sir Charles' work on the "Antiquity of Man," to which the reader is referred. Professor Huxley gives the measurements of both skulls, and compares them

with those of the European and Australian races; but cannot, with any confidence, say to which of these, or to what race, they belong. He also compares their measurements with those of the skull of a chimpanzee, and also compares the Engis and Neanderthal skulls together. Of the latter he says:—"There can be no doubt that, as Professor Schaaffhausen and Mr Busk have stated, this skull is the *most brutal of all known human skulls,* resembling those of the apes not only in the prodigious development of the superciliary prominences, and the forward extension of the orbits; but still more in the depressed form of the brain-case, in the straightness of the squamosal suture, and in the complete retreat of the occiput forward and upward occipital ridges."—*Lyell, id.*, p. 84.

"The question," continues Professor Huxley, "whether the Engis skull has rather the character of one of the high races, or one of the lower, has been much disputed; but the following measurements of an English skull, noted in the catalogue of the Hunterian Museum as typically Caucasian, will serve to show that both sides may be right, and that cranial measurements alone afford no safe indication of race."—P. 87. After giving the measurements referred to of an English skull, he adds:—"In making the preceding statement, it must be clearly understood that I neither desire to affirm that the Engis and Neanderthal skulls belong to the Australian race, nor to assert even that the ancient skulls belong to one and the same race, so far as race is measured by language, colour of skin, or character of hair."—*Id.* p. 88.

The foregoing quotations have been made for the pur-

pose of showing the nature of the argument, and the grounds upon which it is supported. My limits would debar me from a full discussion of the subject, were I qualified for the task; but those who wish to see the whole of the facts fully stated, and the subject fully discussed, are referred to Sir Charles's work itself.

2. I now proceed to notice, as briefly as possible, the second argument for the antiquity of man, grounded upon the fact that implements, evidently the work of man, and designed for his use, such as spear and arrow heads, and hatchets of a very rude formation in stone, are found principally in river drift formations in the valley of the Somme, near Amiens and Abbeville, along with the bones of extinct animals, at considerable depths from the surface.

In his work above quoted, Sir Charles Lyell says: "M. Boucher de Perthes found in ancient alluvium, at Abbeville in Picardy, some flint implements, the relative antiquity of which was attested by their geological position. The antiquarian knowledge of their discoverer enabled him to recognise in their rude and peculiar type a character distinct from that of the polished stone weapons of a later period, usually called 'Celts.' In the first volume of his 'Antiquités Celtiques,' published in 1847, M. Boucher de Perthes styled these older tools 'Antediluvian,' because they came from the lowest beds of a series of ancient alluvial strata bordering the valley of the Somme, which geologists had termed 'diluvium.' He had begun to collect these implements in 1841, from which time they had been dug out of the drift or deposits of gravel and sand, whenever

excavations were made in repairing the fortifications of Abbeville; or annually, as often as flints were wanted for the roads, or loam for making bricks. Fine sections, therefore, were laid open from 20 to 35 feet in depth, and the bones of quadrupeds of the genera elephant, rhinoceros, bear, hyæna, stag, ox, horse, and others, were found, and had been sent from time to time to Paris to be examined and named by Cuvier, who described them in his *Ossements Fossiles.* A correct account of the associated flint tools, and of their position, was given in 1847 by M. Boucher de Perthes in his work above cited, and they were stated to occur at various depths, often 20 or 30 feet from the surface, in sand and gravel, especially in those *strata* which were nearly in contact with the subjacent white chalk."—*Id.*, pp. 94, 95.

What has been said is sufficient to show the nature of the leading facts upon which Sir Charles's arguments are founded. Many others are given in his work, and the subject is discussed and reasoned out in a manner which might be expected from a geologist of world-wide and well-merited reputation. The author has spared neither expense nor trouble in verifying the facts on which he founds his arguments. He has been in communication with the original discoverers of the facts; has travelled over the localities in which the discoveries were made, in order to their verification; and has become a convert to views which he formerly combated, and has prosecuted the object he has before him with all the perseverance, energy, and zeal of a new convert.

I preface the observations which I am about to make in

reference to the antiquity of man, by the following quotation from Dr Page's Work on the Philosophy of Geology.

In approaching this question, namely, At what period of the geological scale did man make his appearance? Dr Page thus expresses himself: "Geology must resolutely abide by her own methods of solution. It may be difficult to free the mind from the influence of long-established beliefs—it may look like presumption to differ from the teaching of centuries; but older than these are the facts of nature, and reason is bound to an honest interpretation. So far as research has been prosecuted in the different quarters of the globe—and at the outset, it must be confessed, how insignificant the area that has been examined—no remains of man or of his works have been discovered till we come to the lake-silts, the peat-mosses, the river-gravels, and the cave-earths of the post-tertiary period. In these have been detected tree-canoes, and stone hatchets, rude implements of flint and bone, the embers of the fires he kindled, and occasional fragments of his own skeleton. As yet, these have been chiefly discovered within the limited area of Southern and Western Europe, and we have scarcely any information from the corresponding deposits of other regions. Till these other regions shall have been examined—and especially Asia, where man historically flourished long prior to his civilisation in Europe—*it were premature to hazard any opinion as to man's first appearance on the globe.* But taking the facts such as geology finds them, viz., the occurrence of stone implements in conjunction with the remains of Irish deer, mammoth, hippopotamus, rhinoceros, cave-lion, and other creatures long since extinct in

Europe, and this in deposits of considerable geological antiquity, it is evident that man has been an inhabitant of the globe much longer than is popularly believed."—P. 114.

"But while the nature of the deposits, their situation, and their mode of formation, indicate the lapse of many thousand years, (estimating by the usual modes of geological computation) we must be careful not to run into the opposite extreme, and conjure up ages of fabulous duration. Historically, we have no means of arriving at the age of these deposits; geologically we can only approximate the time by comparison with existing operations; while palæontologically it must be borne in mind that the associated animals are among the most recently extinct or exterminated. It is a sound maxim in palæontology, that the more ancient any specific form is, the more widely it differs from existing species of the same genus. Structural variation is, in fact, the measure of antiquity. Now the mammoth, the hippopotamus, and the rhinoceros of our European lake and river drifts, differ but slightly from the existing species in Asia and Africa, so slightly, that, had they been alive at the present day, it might have been a question among zoologists whether they were indeed different species, or merely wide varieties of the same species? At all events the differences between these extinct pachyderms, and those still existing, are not greater than that which appears between the several living species. These slight distinctions would, therefore, indicate no great palæontological antiquity—nothing that may not have taken place within a few thousand years of the ordinarily received chronology."—*Id.*, p. 116.

"As geologists, we may feel convinced that more than six or eight thousand years have elapsed since their formation, but how much more, *we have, in the present state of our science, no means of definitely determining.* Palæontologically, we perceive that other animals whose remains are associated with those of man, do not differ very widely from species still existing, and are therefore constrained to oppose that enormous antiquity which some geologists are disposed to contend for."—*Id.*, p. 117.

On the subject of the antiquity of man, Mr Ansted thus expresses himself:—"At New Orleans, in the Delta of the Mississippi, charcoal and a human skeleton were found, at the depth of 15 feet, under four layers of woody matter, successively deposited with mud and sand. In many caverns human remains of various kinds, and skeletons, have been found at the bottom, buried with the bones of extinct quadrupeds, coated with a thick shell of stalagmite. At certain stages in the deposit of stalacite are other human indications, and among them Roman remains of known date. By an estimate from this, it would appear that the lowest human remains must be of a date carrying us *back a quarter of a million of years.* A similar calculation, made on the occasion of a railway cutting laying bare a highly instructive section in Switzerland, led to the same result."

"All we can say then is," continues Mr Ansted, "that after (perhaps at the close) of the Glacial period, we find that men inhabited Europe. They constructed implements by chipping flints into flakes and knives. They were probably cannibals. They lived in *caverns*—they fed on the animals they could kill by their superior intelli-

gence. They split the bones of their prey to extract the marrow. We have no proof that they cooked their meat. At the same time, it must be remembered, that the lowest state of savage life in one part of the world is perfectly consistent with large groups of the most highly civilised races in another part. The deposits with human remains that might have been deposited a few years ago in Central Australia, would point to the least advanced and least intelligent races as the inhabitants. Not far off, however, existed a multitude of highly developed and intellectual men, whose intellectual powers had already enabled them to bring from the uttermost parts of the earth the luxuries and contrivances, whose invention had taxed the cleverest brains for centuries."—*The Earth's History*, pp. 185, 186.

It hence appears, that even those geologists who hold that the antiquity of man reaches beyond the limit assigned in the Mosaic record, differ widely as to their conjectures regarding the era of his appearance. While Dr Page conjectures that it may not have been very long before the historical period, Mr Ansted conjectures it to be about a quarter of a million of years beyond that era. M. Desnoyers, on the other hand, supposes it to have been within the historic period; and with him Sir Charles Lyell at one time agreed, although after further investigation, he has changed his opinion. It is likewise to be observed that doubts have been expressed as to whether the flint implements relied upon by some of the geologists, were the work of man, and whether one of the skulls was a human skull at all. Differences of opinion have likewise

been expressed in regard to the age of the river drift, in the valley of the Somme and elsewhere, in which remains of extinct animals have been found in conjunction with flint implements held to be of human manufacture. Doubts also have been expressed, as appears from the foregoing quotation, whether the bones found in the caves and in the river gravel, are not the bones of recent and not of extinct animals. I acknowledge that I cannot but express my astonishment at the confident assertion of the finders of the bones of the animals found in the river gravel and caves, not only as regards the genus, but the species likewise,—and in regard also to the indications of their having been gnawed or split up for the extraction of marrow. I cannot but feel the extreme difficulty of accounting for the accumulations of all kinds of animals in the bone caves. Human remains, and flint instruments used by human beings, elephants, hyænas, lions, bears, stags, horses, dogs, &c., are all assembled together. They are supposed to have been swept into the caves through fissures or apertures during floods. If man and the creatures associated with him in the caves possessed the same instincts as they do at present, they would have met to bite and devour one another. It is possible indeed that all might have been swept in during a flood through apertures in the caves, but is this at all likely? Through some of the caves streams of water may have flowed continually, and in that case a heterogeneous mass of relics might have been carried down the streams and entered the caves and been imbedded in their cavities. But it seems evident that the fissures or entrances in some of them are so

small, that they could not have formed channels of streams, and this is shown likewise from the crust of stalagmite overlying the remains. Supposing the interstices in any cave in the present day so large as to admit the relics found in the caves, being, with very few exceptions, only detached bones, and not whole skeletons, what would be the probability even in a period of indefinite length, of the accumulating of the relics of so many animals, having been accidentally introduced during a flood? Or, if human remains were accidentally swept in, how were the flint implements introduced, while there were no other traces of human beings.

I have wondered, as I have said, at the confident assertions as to the species of animals found in the caves; no doubt seems ever to be expressed regarding the species to which every animal found in the river drift and in the bone caves belongs. It has been already shown how cautiously such men as Cuvier and Professor Owen express themselves on this subject. "The determination of the remains of quadrupeds," says Professor Owen, "is beset, as Cuvier truly remarks, with greater difficulty than other organic fossils. . . . . The entire skeleton of a fossil quadruped is rarely found, and when it occurs, it gives little or no information as to the hair, or the fur, or the colour of the species." In speaking of the non-applicability of Cuvier's law of the correlation of parts in the animal structure, in consequence of the limited extent to which it is understood, Professor Owen adds, "The consciousness of that limitation led the enunciator of the law to call the attention of palæontologists

expressly to the extent to which it could be then applied; as for instance, to the determination of the *class*, but not to the *order*, *family*, *genus*, &c.; and to caution also to the extent of the cases, in which the circumstances being only known *empirically*, he consequently enjoins the necessity of farther observation and of caution in their induction."—*Palæontology*, p. 313.

It is likewise a subject of wonder how the existence of the flint implements in the river gravel in the valley of the Somme and elsewhere is to be accounted for, while there are no indications of human remains found along with them. I subjoin the account given by Sir Charles Lyell of their occurrence, which, I acknowledge, surprised me. I had heard it accounted for on the supposition that the situations in which they were found were sites of ancient flint manufactories. This did not seem to be a probable account of the phenomena. But Sir Charles' theory is more improbable still. He gives, in plates in his work, specimens of the flint implements in the valley of the Somme, and says they were for cutting down trees, scooping out canoes and holes in ice, for fishing-hooks, and for grubbing up roots, for destroying beasts of prey, killing game, self-defence, and the like. To judge from the appearance of the implements, one would imagine they were very ill adapted for such purposes. Sir Charles accounts for their accumulation as follows:—"*Possibly*, in the earlier geographical condition of this country, the confluence of tributaries with the Somme afforded inducements to a hunting and fishing tribe to settle there; and some of the same natural advantages may have caused the first in-

habitants of Amiens and Abbeville to fix on the same sites for their dwellings. If the early hunting and fishing tribes frequented the same spots for hundreds or thousands of years in succession, the number of stone implements *lost* in the bed of the river need not surprise us. Ice-chisels, flint hatchets, and spear-heads may have *slipped accidentally through holes* kept constantly open, and the recovery of a *lost treasure* once sunk in the bed of the ice-bound stream, inevitably swept away with gravel on the breaking up of the ice in the spring, would be hopeless. During a long winter, in a country affording abundance of flint, the manufacture of tools *would be continually in process;* and, if so, thousands of chips and flakes *would be purposely thrown into the ice-hole,* besides a great number of implements having flaws, or rejected as too unskilfully made to be worth preserving."

We are greatly indebted to geologists for their facts, but we are often not made much wiser by their modes of accounting for them. The account given by Sir Charles for the presence of the flint implements of the valley of the Somme, is not more probable than the account given of the introduction of vertebrate animals, fishes, sauroids, birds, tertiary mammals, and human beings, by natural selection from monads originally, and subsequently from *Crustacea, Radiata,* and *Mollusca,* without a single fact in support of the hypothesis. Such a mode of accounting for the phenomena of science, can have no other effect than the bringing of science and scientific men into discredit. It would not be difficult to form ever so many conjectures to account for the presence of flint implements in river

drift, every one of which would be quite as possible, and much more probable than that of Sir Charles Lyell, and would lay a much less tax upon our credulity. Sir Charles has mentioned the presence of human remains, of elephants, rhinoceroses, hippopotami, lions, bears, hyænas, rein-deer, dogs, and other bones, in caves in Holland, France, England, and elsewhere. Some of these animals are carnivorous, some amphibious, some of them live in concord, and some prey upon one another, some whose dwellings are in caves some in the woods, some in the open fields. A heterogeneous assemblage truly, it must be allowed, and all accidentally brought together by the action of water at some time or other, conveying them through apertures in the caves. A much more probable and rational mode of accounting for the phenomena is that the beasts of prey that lived in caves might have killed the various animals on which they preyed, and carried them to be there consumed, and this would account for the accumulation in the same place of the bones, both of graminivorous and carnivorous animals. These caves might, after the destruction or extinction of the animals contained in them, have been subsequently occupied by human beings, who might have buried the human bones in the situations where they are found. Before accepting the facts adduced for the antiquity of man arising from the presence of his bones in the bone caves, and flint implements of his manufacture in river gravels, the advocates of the opinion must show more distinctly than they have done, the age of the river drift, the species of the animals found in the caves, and the antiquity of the relics contained in them. It appears from

the quotations above given, that the geologists who are most decided in regard to pre-Adamite man, are at issue among themselves in regard to these points. Surely much more evidence is required to establish a theory that professes to upset the belief of mankind during the whole of the historic period. A vast number of human beings must have existed throughout the period of a quarter of a million of years, during which, it is said by some geologists that man has existed on the earth, but with the exception of the Natchez man and the human remains in a very few cases in Europe, no portion of his remains has been found—America, Asia, and Africa, give no sign. Two skulls only have been submitted for public examination, and there are some doubts whether one of them is a human skull at all. I might have also noticed the report upon the human remains in Aurignac cave by M. Latert to show upon what slender foundations scientific men can raise great superstructures, and tax the credulity of those who have not made science a pursuit. Yet those who have not done so, cannot avoid applying their reason and common sense in judging of the facts founded upon, and the reasons upon which the conclusions drawn, rest. If the facts are clearly established, and the results fairly drawn from them, the public will not fail to appreciate them.

It cannot be stated with any kind of certainty what amount of water may have existed in the river valleys at the ordinarily assigned period of the Adamite creation; and at what period the river drift was brought down which is at present conspicuous in the valleys in which the rivers now flow. Mr Thomas Jamieson, in the paper already quoted

from, shows that the water that covered the earth at the close of the Glacial period must have disappeared with extraordinary rapidity. "The emergence of the land from this watery covering," says he, "seems not to have been so gradual as its submergence. There are many striking facts which seem to indicate that the waters passed over more rapidly. The drift beds have been cut through, and almost entirely washed away, even in places where they can be shown to have been *several hundred* feet thick; I say, *several hundred feet thick.* All the narrow parts of the valleys have been scoured bare to a most remarkable degree." . . . "This retreat of the sea has overspread the lower grounds with great sheets of rolled gravel and sand, *distinguished from the glacial drift* by their looser texture, the more water-worn aspect of the deposits, and the absence of the striæ and polish on the pebbles. These gravels are destitute of fossils, and seem to be the result of the denudation of drift beds. The retreating waters, pouring off through the narrow passes, have scoured these bare, and shot out the contents into the wide valleys below, carrying off the finer mud and clay to the bed of the present sea."—*Essay on the Boulder-drift of the North of Scotland.* No fossils, indeed, have been found in the river drift in Scotland; but it does not follow that they may not have been found in such drift elsewhere. These fossils, too, may not have been originally deposited where they have been found, at Amiens, Abbeville, and elsewhere, but may have been carried down thither from higher localities, and out of drift of a different formation.

As far as discoveries have yet been made in regard to

the antiquity of man, treated of by Sir Charles Lyell, the localities in which his relics have been found are in a comparatively boreal climate, where the difficulties of supporting life must have been very great. There appears to be no indications of cereals or fruit trees at the period assigned for his existence. It is possible, indeed, that he may have sustained life by fishing. But, in the first place, if he expected a supply from fish caught by letting down one of the flint implements shown in Sir Charles Lyell's plates—see figs. 8, 9, 10, pp. 114, 115—into the holes dug in the ice with his flint hatchet, there is little reason to suppose that he could place his dependence upon such a mode of subsistence. In the second place, Professor Agassiz says that all the recent fishes are of different species from those of the tertiary epoch, and Professor Owen and others affirm that the tertiary fishes were unsuitable for human food.

If the human race first appeared in these climates with no means of protection and defence, without instincts naturally guiding them to what was wholesome and guarding them against what was noxious, exposed to the difficulties of procuring food in such rigorous climates; and appeared, moreover, in a savage state, ignorant of the means of protection and defence, and of supplying their wants, beyond the most ignorant savage in existence, it is difficult to imagine how they could have provided for their subsistence, or held their own against the savage beasts about them.

Moreover, if man was introduced into existence in the state in which the whole of the advocates of the high

antiquity of man hold him to have been, it is difficult to imagine, without aid *ab extra*, that he would ever have civilised himself. Archbishop Whately, the Duke of Argyll, and others, have, by unanswerable arguments and facts, shown that he could not; and not one instance has been given by Sir John Lubbock and others, showing that he ever did. No one has shown this more succinctly, clearly, and forcibly, than my highly gifted and highly valued friend, Dr Alex. Harvey, Professor of Materia Medica in the University of Aberdeen, in a work entitled "Man's Place and Bread Unique in Nature; and his Pedigree, Human, not Simian." (Edmonston and Douglas, 1865.) This work, though small in compass, will amply repay a careful perusal; and I am confident I shall gratify most of my readers by a few short quotations from it.

"To have enabled the primeval man," says Dr Harvey, "when first he came into the world, the possessor and the occupant of a bodily organism naturally naked, defence less, and dependent on daily supplies of food, to sustain himself as an animal even for a week—much more to start fair in it as a man, to say nothing of holding his own in it, or 'subduing' it—he must in some sufficient measure have been possessed of that skill in the use of his natural powers of mind and body which bespeaks *teaching, culture, experience.* He must have been possessed also in some degree of that knowledge of things, without him and within, which we call, and which is to us, *acquired* knowledge. From the first he must have been able to stand erect and to walk, to handle, things, to speak, to reason, and to apply his knowledge, as he could not at once have done in any

degree *naturally;* nay, as regards speech in particular, as he never should or could have taught himself to do, and as we can do only by being instructed therein, and by slow degrees, and after many failures."

"On the other hand, the intuitions of instinct and the promptings of instinct, are complete and perfect from the first. They require no education; they admit of no accessions of knowledge from experience, nor are they susceptible of improvement in action from practice. Virtually it is so. And the lower animals, beholden as to their animal life to instinct for their guidance, come at once and of themselves into the possession of all the knowledge, and they acquire at once and of themselves all the skill they need, to enable them to act well their part in the world."

"It is not so with man. Gifted with a will that is free, and with an intelligence and an organism correlative thereto, and designed manifestly to be left ultimately to the guidance of his reason and the dictates of his will, man enters life naked of body, blind of understanding, impotent of will, and helpless in respect of nerve and muscle. Without set limits to his capacities, or with capacities bounded only by the measure of his organism which is fixed, the *native* condition of his mind, and of its corporeal instrument, the body, rises no higher than zero."—Pp. 22, 23.

"We speak of education. We are continually speaking of it; of its importance and its blessings, its improvement and extension, and so forth. But we do not realise, as we might and as we ought the fact, that to man, and to him alone, education is, *physically*, a fundamental condition of existence, as essential physically to his existence as is the

air he breathes. And it begins almost from the birth."—P. 25.

"Even in man arrived at the maturity of his powers, and civilised, the *passive* is still the natural bent or habit of the mind. Inaction, repose, is its native tendency; while as to effort when put forth, the direction it naturally takes is sensual rather than intellectual or moral. Man's appetites, which are truly instinctive, are so constituted, and they are so linked to his organic part, and so associated with the essential requirements of this, as to make themselves keenly felt; and thus felt, they urgently prompt to action. But they rise no higher naturally than the propensities implanted by nature for the sustentation of the body, or the reproduction of the species. These, and other kindred appetites appeased, man seeks naturally for nothing beyond. It is so pre-eminently among the savage tribes."—P. 29.

"Of a condition which is the combined product of a vast number of subordinate agencies, operating very gradually, and through long periods, different views will be taken. This granted, we affirm, nevertheless, that *civilisation* is a condition of human nature which we cannot put away from us, or regard as other than *supernatural.* In the first place, it stands out to view as a condition that is *exceptional,* the condition of a few only as compared with the vast aggregate of our species. And, in the next, it confronts us on every side as a condition that is *artificial.* It is man that civilises man. Absolutely unaided, man could do nothing for himself as the brutes can. He is beholden to his fellow man for the conditions that are essential to

the evolution of his powers, for the means whereby he is enabled to tide over the helpless years of infancy and childhood, and for the foundation of all that fits him in after years to act his proper part in life. But a condition that is exceptional, a product that is artificial, contingent, therefore, and uncertain, variable, and unequal, is not one that can be regarded as provided for in the 'order of nature.'"

"If this be so, and the fact that it is so is indisputable, what but *scientific fanaticism* can hinder any from seeing that, as to the root of the matter, man at the beginning had for his *teacher* and *civiliser* the Almighty God, his creator; that on his coming into the world he received at His hand such special instruction, and such special endowments, as he needed to place him at once in position *befitting* his natural capacities, but unattainable naturally?" —Pp. 30, 31.

In the foregoing pages which treat of the antiquity of man, I have quoted from the authors who have discussed this subject, to obviate any complaint of unfairness in stating the views of others. I have given but a sample of the facts and arguments, and the plan and object of my work prevented me from doing anything more. My intention was merely to show as briefly as possible the grounds assigned by others for ascribing an antiquity to man beyond what the Word of God appears to warrant, and for concluding that the teaching of Science and Scripture is at variance upon this point. It is assumed that the facts regarding the remains in the bone caves and river gravel

are indisputable; but the quotations adduced from those that attribute an earlier date to the human and other remains in the caves and river drift than what the Word of God warrants, show that they are not agreed either in regard to the age of the remains or of the drift, or in regard to the species of animals there found. It is maintained, therefore, upon the grounds that have been stated, that such grave doubts may be raised in regard to the validity of the arguments, that the acceptance of the facts as interpreted by Sir Charles Lyell and others, cannot with any fairness be demanded in the present state of our knowledge. The reports of the phenomena, hitherto examined by men whose opinions to a certain extent are influenced by preconceived notions of the supremacy of natural law, to which all natural phenomena, according to them, are subjected, and by hypotheses of the origin of life, and the progressive advancement of the earth's *flora* and *fauna*, by spontaneous generation, or created monads, or by development, or origin of species by natural selection, which naturally induce the necessity of man's appearance on earth, as Professor Huxley remarks, with a beast-like skull and in a savage state, must be received with much caution. But if men, equally well qualified and free from such bias, were to make the investigations, different and opposite arguments might be raised, and different results might be reached. In the meantime, the believers in the authority of the Bible will hold to it, as furnishing the only probable and consistent account of the phenomena regarding man's creation, the faculties originally imparted to him, his declension from his original righteousness, and his consequent

degradation and misery, and the means used for his enlightenment, regeneration, and salvation.

I trust, however, the candid reader will acknowledge, after the perusal of the foregoing pages, that the general scope of the teaching of science, where facts have been fully investigated, tends to the confirmation, and not the confutation, of the teaching of Scripture on the subject of creation.

It would, as it seems to me, be unwise, while geological science is but in its infancy, where the field is so wide, and so small a portion of it has been investigated, to pronounce more confidently than I have done in regard to the reconciliation between that Science and Scripture. This would be to imitate the illogical rashness which I deprecate in others. I feel, however, that no disclosures of science have in any way weakened the truth or authority of Scripture. For myself, I can say without the slightest hesitation, that any knowledge which I possess of geology, has tended highly to enhance my estimation of the wonders, the wisdom, and goodness of God in creation and providence. The consideration of God's actings from the earliest periods of the geological systems in the kingdom of nature, furnishes us with manifold and most striking analogies in regard to His proceedings in creation, providence, and grace, in the periods of which the Bible records the history. Creations of new and extinctions of old races are conspicuous throughout the whole of the geological epochs, and the Adamite creation is in strict analogy with these.

In by-past epochs, God carried on and perfected His great creative plan, by successive direct interpositions of

His power, in the creation of higher orders, and more highly organised species of organised beings than had before existed, and provided means for their support and continuance, till the creation of newer and more advanced orders and species were required in accordance with that plan. So, in these last times, God created a new order of beings after His own image, and a new *flora* and *fauna* subject to their dominion, and adapted to their use. All this is in accordance with the divine dispensation in the covenant of grace. He furnished man originally with the knowledge which was as indispensable, in order to his fulfilment of the purposes of his being, as his daily bread is for the support and continuance of the natural life. And as God's plan of perfecting the organisation of the inferior animals was carried on from small beginnings, and by slow degrees, and by direct interpositions of power, so from time to time, and as mankind were able to bear it, He has carried on His purposes of grace, by direct interpositions, in the communication of the knowledge of Himself and of His will through preparatory dispensations, until the coming of grace and truth by Jesus Christ; and until the gospel, in all its fulness and freeness, was communicated by his apostles, for the regeneration and perfection of mankind.

One thing is certain. The facts of geological science cut up from the very roots the arguments of Hume and all others against the possibility of a miracle, which are based on what is called the fixed order of nature, or the immutability of natural law, and the consequent impossibility of proving a miracle, as in opposition to the testimony of experience. The origin of the Silurian *flora* and

fauna can be accounted for only by *creation*, in other words, by a direct interposition of divine or supernatural power, *i.e.*, by a *miracle*. That another direct interposition should have taken place was contrary to the experience of the myriad ages of the Silurian period. Yet that such an interposition did occur, is manifest in the subsequent creation of fishes. In like manner, at intervals of immense length, successive interpositions of the same kind are facts which the researches of geology show to be conspicuous and undeniable, down to the accomplishment of the final or Mosaic creation. That creation having brought into existence a new and higher, that is, an intelligent and responsible order of beings upon the earth, it is only in accordance with the previous progressive interpositions in the experience of the past, that farther interpositions suited to the new order of things should have occurred, that is to say, *miracles* designed for the elevation of man towards moral perfection and happiness.

It is farther to be observed, that the earth has reached its present state of beauty and perfection, and has been furnished with means for supplying man's wants, and providing for his comfort and happiness, by a progress from small beginnings to great results, through periods of time not reckoned by thousands but by millions of years; and that these results have always been reached with invariable certainty. We hence see that in present times God's administration of His providence and grace are in strict analogy with these proceedings in times past. Human beings advance by slow progress from the weakness of infancy to the maturity of manhood. The sprouting acorn

requires a long time to grow into an oak fitted for the building of a gallant ship. The progress of knowledge and of the civilisation of nations has likewise been slow and gradual. All the materials which are the bases of the principles of science, its wonderful discoveries and gigantic results, were as near to man's hand six thousand years ago as they are now; but the progress of science has been slow and gradual; and the grand discoveries of the electric telegraph and steam engine have only been made in these last days. So it is in the kingdom of grace. The light of revelation, and the promise of a Saviour, were at first communicated dimly, and mankind for a long period saw Christ, the substance of the law, as through a glass darkly; and it was not till the fulness of time that the glory of God was fully revealed in the face of Jesus Christ. A promise is given in the Word of God that all the kingdoms on earth shall become the kingdom of the Lord Jesus Christ, and that a pure offering shall be offered up unto God from the rising of the sun to the going down of the same. Notwithstanding this promise, during the lapse of nearly two thousand years but a comparatively small portion of the earth has as yet been covered with the knowledge of the Lord; and it is certain that there is a smaller portion still of those who profess the gospel living as becometh the gospel. All this has a tendency to make Christ's people despond, and sometimes to fear that God is slack concerning His promises, in the conversion of the heathen. But we must thank God for what has been already done, and take courage. The kingdom of God cometh not by observation; it is like the leaven in the

meal, silently, invisibly, but certainly, leavening the whole lump. If the means for the conversion of the world are used, the progress will be certain. The progress of the world in the geological epochs, though slow, must assure us that this will be the case. God's workings during these periods must convince us that a thousand years are with Him as one day, and that He is not slack concerning His promises, as some men count slackness.

THE END.

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