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ARTICLE I.

THE RELIGION OF GEOLOGY.[1]

Every important discovery in art, science, or theology, is met with incredulity, and often persecution, by the world; and the unfortunate discoverers are exposed to ridicule and penury, if not, like Galileo, to imprisonment. Some have learned wisdom by experience, and have refused to announce to the world important truths they have subsequently discovered. Those who have sought to illustrate the text and doctrines of our most holy Bible from the fields of science, have too often been met by the smile of derision, or the spirit of denunciation. But when discoveries have been finally appreciated, the public have seized upon them enthusiastically, as if there had never been any odium connected with their propounding. So the church is beginning, more and more, to appreciate the value of science as auxiliary to interpretation, and theologians cannot now pass through the curriculum of study, without devoting much attention to the connection between science and religion.

Yet there are three classes of opinions upon this sub-

[1] The Religion of Geology and its connected sciences. By Edward Hitchcock, D. D., LL. D., Late President of Amherst College and Professor of Natural Theology and Geology. A New Edition, with an Additional Lecture, giving a summary of the author's present views of the whole subject. Boston: Phillips, Sampson and Company. 1859.

ject in the community. The first and most numerous embrace those who receive the Bible as a book inspired to teach the absolute essence of scientific as well as religious truth; who regard the language of inspiration as strictly scientific; and who therefore denounce all attempts to modify the interpretation of the Bible by science as infidel. Some of this class have entered upon a crusade, as it were, against geologists; inundating the religious world with invincible books, pamphlets, and articles in quarterlies. None of them are practically acquainted with geology, but they have read geological works, chiefly with a view to their refutation; and, therefore, have imperfect and one-sided views of the phenomena. Hence their *revised* theories, to explain these phenomena, are very crude. For example: some of them are shrewd enough to see that, if they allow that the accumulations of gravel and pebbles lying upon the surface of the earth were deposited by water, they must admit the conclusions of geologists as to the great length of time required for the formation of all the stratified rocks. Therefore they assign to them an igneous origin; that is, that they were thrown up from beneath the surface, like lava from volcanoes.

Another writer, apparently more advanced, is willing to admit that the earth was once in a state of igneous fusion; for, says he, there are proofs that the surface was once soft. It was so yielding that birds walked upon it; their tracks remaining to this day to attest it. In other words, these wonderful animals — huge birds, reptiles, and batrachians, as well as small insects — walked over this ocean of plastic lava without injury to the integuments of their feet, reared their young, and lived, for ages, upon this fiery furnace!

The same writer is willing to go a step further. Having proved the former fusion of the earth by the argument of the ichnites, he argues that the diameter of the earth must have been much greater than at present, in consequence of its expansion by heat. On account of this increase in bulk, the revolution of the earth upon its axis must have occupied a longer time than it does now. Hence, as there is a controversy respecting the length of the demiurgic days, some call-

ing them ordinary days, others long periods, this view presents a day intermediate in length between the others, which may be adopted as a compromise between them, adequate to explain all the difficulties. Men who hold these views are astonished that no one attempts to answer their arguments!

Some of this class exhibit a charitable spirit towards the innovators, which is truly commendable. They entreat them to reconsider their views, if they would save their souls. In the preface to the new edition, Professor Hitchcock publishes a letter sent to him by an English clergyman of this class, exhorting him to repentance. Says he: "I am loath to publish anything [against your views] without first addressing a few lines to you, entreating you, for your soul's sake, and for the sake of the eternal welfare of others, to reconsider, with earnest prayer to God, the assertions you have made. I cannot but behold you in the fearfully perilous circumstances of having made yourself an antagonist to God. I know he is marvellously long suffering; and a perusal of your book has impressed the thought more strongly than ever on my soul, how patient and forbearing God is; for I must, in honesty tell you, that I never before read a work which so presumptuously calls his word in question, or treats it with such contempt. I am sure you are not aware of this. I give you full credit for not knowing what you are about."

The second class of opinions embraces those who either reject the authority of Christianity entirely, as sceptics and atheists; or those who deny the authority of the Pentateuch. They are not at all troubled to find difficulties in the Mosaic history, or at any of the apparent discrepancies between science and revelation. The author of the Religion of Geology had been told that his views would be quite acceptable to this class. Hence a critique upon this work, which appeared in a dozen weekly issues of the Boston Investigator, was the most gratifying of all the notices of his book which he had seen. The critic had so great a spite against the author, that he would fly, at once, from a review of the work itself to a personal assault. Thus he says: "In my last letter, I exhibited you as an archangel ruined, not a goblin

damned. I informed you that I had not left you. True to my word and the cause of truth, I am come again. I hear you say: 'Give me credit for honest and good intentions.' I cannot, I will not do it.

"I regard you, in reference to the future, the same as would an impartial and independent historian that of Talleyrand, had he been writing his history in his day, after he had, as you have, well nigh run his career. He would have given him all credit as a shrewd, talented, able, and successful financier, uniting foresight with amazing tact and unblushing impudence; but as a man, one of absolute selfishness and hypocrisy. Always able, always successful, the historian would have given demonstration of the truth of his delineation and narration, by a series of facts, which would have forced conviction. I am writing your history," etc.

This extract shows with how great loathing and abhorrence the views of this book are received by infidels. How strange it must seem to an author to receive such earnest attacks from such opposite sources! In these cases, one of the parties must surely be mistaken in its bearing; and the author suggests that, till they can settle this question, he shall rest quietly. "Like an acid and an alkali, in chemistry, the two attacks neutralize each other, and leave me unharmed."

The third class of writers believe fully in the inspiration of every part of the Bible, and in the truth of the leading principles of science; and that these two records are not discrepant, but mutually illustrate and confirm each other. Such is the ground taken by the Religion of Geology. In the midst of vituperative attacks, it must have been a source of consolation to its author, that he has also received, from more enlightened quarters, words of encouragement and expressions of thanks for the relief afforded, by these reasonings, to minds struggling long in the midst of doubt.[1]

[1] The book has been the occasion of good in another way. We learn that the suggestion in the Preface to the Religion of Geology, that professorships of natural theology in connection with the natural sciences should be united with our theological seminaries, led the Rev. Dr. Lyon, of Columbus, Mississippi, to make efforts to have one endowed at Columbia, South Carolina. Hon. John

There is a false notion prevalent respecting the science of geology. Its principles are thought to be unsettled and constantly changing: it is supposed that the science is made up of conflicting hypotheses, and that there is no agreement among its standard writers. This opinion may arise, partly from the fact that many hypotheses have been put forth in the name of geology, which are generally condemned; and partly because geological discussions are mainly confined to the comparatively unimportant theories yet unsettled. The doctrines fully established, are those which bear directly upon religion. And they are as well settled as the theory of the earth's diurnal and annual motions in astronomy, or the doctrine of definite proportions in chemistry. The most important of these principles are the following: the whole accessible crust of the globe has undergone entire, and ofttimes repeated, metamorphoses since the rocks were created; enormous erosions have taken place upon the earth since it was consolidated; existing continents, by slow vertical movements, have been below the ocean several times; processes are now going on, around us, capable of producing nearly all the known varieties of rock, with the aid of water and heat; water and heat have been the grand agents of all geological changes; the whole globe has once been in a state of igneous fusion; there was a time when no animals or plants existed on the earth; several distinct economies of life, or groups of animals and plants, have occupied the surface, each adapted to the altered condition of things; these ancient races have been unlike one another, and, with a few exceptions, in the highest formations, unlike those now alive, the resemblance between living and fossil types becoming more unlike as we descend; some ten or twelve miles thickness of fossiliferous rocks were deposited previous to the creation of man, who was among the last of the animals that have appeared upon the globe; and, finally, amid all the di-

Perkins, of Mississippi, gave $30,000 as an endowment, and the professorship will shortly be filled, and the experiment tried. We hope the example may be followed by other liberal minded men of means, until all our theological seminaries are supplied with such professorships.

versities of organic structure, and change of species, genera, and families, in different formations, the features of one great system of life can be seen running through the whole series, linking all past minor systems together and to the existing races, and showing the one grand plan of creation, as it lay originally in the Divine Mind.

We proceed to state the positions advanced in the last edition of the Religion of Geology, under six general divisions: I. The arguments drawn from science to prove the existence of God. II. The modifications required, by geology, of the interpretation of those parts of the Bible relating to the past and future history of the earth. III. Arguments from geology, for the divine benevolence. IV. Miraculous and special providence. V. Fallen condition of the world, as illustrated by science. VI. The new and enlarged views, afforded by science, of the divine plans.

I. *The Existence of God.* Geology furnishes a new phase of the argument for the existence of the deity from design. That argument assumes a beginning to the existing system of nature, organic and inorganic. Though geology cannot prove the original creation of matter out of nothing, it does show that there was a beginning to the present economy of life. It shows that matter has been moulded into ten thousand forms, so exquisite, with such wise and wonderful adaptations, that only an infinite Deity could have done it; especially since the still more wonderful powers of life, and instinct, and intellect, have been added to organism. Without injury to theism, we may give up, to the atheist, his eternal matter and its laws; for, not till he has endowed those laws with all the attributes of deity, could he people that world with living beings.

In the modifications of matter, then, which constitute the chief beauty and glory of the world, do we find full proof of a creating Deity; and in the wise and exact adaptation of one thing to another, and especially in the modifications of structure to adapt animals and plants to a changing world, we see evidence of a personal Deity. For a blind, unintelligent force, like law, could not have made such alterations

in the successive races, and made them wisely. Geology, then, in the very argument by which it proves the existence of God, shows the absurdity of pantheism, as well as every other form of atheism.

Let us examine, now, the hinge upon which all our arguments for the existence of the Deity depend, the *beginning of things*. The eternity of the world, and the eternal and necessary development of all things, from one another, are the foundation of the atheistic system, and it becomes us to look well to our positions here. Many minds are sincerely disposed to doubt the force of all arguments, furnished by abstract reasoning, to reply to this question, viz. from the world's contingency, and from the absurdity of supposing an infinite series of finite beings.

Matter, says the atheist, is eternal, and all its changes proceed in cycles, which never had a beginning, and will never have an end. Even though you prove that the earth has passed through a series of changes, from liquid fire to a condition fit for the residence of successive tribes of organisms, this series is only one of a vast number of similar cycles. Man existed before the present system; but he and all his works were consumed by fiery agencies. Matter, after the destruction of life, has certain tendencies to produce organisms; which, in their turn, give place to higher forms of life, until man appears again, preceded by thousands of generations of his less perfect ancestors.

Now the most important and fundamental principle, upon which this argument depends, is this (and it is a principle that we are all disposed to adopt, without perceiving its disastrous tendencies): germs and tendencies to form worlds and organic races, may have existed in matter previous to the existence of life and organisms. Hume says: "for aught we can know *à priori*, matter may contain the source or spring of order originally within itself, as well as mind does: and there is no more difficulty in conceiving that the several elements, from an internal, unknown cause, may fall into the most exquisite arrangements, than to conceive that their ideas, in the great universal mind, from a like in-

ternal, unknown cause, fall into that arrangement." If we admit that the highest exertions of matter, in any form, can produce the feeblest organism, we cannot stand before the atheist an instant, and we destroy the prime distinctions which constitute the framework of the natural sciences. For if matter can produce the feeblest organism, that organism can reproduce its like; and it is an easy if not inevitable inference to say, then, that these organisms can give birth to others higher on the scale, even though it be only infinitesimally higher. There will be a gradual rise in the scale; and there will be no stopping-place until man is developed from the highest of the inferior animals. This is the hypothesis of *creation by law.*

To defend this hypothesis, atheism makes a confident appeal to geology. For that science teaches that, since animals and plants first appeared on the globe, there has been a marked upward progress in the races that have succeeded one another. In the lowest Silurian, invertebrate animals and flowerless marine plants alone appear. In the upper Silurian, a few fishes, the lowest vertebrate animals, are found. But not till we rise into the Devonian, is there even a trace of reptiles, nor do birds appear at all, till we ascend to the Jurassic series; and these perhaps, as their tracks indicate, with characters somewhat peculiar. Nor do the Mammalia show themselves, a few marsupials excepted, till we reach the Tertiary; nor were the human race introduced till a late period in the Alluvial formation. The plants show a similar progress from the less to the more perfect; while a corresponding improvement was going on in the inorganic world. What do these facts indicate, but this gradual development?

The hypothesis fails in several essential points. While there has been progress in the organic, because the same is true of the inorganic, world, there is not the slightest evidence of any gradual change of one species, or genus, or family, into another; but each species of fossil animal or plant is just as distinct from every other, as in existing nature; whereas, if this hypothesis were true, we ought to find endless interme-

diate varieties. Moreover, the species, in one formation, ought to pass insensibly into those of the formation above; whereas there is often not even a similarity. Again, there is sometimes a retrogradation of the races, from the more to the less perfect, as we ascend in the formations. Some of the ancient fishes were of a higher grade than their successors: so was it with the reptiles, and with the cephalopod mollusks, which retrograded from the compound to the simple.

If the most powerful species of mollusk or articulate animal could not produce the lowest organism among the vertebrates, which is inferior to it, much more, *à fortiori*, matter could not, by its utmost exertions, produce the feeblest organism. Matter has not, and cannot produce, life; nor even such a collocation of particles as will form a lifeless organism. Creative power is the only cause to which science can refer as the cause. Upon this point, geology is more biblical than many metaphysicians.

Thus we see that the advance has been by creative acts, not by infinitesimal development. Let us now examine the hypothesis of the eternal series.

Preliminary principles: 1. Our argument does not require that we shall show that the matter of the world has been created out of nothing by the Deity, if we can only prove that matter has undergone such modifications as Deity alone could accomplish; that is, that the great cycles of nature have been *interrupted* in their natural course.

2. If we can prove that any of the great systems of organic life on the globe, or in any one zoological district, had a beginning; or, in other words, that there was a time when they did not exist, we show an exigency to have existed, demanding a being of infinite power, wisdom, and benevolence, to create and adapt to circumstances such races of creatures. If their structure and adaptation do not demand a Deity, neither would the production of matter require his agency.

3. If we can show that any important genera or species of animals or plants did not once exist; their creation demands a Deity, and proves that the whole organic system upon the globe had a beginning. For, such is the connec-

tion and mutual influence of the different races, that a single new species could not be introduced without disturbing the harmony of the whole, and producing, thus, the ruin of the whole, unless Infinite Wisdom should interpose to prevent such a result. And to create one animal, or plant, demands the same infinite attributes as to create a whole race.

4. If we can prove the extinction of even one species of organic beings, and much more of many species, we show a tendency to ruin in the system of organic life, of which they form a part, and consequently a beginning to the same; since any system tending to decay cannot be eternal. The disappearance of even one species, on this principle, would disturb the harmony of the whole, and tend to its entire extinction.

Arguments: A. Geology shows that there was a time when the whole globe was in a state of fusion from heat; and, of course, destitute of organic life. Some power besides matter, or law, is requisite to prepare this ball of fire for inhabitants, and then to produce the different races.

B. Since the introduction of life upon the earth, there have been several distinct groups or economies of animals and plants, which have successively appeared and passed away. Not less than six of these groups have been so distinct from one another, that no species is common to any two of them. The creation of these successive races is such an interruption in the cycle, that it can be explained only by the interposition of an infinite Deity.

C. All agree that man was not created till after the tertiary period; and, judging from chronological records, about six thousand years ago. The most perfect being of all the creatures enters suddenly upon the arena of life, with no antecedents to connect him with previous existences, either physically or mentally. The creation of man is the greatest event in the earth's history. If this does not require an interruption of the cycle of ages, surely nothing else can.

D. Since the commencement of the Alluvial period, several animals have become extinct: for example the mastodon, the dodo, and the gigantic birds of New Zealand. Now, as already explained, so many examples of the disap-

pearance of species, shows a tendency to ruin in the system, and consequently a beginning to it; since no such system of decay can be eternal. The present economy of life, then, had a beginning; which is also proved by the absence of the relics of existing animals, in the formations beneath the Tertiary.

E. Astronomical argument: Certain comets are retarded in their motions through space. This proves the existence of some rarefied substance, in space, which, is of necessity, a resisting medium. The solar system, therefore, cannot have existed always; for, if this had existed from eternity, even the planets would, ere this, have emptied themselves into the sun.

Conclusions: 1. The first four arguments prove a beginning to organic life; the fifth, a beginning to the solar system.

2. To produce organic life, the interposition of Deity is required. Therefore

3. The world has not existed in an eternal series of cycles.

4. To create animals and regulate the motions of the universe, as much requires an infinite Deity, as the creation of matter out of nothing.

5. Hence it is not necessary, for our argument, to prove the creation of matter. We are not, however, without some proof of the origination of matter from the will of the Deity.

II. *Interpretation of those parts of the Bible relating to the physical history of the earth.* Geology throws light upon the scriptural statements respecting the *age of the world, its cosmogony or mode of formation, the Noachian deluge, the introduction of suffering and death, and its final destruction by fire.*

Much has been written, of late, concerning cosmogony. As Professor Hitchcock treats this subject from the scientific side, and as he suggests some new views, such as are required by science, we shall enlarge upon this subject, and quote several passages from the new Lecture. He says:

"1. *The Bible does not fix the time when the world was created.*

"It says that *in the beginning God created the heavens and the earth.* And surely this does not fix the time of the event, but shows only that some time or other these heavens and this earth began to be; that is, they were not eternal, as many heathen philosophers supposed; there was a time when God *had not made the earth, nor the fields, nor the highest parts of the dust of the world* — that is, the elements. It has, indeed, been usually understood that the beginning spoken of by Moses is so connected with the six days' work, that we must regard it as coëval with the first of those days, and, if those be regarded as literal days, and the chronology of man as reaching back only about six thousand years, the beginning must have nearly the same age. But it can never be proved that the days were not separated from the beginning by an indefinite interval. If so, that interval may have been incalculably long — long enough to satisfy all the demands of geology.

"2. *The Bible does fix the time when man first appeared on the globe.*

"The Bible distinctly represents man as the last animal created; and, since no other species of men had been previously placed on the earth, we may reasonably presume that the place assigned him on the Mosaic roll of creation may be regarded as chronologically exact. Now, the scriptures carry forward a series of chronological dates, commencing with man, to the time of Christ, and thus link the time of his creation with the history of the race.

"It is quite probable that the chronological date of the cattle, and creeping things, and beasts of the earth, created on the sixth day, was intended to be fixed. For geology shows that those which were man's contemporaries were far more abundant and varied than all that had before appeared. But some did appear much earlier; and how was it possible for the sacred writer to give the time when all of them appeared, unless he had appended a table of dates? But more on this subject under a subsequent head.

"3. *The Bible represents the creation as the special result of Jehovah's efficiency, to the exclusion of every other cause.*

"Doubtless the writer had specially in mind the gods of the heathen supposed by them to be the authors of the universe. But the language applies equally well to any other agency, such, for instance, as a law of nature, which has been supposed capable of the creation of organic races. All is excluded as a creative power save Jehovah's fiat.

"Geology teaches the same lesson. It finds the successive races in the different formations to have come in by groups, at once, so as divine creating power can alone explain. If law had done it, as some contend, we ought to find all the gaps filled up by uninterrupted series. Here is another interesting coincidence between the natural and the revealed record.

"4. *The Bible represents God as employing instrumentalities in the work of creation.*

"He commanded the earth to bring forth grass, and herb yielding seed, and the fruit tree yielding fruit, on the third day, and the waters every living thing that moveth, on the fifth. His own efficiency was, indeed, the

power that enabled the soil and the waters to execute their commission. Still they were instruments; nor can we say how long or how extensively they were employed. If we inquire of the geological records, their testimony is, that immense periods were consumed in the preparation, by natural operations, of the earth, the water, and the air, for their inhabitants.

"5. *The Bible teaches us that the creation was a gradual work, completed by successive exhibitions of divine power, with intervals of repose.* How long the intervals were will depend upon the meaning which we attach to the word *day*. But, if it were only twenty-four hours, the acts of creation would still be successive, and the work progressive.

"Here, too, geology corresponds closely with the scriptures. It distinctly shows us epochs of creative action with long intervals of repose. The intervals are, indeed, of vast duration, and the creative interventions, probably, more numerous than those mentioned in Genesis. But the fact of successive creations, not their number, is the chief lesson taught us by the two records. And it is one of great interest, because, *a priori*, we should conclude that all organic beings would be commanded into existence by one instantaneous fiat of Jehovah.

"6. *The Bible describes the emergence of the land from the waters before the creation of animals and plants.* And so does geology. It tells us, indeed, of very many such vertical movements of continents. Yet, to men in general, even in our day, this geological doctrine is regarded as very doubtful. How strange, if Moses were uninspired, that he should bring it out so distinctly!

"7. *The Bible does not describe a chaos, in the popular acceptation of that term.* It declares, indeed, that the earth was without form and void; which means, as the commentators say, invisible, or waste, and unfurnished; invisible, because covered by water; unfurnished, because destitute of animals and plants. But the common notion of a chaos is, that it consists of "a confused assemblage of elements," not governed by the same chemical and electrical laws as now prevail. Now, geology shows clearly that the matter of the globe has never been free from the same laws that now govern it; for we have abundant products, in the hypozoic rocks, of the supposed chaotic period, and they all show the controlling power of the laws of chemistry and crystallography, in the production of the most beautiful gems and other crystalline forms. Geology and the Bible, then, agree, in spite of bad translations and the fancies of heathen philosophers, in excluding chaos from the works of God.

"8. *By comparing geology and the Bible, we learn that the earth had a very early revolution on its axis in twenty-four hours.*

"On the first day, immediately following the sublime mandate, *Let there be light, and there was light*, we find God dividing the light from the darkness, and he called the light day, and the darkness he called night. This has seemed strange to commentators, because the sun and moon were not created till the fourth day. And yet it would seem difficult to avoid the conclusion that there was thus early some movement of the earth or the

heavens producing an alternation of day and night. If we turn to geology, we shall find that it was in fact the same diurnal revolution of the earth which now takes place, and occupying the same period too. For we find the earth flattened at the poles, exactly to the amount, according to La Place, which would be the result of the revolution of a fluid globe in twenty-four hours. And geology makes it almost certain that the earth was in that condition, from intense heat, at a very early period. After it became solid, no such effect, to much extent, would result from a revolution on its axis. We may, with confidence therefore, infer that the earth's revolution in twenty-four hours began as early as the time when it was in a molten state. If the revolution had been more rapid then than now, the poles would have been more flattened than they are; if less rapid, the oblateness would have been less. The revolution, therefore, must have occupied neither more nor less than twenty-four hours.

"This is an interesting coincidence between geology and revelation. But it is fatal to an opinion that has been quite popular, and still plays an important part in some theories, *viz.*, that before the fourth day the standard of measurement for the day, and therefore its length, must have been quite different from what they were afterwards. This is the grand argument on which some rely to prove the days of creation to have been long periods.[1] Alas for the theorist! the facts of science show that it has no foundation.

"9. *My next position is, that the Mosaic account of the creation admits of an indefinite period between the beginning and the first demiurgic day.*

"The first verse merely asserts the creation of matter at some unknown epoch. The second verse describes its condition as without form and void, covered with water and with darkness. Then commences a description of the first day's work; the Spirit of God brooding over the face of the waters, and the evolution of light. But who can tell how long it may have continued in a waste and unfurnished condition? or who can say but previous to the chaotic state it may have been again and again reduced to order, and have even been the seat of several economies of life — of all those changes, organic and inorganic, which geology discloses? It is no very unusual thing in scripture for events, and even centuries, to be dropped out between two consecutive verses, and those linked together as if in immediate succession, which, in fact, were widely separated. It may be so here; and the chaotic condition described in verse second may not have been the waste and unfurnished states the earth had experienced earlier; but only that condition immediately preceding the creation described in the six days' work. This would be the view adopted by those who will admit the six demiurgic days to be only common days of twenty-four hours. They would place all the fossil animals and plants in that vast undefined interval which may have existed between the beginning and the first day, while the six days' work was limited to the existing races. Yet even those who suppose the days to have been long periods, admit of this long, indefinite interval between the first and second verses. (See *Bibliotheca Sacra*, vol. xiv. p. 92.)

[1] See the "Six Days of Creation," by Professor Tayler Lewis.

"But, if the sacred narrative does not fix the epoch of the creation of matter; if an interval of indefinite length may have preceded the six days' work; if those six days may have been natural days, what more do we need, especially when we add the other points of coincidence which I have described, — what more, I inquire, do we need, to bring the geological into full harmony with the biblical record? It is sufficient, answer Dr. Chalmers, Dr. J. Pye Smith, Dr. Buckland, Dr. Harris, Dr. King, Professor Sedgwick, and many others. It may have been perfectly adequate in 1814, answers Hugh Miller, but was found in 1839 to be no longer so, on account of new discoveries in geology. One was, that, in the geological history of the earth, immediately preceding the appearance of the existing races, there is no evidence of the occurrence of a period of death and darkness; but, on the contrary, the tertiary passes into the alluvial, and the earlier alluvial into the historic period, quietly and without disorder. The other discovery is, that some of the animals and plants of tertiary days have been continued to the present time, and still live. Is it not evident, then, that the six days' work must have reached back much farther than six thousand years?

"These statements of Hugh Miller have been widely received as settling the question as to the date of the six days' work, and showing the inadequacy of the theory of Dr. Chalmers and others to reconcile Genesis and geology. But, with all due deference to his eminent ability and sagacity, I cannot regard his objections as insuperable.[1] Are we sure that the waste and desolate state of the globe immediately preceded the work of the first day? or may it have lain far back among the ages of the indefinite period intervening between the beginning and the first day? or was there not, in most northern countries, a time of disorder and ruin as great as that referred to in scripture, during the drift period, and even during a considerable portion of the alluvial or modified drift period? Most geologists believe that during the drift period northern countries generally were below the ocean, and swept over by northern oceanic currents loaded with icebergs. I have adduced facts to show that the United States were two thousand feet below the waters at that time; and Professor Ramsey has shown the same in respect to Wales, and, of course, all England. What greater disturbance than this, according to scripture, preceded man's creation?

"And as to many of the tertiary and earlier alluvial species being found among the present races, what is there in scripture to forbid the supposition that they may have been permitted to live on from the earlier into the

[1] "I have ventured in this lecture, on two points, to call in question the correctness of Hugh Miller's views. But I hope it will not hence be thought that I differ from him in the leading principles of his Testimony of the Rocks; for I cordially embrace them; especially his theory of the days of creation; and regard this work as a most valuable addition to the religion of geology. I object only to some of the illustrations of his arguments."

historic period? Or why may not God have recreated the same species in some cases, as he assuredly would do, if there were no reason to alter the type, and as he seems to have done in different localities among existing species? Certain it is that, when I adopted this mode of reconciling the records some forty years ago, I was acquainted with some of the facts which Mr. Miller speaks of as recent discoveries; and they did not seem sufficient to invalidate the theory; nor do they now.

"There is, however, another difficulty in respect to this theory not mentioned by Miller, but stated with great force by Professor Silliman, a quarter of a century since, which has always perplexed me more than any other. Any one who reads the Mosaic account without prejudice, cannot but get the impression that, though brief, it does embrace the whole history of creation, organic and inorganic, from the production of matter to the formation of man. It begins with a period when an uninhabited ocean covers the surface, and then, ere life is introduced, light breaks in upon the darkness, and the land emerges. All this corresponds to the immensely long processes which geology shows the earth to have gone through. But how improbable that a continent should be upheaved and rendered habitable in one or two literal days! And then, the work of the fourth day, the creation or appointment of the sun, and moon, and stars to their circuits, comes in naturally if we take this broad view, and imagine ourselves far back in the history of the universe; but how apparently out of place in a creation limited to six literal days!

"It is the pressure of this difficulty that has led many able men to seek an expansion of the demiurgic week by regarding the days as either figuratively or symbolically long periods. I am not sure that this is necessary to a satisfactory vindication of the Bible, or that the Chalmerian theory is insufficient. Yet I incline to the opinion that the time has come when we may advance a few steps towards a better understanding of the nature of the demiurgic days.

"Ever since I began to read the Mosaic account with reference to geology, more than forty years ago, two facts have been more and more strongly impressed upon my mind in respect to the days. One is, that Moses understood them, and meant his hearers to understand them, as literal days. The other is, that they are in reality, or stand as the representatives of, something quite different. The earth's submergence during the first day, and emergence on the third, if we can judge from geological changes of analogous character, could have been no twenty-four or even seventy-two hour processes, but rather requiring untold ages. So geology teaches us that all the great classes of plants were introduced only after immense intervals, whereas Moses brings them all in upon a single day.

We give, next, the substance of the symbolical theory, as it is drawn out in the South Danvers Lecture.

10. We may understand the days as symbolically repre-

senting indefinite periods. A symbol is the representative of something else. The word is taken, in all respects, in its literal signification ; yet it has a higher meaning. Moses probably understood, and meant his readers should understand, the days of creation as literal days : but they actually symbolize higher periods : just as days, weeks, and times, are used in prophecy (which often has a symbolic form), for years.

The great advantage of this view of the subject, over that which makes the days a figurative representation of long periods, is that hereby we can take the scriptural statement in its plain literal sense ; yet those literal days may be stretched, by symbolism, over the widest periods which geology shows to have separated the divine creative acts. It is no error, if a man chooses to understand these six days of creation as literal days ; nor any error for the geologist to make them symbolic of vast periods.

11. The biblical account of creation may be regarded as a succession of pictures, with existing nature on the foreground. Ever since this pictorial method was suggested by Dr. Knapp, in 1789, it has been a favorite mode of representation among authors, the most brilliant of which was made by Hugh Miller. But, three errors have generally pervaded these representations : The first is, that the six pictures in Genesis embrace every geological change the earth has undergone ; secondly, that they are given in true chronological order ; and, thirdly, that in the life-pictures, the plants and animals now found fossil — not the existing species — occupy the foreground. Inextricable confusion and discrepancy have resulted from the mixture of such elements. But admit that the sacred writer intended to give only certain prominent scenes in creation — its most important *memorabilia* — and not always in true chronological order, and that existing animals and plants were the models before him, the fossil species coming in on the background only by implication, and all the pictures become luminous, beautiful, and harmonious.

12. By such a mode of description, the sacred writer was not bound to give, and indeed could not give always, the

true chronological order of creation. To make this evident, we subjoin a table, prepared by the author, exhibiting, in

	Man.	Man.	
6 Day.	Mammals and Land Reptiles.	Full Fauna and Flora.	Alluvium.
		Mollusca. Articulata. Mammals. Dicotyledons.	Tertiary.
5 Day.	Birds. Sea Animals.	Radiata. Mollusca.	Chalk.
		Birds. Reptiles.	Oölite.
		Reptiles.	Trias.
4 Day.	Sun, Moon, and Stars created.	Saurian Reptiles.	Permian.
		Dicotyledons. Acrogens.	Carboniferous.
		Batrachians. Fishes. Monocotyledons.	Devonian.
3 Day.	Plants of all sorts. Land emerges.	Fishes.	
2 Day.	Atmosphere created.	Articulata. Radiata. Mollusca. Algæ.	Silurian and Cambrian.
1 Day.	Light, Darkness and Ocean.	Mostly Ocean.	Azoic.
		Igneous Fluidity.	

parallel columns, the principal events, as they are revealed by the sacred penman and by geology.

The right-hand column gives a fair view of the order of creation, as developed by geology, the names of the several classes of animal and vegetable life being given where they first appear, and their greatest development by small capitals. The left-hand column gives the principal results of the six days' work, according to scripture, and where there seems to be no doubt of parallelism, they are placed opposite to events in the geological record. An examination of this table leads to several important conclusions :

a. We learn that some events, found in one column, do not occur in the other. The igneous fluidity of the earth is one of the best established conclusions of geology, but it is not named in the Bible. The introduction of numerous groups of animals and plants at different periods, is another settled fact in geology; but the scriptures name only one creation of the great classes. On the other hand, the creation of the atmosphere, on the second day, and of the sun, moon, and stars, upon the fourth, have no counterpart in the geological record.

b. There are several rather striking coincidences between the two records, as to the order of events, and the kinds of organisms introduced. Both show us, in early times, the continents beneath the ocean, and subsequently lifted out of it. Birds and sea-animals are introduced on the fifth day, which may reasonably correspond to oölitic times, when birds and reptiles appeared, in large numbers, if we may depend upon the tracks of the former as proof. Land-reptiles and mammals, or quadrupeds do not appear till the sixth day, which may well be regarded as synchronous with the tertiary series, when, according to geology, they were first fully developed. Man, too, in both records, is represented as the last animal created : a coincidence of great interest.

c. There also exist several diversities in the two records, as to the nature and order of events. They are not to be regarded as discrepancies; for they are so different, in nature, as to be incapable of being compared. Thus, the creation of the atmosphere is represented as occupying the whole of the demiurgic day. But geology has no record of such an

event, and therefore no comparison can be instituted. The same is true of the creation of the sun and moon, on the fourth day. It does seem remarkable, however, that these luminaries should be represented as created, not until after the vegetable world, on the third day, if the writer had intended to present the true chronological order of events. No impostor would have been so short-sighted as to commit such a blunder; hence there must be some other reason for such an arrangement. Alike strange is it to find the creation of the atmosphere placed so much before that of the heavenly bodies, when these, as things now are, seem to be indispensable to atmospheric phenomena.

d. The most important conclusion drawn from this table, is, that the sacred writer did not and could not give the true chronological order of events. The different classes of animals and plants, according to the geological record, appeared at different periods, the same class often several times repeated, and with different degrees of development. Thus plants began with the lowest class, the Algae, and were not numerous in the Cambrian slates, the oldest of fossiliferous rocks. In the Devonian series, a few monocotyledonous plants appeared. In the Carboniferous, there was an immense development of acrogens or flowerless trees, and some dicotyledons. The latter, however, the most perfect of plants, were not fully developed till the Tertiary, and still more fully in Alluvium. Yet plants are all represented as having been created on the third day. How was it possible, then, to give the chronological date, or order of their creation, unless the sacred writer had gone into the scientific details thus alluded to? The same is true of the groups of animals, which, in the Bible, are more comprehensive and indefinite than those of science, because they are such as are in popular use. By the plan of the inspired writer, the time and order of their appearance could not be given; and therefore the discovery of any diversity, in this respect, between revelation and science, is no objection to the former, because it is not responsible for the time and order of events, but only for their truth. And if this is so in regard to the organic world, why may it not

be so in regard to the other events described? Moses wished to give a pictorial representation of some of the principal events in the work of creation, and therefore he conformed to the chronological order only so far as his leading object required. It would be natural for him to begin his pictures with the world in a chaotic state, buried by darkness and water, with the light just breaking in. According to ancient ideas, there was an ocean above as well as below; and this might have suggested the formation of the firmament on the second picture. It was natural, next, to bring up the submerged land, and adorn it with vegetation. This might awaken the thought of introducing the heavenly bodies. And now it might occur that everything was ready for the introduction of animals into the atmosphere and the waters; and, last of all, to let the most perfect of animals come in with man.

These may not be, and probably were not, the reasons why, as we suppose, Moses departed from a chronological arrangement of his six pictures; but they may show that there might be reasons for doing this. It has been, and still is, almost universally assumed, that Moses gives a connected and chronological history of creation; and then ingenuity has been taxed to the utmost, to accommodate the facts to such a supposition. But if we may reasonably suppose that he meant only to give certain leading and selected facts, conformed to a chronological order only so far as suited his purpose; just as one might select certain facts from the early history of the country, and show them, by pictures, arranged so as to produce the best effect without reference to dates, it relieves the sacred writer from all responsibility as to chronological order and scientific arrangement; and really does more to bring out the beauty of the Mosaic history of creation, and to bring it into harmony with science, than almost all other principles.

A few concluding remarks of considerable importance we present in the language of the lecture:

"(1.) *This theory of interpretation allows us to retain the literalities of the Mosaic account.*

"I cannot believe that any man of unbiassed judgment can read that ac-

count and not feel that Moses is writing a literal history. The objects about which he writes are all of them real existences, which were before him, and he seems to be giving an account of their creation in the simplest possible language. Now, to be told that he understood the word *day* to be a period of indefinite length, and meant his readers so to understand it, seems so discrepant to the whole character of the record, that it greatly troubles the honest inquirer. But the symbolical theory allows us to understand the account literally; at least, as much so as many prophecies. That is, we may take the terms in a literal sense until science shows us that they are insufficient, and then we are allowed to expand them as far as is necessary. It may be doubtful whether Moses had any idea beyond the literal sense, just as was probably sometimes the case with the prophets. Yet subsequent discoveries make a wide expansion of the term *day* quite natural. Moreover, by regarding the account as a literal one, and the days natural ones, the sanction of the Sabbath is preserved in all its force to those unacquainted with geology, and retained symbolically to those acquainted with it.

"(2.) *This theory gives the amplest scope to the demands of geological science.*

"If the literal day in the Mosaic account may symbolize one ten years long, it may one which is ten millions of years in length. Here, then, is a field wide enough for the amplest demands of geology; nor are we required to give the successive days the same length. So that we can find room for all the widely-different floras and faunas of the geological periods, with intervening revolutions.

"(3.) *This theory does not require us to force Moses into the strait-jacket of modern science;* that is, to represent him as describing animals and plants according to modern scientific arrangements; cryptogamian plants, for instance, instead of "grass;" great reptiles instead of "great whales;" instead of creeping things, the "rapidly-multiplying creature;" instead of waters above and beneath the firmament, "nebulous vapors;" in short, to maintain, as one able writer has done, "that if one should seek to give a sketch in the fewest words of the Celestial Mechanism of La Place, the Cosmos of Humboldt, and the geology of the latest and best authorities, he would do it in the very language of Moses." The grand objection to such opinions is, that if Moses used scientific language in these cases, he must have done it every where, and so must the whole Bible. But we know that in general its language is that of common life, often loose and indefinite in meaning, describing things as they appear, often, and not as they are in their true nature. In the times of Moses, language must have been very general and indefinite, and the views for which we contend require only that in speaking of the different classes of objects created, he gives merely the common, unscientific ideas, which then prevailed, concerning them. It is a great relief thus to be able to extricate the sacred writer from the trammels of modern systems.

"(4) *It is far more natural to suppose the Mosaic life-pictures to be retrospective than prospective.* Suppose we wish to bring into three panoramic groups, as Hugh Miller and others have done, all the existing and fossil species. What is the most natural starting point? In other words, shall we place the fossil or the living species in the first part of the picture, leaving the others to come upon the back-ground as congeneric races? Look at the outline, which I have given a few pages back, of these three life-pictures, as they presented themselves to the eye of Moses, supposing his vision to reach downwards among the fossil species. Directly before him and around him he saw a living, moving fauna and flora more perfect than any which had gone before. Would it not be most natural to take these as the conspicuous figures, leaving the buried races to come in upon the back-ground? Or, even if the historian knew nothing of the existence of the fossil races, so linked are they to the living ones, that they might have been placed on the picture unperceived, to be discovered only by the keen eye of modern science, just as upon a photograph a magnifying glass brings to light many objects before unnoticed. How much more natural, I say, is all this, than to suppose the historian to have passed by the living species, and to have chosen his representatives of creation among some of the inferior developments of the fossil races! From such a stand-point he would be compelled, in order to bring the complete series upon the picture, to look both backwards and forwards, since, in nearly all cases, a few representatives of the different races have preceded their greatest development.

"(6.) *This theory relieves us from the most embarrassing geological objections which lie against other modes of interpreting the demiurgic days.*

"It does not, as they do, exclude the existing organic races, and thus compel us to admit that Moses describes only the fossil species. It does not compel us to place the creation of plants before the sun.

"But the most formidable geological objection to any view which expands the demiurgic days into long periods, is the statement in the second chapter of Genesis, which, as usually understood, teaches that it had not rained on the earth till the third day — a statement not very improbable if the days were of twenty-four hours, but incredible if they were each tens of thousands of years.

"A somewhat careful examination of this passage — more, however, by comparing its different parts with one another, and with other texts of Genesis, than by verbal criticism — has led me to the conclusion, that in several important respects it has been misunderstood. I do not believe that it was intended to give us dates at all, but only to show how God provided for the growth and cultivation of plants when he made them, whatever that time was. One thing essential was the production of rain; and, accordingly, Moses tells us how it was produced, *viz.*, by evaporation from the earth, which afterwards watered the ground; that is, doubtless, as the same process is now often repeated, by the condensation and descent of rain. Commen-

tators have fancied that they saw in this statement a different mode of watering the earth from what now prevails. But the vapor ascended, apparently, just as it now does; and though we are not told how it descended, yet we know how that it is done now, and why should we seek any other mode?

"Thus one of the wants of the new vegetation was supplied: the other was a cultivator, and man was created for that service.

"But must not the period of the ascent of the vapor have been the third day, since, according to the first chapter, that was the time of the introduction of plants?

"It may have been so; but some considerations make it probable that the sacred writer had no reference whatever to dates in his account.

"First, the accounts of the creation in the first and second chapters are so different, that I doubt whether we can safely refer from one to the other for dates. Thus, in the first chapter creation occupies six days, but in the second only one; and this condensation of the work may be intended to prevent all chronological comparisons.

"Again, though the panorama of creation shows plants upon the third picture, yet we have shown that they must have been created at many different and widely-separated epochs. Which of these are referred to in this case, we may not know. Why may it not have been the last, that is, the plants of Eden? Indeed they are so coupled with man as their cultivator, that it must have been the living plants that are here meant. There is nothing in the context, as I can see, that forbids such a supposition.

"I would add, moreover, that so coupled together in the account are man and these newly-created plants, that, if the latter must be referred to the third day of the first chapter, so must the creation of man — an additional fact, showing that, whatever else this passage was intended to teach, it was not chronological dates.

"If this position be admitted, then the geological objection with which we started loses its force, because founded on a wrong interpretation. Hebrew scholars may contest my positions. I submit them with all deference to their candor."

13. Geology and the Bible agree in representing physical evil as in the world before man. Geology shows that the same mixed system of suffering and enjoyment, of liability to painful accident and inevitable death, has always prevailed, as they now do. The Bible, too, intimates that death and other evils preceded man. Of what use were the threatening of death, if no example of it existed among animals? Again, plants were created with seeds in them, and animals

made male and female, for the production of a succession of races, and such a system implies a correspondent system of death. The human family might have been specially preserved by the fruit of the tree of life, perhaps, from the common lot, till they had sinned, when they, too, must die. Again, the selection and fitting up of a spot eastward as the Garden of Eden as a place for man while holy, and his expulsion from it after he had sinned, implies that the world, generally, was, as now, a world of evil and suffering. It was made so from the beginning, because it would ultimately become a world of sin; and sin and death are inseparable.

14. Zoölogy and Geology throw doubt over the literal universality of the deluge of Noah. The many vertical movements of continents, taught by geology, afford a presumption in favor of the Noachian deluge. But the science also shows the absurdity of a wide-spread opinion, that the numerous marine shells and plants found fossil in the rocks were deposited by the deluge. For they extend through more than ten miles thickness of rocks, and are arranged in systematic order, and most of them have been changed into stone by a slow process, and to impute all this to a transient deluge of less than a year's duration, is to impute events to a totally inadequate cause.

The doubts about the flood's universality result, first, from the difficulty of covering the whole earth for so long a time with water: secondly, to find a place in an ark 450 feet long, 75 feet broad, and 45 feet high, for 1,658 species of quadrupeds, 6,000 species of birds, 642 species of reptiles and tortoises, and 120,000 species of insects; all of which have been shown by naturalists to exist. But the grand difficulty is, to collect them all in one spot, and then to disperse them again without a miracle; and if a miracle be introduced, all reasoning is nonsense. Moreover, if the regions inhabited by man, then probably quite limited, were covered, what was the use of drowning the rest of the world? The language of scripture, though at first view seeming strongly to teach a

literal universality, is, in many other cases, quite as strong, although we know that it does not imply universality; but is an example where universal terms are employed to designate only a great many. See Genesis 41: 57. Exodus 9: 25. 10: 15. Acts 2: 5. Colossians 1: 23, etc.

15. The Bible teaches that the earth will be, and geology that it may be, destroyed by fire, and its surface renovated. The Bible declares that the earth will be burnt up, and its elements melted, which would reduce it to a molten globe. Geology shows that the earth contains within itself all the elements necessary to bring about such a result. At the rate the internal heat increases, melted matter would be reached in less than one hundred miles. The proportion of the cooled to the melted matter, may be represented as the circumference of a circle twelve inches in diameter — the line being nine hundredths of an inch wide. It is clear, then, that if from any cause, natural or supernatural, such a crust in one part should be broken through and sink into the molten ocean below, all the rest might flounder and disappear, and a melted globe alone remain. Then would begin anew the formation of another crust, on which another economy of life might be established, and where might be the new heavens and new earth described in the scriptures, as the future residence of man glorified.

III. *Arguments for the Divine Benevolence.* Geology furnishes some new and peculiar arguments in proof of the general benevolence of the Deity. They are called *peculiar*, because some of them have been said to prove former penal inflictions upon the human race. We shall certainly hail with satisfaction any additional light upon this most fundamental doctrine.

Most of the geological proofs of this truth are derived from agencies whose immediate effects are destructive, and thus *prima facie* evidence of malevolence. Thus the soils, so essential to the existence of man, cannot be prepared and spread over the surface of the underlying rocks, without scenes of great desolation. Glaciers and icebergs have covered the country, crushing and tearing up the ledges;

and, subsequently, storms and inundations have prevailed, which, though involving men and animals in destruction, have developed additional capacities in the soil to sustain vegetable and, consequently, animal life. So the processes by which the various useful ores have been injected into the crevices of the rocks, so as to be accessible to man, have been carried through only by violent fractures and upheavings of the strata, and the fusion of some of the veins. How little like benevolence did it appear in the early history of the globe, when the ploughshare of ruin was driven through the earth's crust, its strata were bent, fractured, and dislocated; ridged up into mountains and sunk into valleys. Yet without this apparently ruinous process, man could never have got access but to a small part of the useful mineral materials of the earth; water would have become stagnant over a marshy surface, and the most beautiful scenery of the earth, the mountains and hills, so exquisitely related to each other, would never have existed. In other words, the natural evils were the means of producing natural good. Even the most fearful calamities to which we are subject have marks of benevolence in them — the phenomena of earthquakes and eruptions from volcanoes. They appear to be essential to the preservation of the balance of nature, and give vent to that great furnace of fire within the globe, which might otherwise rend its crust to atoms; and to save countless millions, how small the sacrifice of a few thousand lives! — an incidental effect, but not the object of volcanoes.

Of course the inquiry arises here, as elsewhere, why a Being of infinite perfections could not have secured the good without the evil. The author suggests that the most satisfactory reason for this mixed system, is the fact of the fallen condition of man; man's highest good demands a mixture of evil in the system, as a means of discipline.

Geology furnishes interesting proofs of what the author calls *prospective benevolence*. It is illustrated by the origin and distribution of coal and gold. Untold ages before the creation of man, processes for the formation of coal were in

operation, then, apparently, without design, but intended to provide for the wants of the future man. We might transport ourselves in imagination, and view the gigantic forests in those low lands, as of the United States, where mountain ridges may now rear their summits. We should see them submerged, or forming beds like peat, and interstratified with layers of sand, gravel, and limestone. We might wonder at the immense wastes, at the immense forests, inhabited by few animals of any kind, as the atmosphere is thoroughly impregnated with carbonic acid. But the forests passed away, the strata of alternate beds of vegetable matter and earthy materials, are elevated above the waters; erosion lays bare the edges, and man is introduced; and, after several thousand years, he discovers the use of this coal so long laid up for his benefit. The vast amount of the coal in this country is another significant fact. Not less than two hundred and twenty-five thousand square miles of our surface, equal to twenty-five such States as Massachusetts, are underlaid by beds of coal; and if the average thickness of these beds be only twelve feet, the whole amount of coal in our country cannot be less than five hundred cubic miles; and one cubic mile, at the rate we now use it, would last a thousand years; so that we may estimate the period when our coal will be exhausted at several hundred thousand years, unless its consumption should vastly increase. Not only do we see a striking proof of prospective benevolence, in thus providing for the means of comfort and civilization of future inhabitants, but also in the immense magnitude of this treasure, we may discern the intention of God as to the future population of our country, and the prominent part it is to take in the civilization and salvation of the world.

The illustration from the time and manner in which gold has been introduced into its present position, is even more peculiarly a mark of prospective benevolence, to the geologist's mind. Gold is found, either in veins in the older rocks, or in the sands and gravels of the most recent deposits derived from them, while it is scarcely found at all in the

Mesozoic and Tertiary, or the intermediate formations. Yet both the latest and the intermediate strata, are made of fragments derived from the older rocks. Why, then, should gold be absent from the intermediate series? The conclusion is irresistible, that it was not introduced into the older rocks until after the formation of the intermediate groups. Then the auriferous veins were introduced into the older rocks, so that, as they were denuded subsequently to the Tertiary, the gold was also worn away, and accumulated in the placers. In other words, this accumulation took place just before the introduction of man, as if it was intended solely for him. Of what use could gold have been to the iguanodons, otozoums, or gigantic birds of the intermediate periods? they could use it neither for food, nor as a procurer of food; and they had no higher use for any article. But man uses it for important purposes of political and social economy.

IV. *Miraculous and Special Providence.* — The following is Dr. Hitchcock's definition of Miraculous Providence: "It is a superintendence over the world that interferes, when desirable, with the regular operations of nature, and brings about events, either in opposition to natural laws, or by giving them a less or greater power than usual. In either of these cases, the events cannot be explained by natural laws; they are above, or contrary to, nature, and, therefore, are called miracles, or prodigies."

Geology abounds with such interventions. The facts of all other sciences may be brought into ceaseless cycles, but geology shows a divine hand cutting asunder the chain at intervals, and commencing new series of operations.

We may imagine an observer to stand upon one of the nearest heavenly bodies, as the moon, and see the earth passing through its various stages of progress, and noting when a miracle is performed. He may see the world at first a globe of liquid fire; and the problem is, to fill it with forms of organic life. A crust is first formed, and then the observer sees that races of animals are crawling upon it, and

plants flourishing upon its surface. Though he cannot see the Deity as an agent locate these beings upon the earth, he sees that their creation is a miracle, not resolvable by the laws of nature. If the production of organisms, enough to fill the world, is not a miracle, there is no act that can be, and we might dismiss the term from the language.

But this observer soon discovers new forms of life among the primitive races, and by inspection discovers that the first set of beings have entirely disappeared, and that a fresher and more vigorous economy is introduced. Catastrophes may have destroyed the first, or else the changed condition of the climate, as the planet cooled. Again do the long ages roll on, and Earth rejoices in her crowded and happy population; but the divine decree, which limits the terms of economies, as well as of individual life, must be accomplished; and inundations, earthquakes, eruptions, or slow submergence terminate the second period of life; and then more complex forms are introduced by creation, with such an adaptation to circumstances as only Infinite wisdom can make. In like manner, at least six entire changes of life pass in review, and from twenty-five to thirty successive miraculous acts of creation.

The observer on the moon has witnessed the introduction of separate economies, each one, on the whole, superior to the preceding. He now sees an unusual preparation for the support of higher forms of organization; as a greater extent and richness of soil, a purer atmosphere, and the introduction of the metallic ores. The object of this preparation at length appears; one species so remarkable, that its creation may justly be regarded as the most striking of all the miracles of nature, as it is also of revelation. It is man: a being whose physical organization is the perfected antitype of all other animals; who subjects all others to his sway, and converts even the fiercest elements into servants. Man's creation, as taught by geology, rises up as a lofty monument of miraculous intervention in nature, beating back the waves of unbelief, and reflecting afar the divine wisdom and glory.

Hence we have an important addition to the articles of

Natural Religion; for, heretofore, miraculous intervention has been confined to Revealed Religion. This places miracles upon such a basis that we may confidently appeal to them to take away all improbability from the miracles of Christianity. The constancy and uniformity of nature have been the grand argument against them; and no human testimony, it is said, can prove a miracle in opposition to the will of all nature. Much labor has been spent in the vain attempt to answer this objection of Hume, upon his premises. And, in fact, from metaphysical reasoning, we cannot disprove this objection, without laying down several established fundamental principles, as the existence of a Deity. And, even then, it may be a question whether the reasoning is entirely satisfactory. But the miracles of geology destroy entirely the groundwork of the objection. Miracles are not contrary to experience, for how easy it is to read them from the leaves of nature's volume. We may call the miracles of scripture myths, but it is not so easy to dispose of the thousands of exhumed species of fossils. They testify that miraculous intervention has been a law of God's natural government from the beginning; and if we do not find miracles in the Christian dispensation, it is an exception to the general course of Providence. Thus the *very stones* cry out against unbelief.

Special Providence is also regarded by our author as a doctrine of Natural Religion. "I should define it," says he, "to be an event brought about apparently by natural laws, yet, in fact, the result of a special agency, on the part of the Deity, to meet a particular exigency, either by an original arrangement of natural laws, or by a modification of second causes, out of sight at the time." Thus he regards all special providences as *interpositions* of Deity, inferior in *degree* to miracles. Nor does he confine it, as some do, to phenomena fitted to arrest attention by their peculiar and striking adaptedness to a *moral* design. He also defines a providence as the *event* happening, not the *act* of the Deity in producing the event.

Several special providences in the earth's history are

pointed out. For example, go back to that period in the history of the earth and the moon, when both of them were molten globes. Both have been cooled down so as to become solid. But the moon's surface presents only naked volcanic rocks, and is, therefore, unfit for organic life; while the earth has been going through processes which have fitted it for successive races of higher and higher grades. The agencies of change have been wisely and exactly ordered to produce this difference. To control these operations, especially when the agencies have been at work so irregularly, has needed a guiding hand to meet every exigency.

A special providence is seen in the many careful preparations made for man's benefit. The results of prospective benevolence, in providing the vast stores of mineral fuel, the various metals, the marble and building stones, and the wonderful varieties of natural scenery, are all special providences; for a special fiat was necessary thus to segregate these articles for this particular purpose.

A still more marked example of special providence is seen in the structure of the different races of animals and plants. So far as is known, these changes were all made to adapt organic races to the altered circumstances of the land, the waters, and the air. This shows that the Creator, after once arranging the laws of nature wisely, did not leave them to run on interminably, but stood by the great machine, and modified its action as was best. He so shaped and modified the moving forces, as to meet the exigencies of living beings.

The importance of this doctrine to religion need not be dwelt upon here. It is surely an unexpected encouragement to us to persevere in prayer; for it teaches us that all events are guided by the hand of the Deity, not by blind law, and that, when necessary, either to answer some humble prayer, or accomplish some desirable purpose, he will alter the usual course of nature by second causes, out of sight, so as to bring about the special result.[1]

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[1] This subject is fully discussed by Prof. H. in the Bibliotheca Sacra, Vol. XI. pp. 776—800.

V. Another important position of the author is that in connection with human history, *Geology presents strong pre-Adamic as well as post-Adamic evidence of the fallen condition of this world, and presumptive proof of the mediatorial work of Christ.*

Geology shows that the same organic and inorganic laws which now prevail, have been in operation on the globe from the earliest times, and, consequently, the same mixed system of enjoyment and suffering among animals. Accidents now may happen to all, and death is inevitable. So was it with the earliest trilobites and brachiopods of the Silurian age. Their numberless petrified relics show how unsparing death has been. Hence the idea which some have expressed, that suffering and death were introduced among the lower animals, only after the sin of our first parents, is erroneous.

The mixed system of good and evil under which we live, seems to be adapted for a state of probation for man. The evils are adapted to discipline the moral powers by trying their strength. But why has this mixed system prevailed from the dawn of earthly organic existence? Why should the inferior animals be made to suffer long before man's existence, because he would, by transgression, incur the divine displeasure? If God foresaw that man would sin, and that a probationary system was the best for sinners, infinite benevolence would adapt the world for a fallen being; and if it can be shown that animal existence is, upon the whole, a blessing, or if animals may exist in another world, and there receive some compensation, we can see why God, to give unity to the system, should from the first have mixed evil with good in the natural world. Thus, moreover, would he more impressively exhibit the evil of sin.

By comparing revelation and science, the conviction will be impressed upon us, that all the disorders and sufferings of the present world, and in its past history, point significantly to the cross. That solves the deepest mysteries of all time, before or after Adam. A world fallen yet redeemed, is the great truth engraved upon the earliest and deepest

foundations of the earth by her Creator and Redeemer. This is the profoundest lesson of paleontology.[1]

VI. *Geology Presents us with New and Enlarged Views of the Divine Plans.* The plans of God have been developed gradually. The Mosaic dispensation was a revelation of plans not known to the patriarchs: the Christian dispensation is much in advance of the Mosaic, and modern science is permitted to extend the knowledge of the Christian in respect to God's works and laws in every direction. The telescope has opened an infinity in one direction and the microscope in another. Geology leads us into depths of duration alike beyond the imagination.

One of these plans is the *law of unity.* Unity of design is a striking characteristic of existing nature. Though there are diversities of form, aspect, and structure, yet we everywhere meet with the same original model on which all are constructed, — the organic and inorganic, the great and the small, the proximate and the remote, bound together by ten thousand relations and sympathies into one golden tissue of harmonies. This same thread of unity runs through all the successive economies of life that have successively appeared upon the earth. They were not several independent systems, but they form the parts of one great whole. For the laws of inorganic matter have never varied, nor have the laws of organisms, or the laws of zoölogy, botany, anatomy, and physiology. For the fossil animals and plants can be classified with existing species; and not only so, but certain links that are wanting between existing forms, are supplied from the fossil races. For example, in existing nature, there is a sudden transition between birds and reptiles: there are no animals having a type of structure intermediate between these two classes. But geology presents us with examples of beings forming this connecting link, among the *Lithichnozoa*, or the animals who made

[1] The author has developed this subject in a lecture entitled: *The Cross in Nature and Nature in the Cross*, which will appear in a subsequent number of the Bibliotheca Sacra.

the tracks upon stone. One class of them have ornithic and lacertilian features combined.

Another important principle is the *law of change*. The law of constancy and uniformity in nature is subordinate to the higher law of change. Hitherto, the law of gravitation has generally been considered the highest of all laws, second only to the divine will, but our modern sciences show it to be subordinate to the law of change.

In the inorganic world change is the great conservative principle of the universe. If only mechanical forces operate, matter would be condensed into lifeless adamant. But chemical changes give mobility to the particles, and the segregating processes of affinity and cohesion begin the mighty cycle of change, which would be endless were the forces, as in gravity, exactly balanced. But they are not, and hence a particular system fails — requiring divine power to interpose and commence a new series. Thus the law of change is a higher power, coming in to modify and control for a time, the law of constancy. And herein is its special adaptation to our world; for it the endless variety needed by sentient creatures, and allows a permanency as enduring as Infinite Wisdom sees fit to ordain.

Change shows itself in the organic world by the introduction of modified forms of organization. It is seen as we examine in review the constituents of the different systems of life. Different families, genera, and species lie close together, and of such varied proportions, that we almost fancy them to belong to some other system. But we learn presently that they are only wise adaptations to a changing world, possessing strong links of connection with all other terrestrial beings.

When we thus regard these changes, not merely as connected with death, but as the precursors of renovated excellencies, and see that they are but a part of the wise plans of the Deity, we no longer view them as defects in nature, but essential features of a fallen world. We admire the perfect wisdom that has devised them, and anticipate joyfully the wonderful developments of this law yet to appear in eternity.

This topic has an important bearing upon revealed religion; for it removes objections to a miraculous dispensation, and narrows the distinction between natural and revealed religion, giving to both the same origin.

Many interesting suggestions are given in the lecture upon the *vastness of the divine plans.* The mind is almost overwhelmed in considering the infinite spaces developed by astronomy, and the mighty duration of the earth as made known by geology. Chronology has no measuring line long enough to stretch over them, and imagination tires on her wing in attempting the daring flight. Yet to the mind of Jehovah they are perfectly distinct. We discover everywhere, in every change, his footsteps, his energizing and controlling power. Every new *tableau* in the opening series, gives a brighter display, till the harmonies become complete in man.

From the past we may derive a presumption as to the future. If in all past periods change has been the higher and controlling law of our world — the essential means of its preservation and of the happiness of sentient beings — we may presume that other changes are to succeed. And since we know of no example of the annihilation of a single particle of matter, but only of its metamorphosis, we can set no limits to the expanding series. Why may not change, through all eternity, be, as it has been and is now, an essential means of happiness to created natures?

Thus we stand upon the middle point of existence, as it were, and can look backwards and forwards, but cannot pierce to the beginning or end of the series. The extremities lie too deeply buried in the past and the future, to be seen by mortal vision. These views are ennobling. What Christian will hesitate to give up his soul to the liberalizing, purifying, and elevating influences of these grand disclosures? For having felt their interest and power on earth, he may surely hope that their deeper and more thorough study will form a part of the employments and enjoyments of heaven.

We close with the following inference from the whole subject, in the words of the author:

"From all that has been advanced we may safely say, that no other science, nay, perhaps not all the other sciences, touch religion at so many points as geology. And at what connecting point do we discover collision? If upon a few of them some obscurity still rests, yet with nearly all how clear the harmony — how strong the mutual corroboration! With how much stronger faith do we cling to the Bible when we find so many of its principles thus corroborated! From many a science has the supposed viper come forth and fastened itself upon the hand of Christianity. But instead of falling down dead, as an unbelieving world expected, how calmly have they seen her shake off the beast and feel no harm! Surely it is time that unbelievers, like the ancient heathen, should confess the divinity of the Bible, when they see how invulnerable it is to every assault. Surely it is time for the believer to cease fearing that any deadly influence will emanate from geology and fasten itself upon his faith, and learn to look upon this science only as an auxiliary and friend."

ARTICLE II.

THE ABORIGINES OF INDIA.

Herodotus was the first to introduce India to the acquaintance of the western world. Following the report of Scylax, who at the instance of Darius had explored the river Indus, he enumerates at least four classes of men who had their abode about the mouth of that river.

1. Fishermen, who inhabited the marshes of the Indus, the description of whose habits and methods of fishing would apply, with equal accuracy, to the fishermen of Scinde to-day. 2. Pastoral tribes, called Padaeans. 3. People who ate no flesh, but lived upon vegetable diet, whom no one can fail to recognize. 4. Calatians. These classes he speaks of