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ORDINARY MEETING, JANUARY 21, 1867.

THE REV. WALTER MITCHELL, VICE-PRESIDENT, IN THE CHAIR.

The minutes of the previous Meeting were read and confirmed.

The following paper was then read by Mr. Walter Brodie, in the absence of his father :—

ON THE LESSONS TAUGHT US BY GEOLOGY IN REGARD TO THE NATURE OF GOD AND THE POSITION OF MAN. *By the* REV. JAMES BRODIE, M.A., *Mem. Vict. Inst.*

MANY seem to entertain the opinion that there is a natural antagonism between the study of science and a simple and earnest belief in the Record of Revelation. Not a few of those who take an active part in our philosophical societies, and who speak on the subjects brought before them as men who are entitled to assume the voice of authority, treat the Mosaic narrative as they would treat an idle tale, and speak as if they deemed it inconsistent with the character and position of *savants* to pay any regard to the statements of Scripture. Some timid theologians, on the other hand, draw back from the study of science, as if the necessary result of engaging in it would be the awakening in their minds of doubt and perplexity, and shrink from an investigation into the laws which regulate the material creation, as if that would prove a first step to open infidelity.

As it is one of the special objects of the VICTORIA INSTITUTE to show that these views are altogether erroneous, and that the Work and the Word of God are in perfect harmony with each other, it is hoped that a few remarks on the lessons which geology teaches, in regard to the nature of God and the position of man, may be regarded as suitable to the times in which we live, and appropriate to the objects of the Society before which they are brought.

Without stopping to inquire whether the facts on which geologists rest their hypotheses have been ascertained with

sufficient accuracy, or whether the arguments which they employ have been weighed with the requisite care, we shall assume that their conclusions are correct; and, after briefly stating them, we shall consider some of the inferences to which they lead.

Conclusions of Geologists.

During a lengthened course of ages the earth remained destitute alike of animal and of vegetable life; at least, no trace of organized existence has hitherto been discovered. At an after-period, a period, however, very remote from the present, life began to manifest itself in some of its lowest forms. Since that time it has been exhibited in a great variety of species and genera. Abundant evidence is afforded that there have not only been innumerable generations of plants and animals that have lived for their appointed season and then passed away; but that species after species, and genera after genera, have lived and died, and been entombed, since life first dawned on the globe.

The history of the earth's varied conditions has been divided into more than thirty epochs, or formations, as they are usually termed, which are distinguished from one another by the peculiarity of their organic remains. The vegetation that covered the earth in the earlier eras, and the living creatures that then inhabited it, were very different from those that afterwards appeared; and these again were altogether unlike those that now exist. There seems also to have been a gradual change in the material or physical condition of our planet. Its outer crust, in the earlier ages, appears to have been subjected to subterranean action of a far more formidable kind than any that is experienced in the present day. A larger proportion of the carboniferous element was diffused through the atmosphere, and there is reason to conclude that the average temperature of the globe was much higher than that which now prevails.

Two things more especially press themselves on the notice of the inquirer, who takes a general view of the conclusions to which geologists have come, without allowing his thoughts to be distracted by a minute attention to details. These are, the vast duration of the epochs that are past, and the uniformity of system that has been exhibited in the course of creation and providence.

The Vast Duration of Former Epochs.

The more carefully we consider the subject, the more are we

impressed with the sense of the earth's immense antiquity. Upwards of thirty formations, or eras of creation, containing thick beds of fossil remains, have already been discovered, and without doubt many more remain to be explored. These must have taken very protracted periods for their accumulation; beds of sand and gravel may be deposited in a single season, but thick masses of organic remains must have required a lengthened time for the production, the growth, and the life of the vegetable or animal forms of which they were once a part. The duration of the different geological formations is not to be reckoned by centuries, but by millenniums. When we are told, for instance, that in Nova Scotia there are found "fifty or even a hundred ancient forests, buried one above the other, with the roots of trees remaining in their original position," we conclude that as each of these forests must have required at least five hundred years for the formation of the soil in which it grew, for the growth and decay of the trees, in so far as we can judge, the epoch to which they belong must have extended from forty to fifty thousand years. Masses of shells and corals, "hundreds of feet in thickness," demand an equally lengthened period for their deposition. Another formation, of less extent than these, conveys, perhaps, even more vividly than they do, the idea of great duration. Sir C. Lyell, in describing some lacustrine strata that are found in Auvergne, gives the following statement:—"The entire thickness of these marls is unknown; but it certainly exceeds, in some places, seven hundred feet. They are thinly foliated, a character which frequently arises from the innumerable thin plates, or scales, of that small animal called *cypris*, a genus which comprises several species, of which some are recent, and may be seen swimming swiftly through the waters of our stagnant pools and ditches. The animal resides within two small valves, not unlike those of a bivalve shell, and moults its integuments annually, which the conchiferous molluscs do not. This circumstance may partly explain the countless myriads of the shells of the cypris which were shed in the ancient lakes of Auvergne, so as to give rise to divisions in the marl as thin as paper, and that, too, in masses several hundred feet thick." The little shells or scales, here referred to, are smaller in diameter than the head of the smallest pin; they are annually shed, and float lightly in the stream. Here, we are told, that layers of them divide the marl into beds as thin as paper. These facts naturally lead to the conclusion that, year by year, as the moulting season came round, and these diminutive denizens of the stream and pool dropped their scales, their cast-off habiliments were car-

ried into the lake, and scattered over its silent depths. Autumn and winter followed, and sent down their floods, swollen with the rain, and carrying along the *debris* of the mountains around. While the gravel and sand brought down by the streams were deposited at the sides of the lakes, the lighter particles of floating mud were spread over its entire extent, and settled down in the stillness of its deeps. The cypris scales were the deposits of the summer floods; the alternating marl was the product of the winter's rain. Every layer, therefore, may be regarded as the record of a year; and if these layers are as "thin as paper," in masses "several hundred feet thick," a very extended time must have elapsed before the lake had its peaceful repose disturbed. If we reckon ten of these divisions to an inch—and the description would lead us to suppose that there are many more—stratified masses thus formed, and of the thickness Sir Charles mentions, must indicate a period of at least some fifty thousand years. These marls, moreover, are spoken of as representing only the latter part of the period, during which the Upper Eocene was formed; and the whole of that epoch seems to have been brief when compared to the duration of others.

Who then can calculate the age of the earth, or reckon up the years of its many generations!

Uniformity of System in the Course of Creation.

We now proceed to remark that the history, written in the records of the rocks, very plainly shows that in all the periods of the earth's existence, the laws that regulate the material world have been the same as those that are now in operation. The ripple-mark left by the tiny billow on the muddy shore, and the impression made by the raindrop on the yielding sand, can still be traced in formations many epochs old. The annual rings that we find in the trunks of fossil trees testify to the regular return of "summer and winter, seed-time and harvest," in ages long since gone by.

Leaving it to others to speculate on the law of progression, according to which animals of higher development and more delicate organization have, from time to time, been introduced into the terrestrial sphere, we content ourselves with remarking that in all the various stages through which the world has passed, we find creatures formed with an organization that was admirably fitted for the circumstances in which they were placed. When the globe was subject to volcanic convulsions, far more terrible than any we now experience, and the ocean was tossed with tempests of proportionate violence, the ani-

mals that peopled the dry land belonged to the reptile tribes and other genera which are distinguished for their tenacity of life, while the fishes that swam in the primeval seas had bones of gristle, the better to endure the stunning effects of a blow, and were covered with scales of bone, that, clad in coats of mail like the knights of olden time, they might pass unscathed through the elemental war. Other epochs came, and saw other races rise, conformed to the altered conditions of the time. "Fishes and reptiles," says Mr. Miller, "were the proper inhabitants of our planet during the age of the earth's tempests; and when, under the operation of the chemical laws, these had become less frequent and terrible, the higher mammals were introduced. That prolonged ages of these tempests did exist, and that they gradually settled down until the state of things became at length comparatively fixed and stable, few geologists will be disposed to deny. The evidence which supports this special theory of development of our planet, in its capabilities as a scene of organized and sentient being, seems palpable at every step. When the coniferæ could flourish on the land, and fishes subsist in the seas, fishes and cone-bearing plants were created; when the earth became a fit habitat for reptiles and birds, reptiles and birds were produced; and with the dawn of a more stable and mature state of things, the sagacious quadruped was ushered in."

The Lesson taught by Geology in regard to the Nature of God.

We now direct attention to the lesson that Geology teaches in regard to the Author of All. In all these lengthened eras, amid all the changes which the globe has undergone, we can trace the same unwearying power, the same unerring wisdom, and the same beneficent design, that we discover in the scenes that now surround us. We review the list of epochs past, we stretch our ideas of time along the far receding array, till we are oppressed with a sense of the vastness of a duration which the mind of man attempts in vain to conceive; and still the world testifies of Him that made it, that in all the varied manifestations of His providence, which the terrestrial scene has beheld, the character of the Creator has remained the same. Geology and Scripture alike declare that the Lord hath reigned through all the ages of the past, as He reigns in the time that now is—infinite in wisdom, in power, and in goodness—the unchanged and unchangeable God.

The Lesson taught by Geology in regard to the Position of Man.

Another important lesson which Geology teaches, is the peculiarity of Man's nature and position. When the records of the different strata are laid open before our eye, and we examine one by one their pages of stone, they tell of a vast variety of species and genera that lived, and multiplied, and passed away; but from the earliest appearance of life on the globe, up to the day of Adam's creation, during ages so long that we cannot conceive them, and among species and genera so numerous that the thought of their multitude overwhelms us, there is no trace of any creature possessing the faculties and feelings of a rational mind, the hopes and aspirations of an immortal soul. In all the epochs of the past, we find no evidence of any being exhibiting intelligence like that of the human race. There are no remains of the builder's toil, or of the potter's art; there is nothing to indicate the presence of mechanical skill capable of directing the agencies of Nature; there is no sign of a master-mind capable of subduing the inferior orders to his will. Had such a being existed, he must have left some impress of his operations, some relics of his power.

When Man appeared on the terrestrial scene an altogether new element was introduced into the constitution of earthly things. Mineral, vegetable, and animal existences had been there before; but it was not till that time that an accountable and intelligent creature became a dweller here below. Geology teaches us that man stands alone, and that he is not to be classed with any other being that has hitherto inhabited the globe. His nature and his position are altogether peculiar. He is as highly, and as essentially, exalted above the most intelligent of the irrational animals as they are exalted above the vegetable, or as the vegetable is above the stone. He has before him a nobler destiny than theirs, and he has been created for a higher end.

It is needless to remark that the lesson taught us by Geology is in perfect harmony with the doctrines of the Bible. We may go farther, and affirm that even the conjectures that are suggested by the study of the past, find a striking confirmation in the statements of Scripture. Science leads us to conclude that, if the primeval introduction of animal life into the globe was followed by brighter manifestations of the Creator's perfections than had been exhibited before, the creation of a rational and intelligent being must be followed by still more striking exhibitions of His sovereign power. It bids us look

for scenes as far surpassing those that we have hitherto seen, as the beauty of the present world excels the dreary and desolate aspect of the Azoic ages. Science and Scripture concur in saying that *Man does not belong to the past, but to the future.* To that future they bid him look, and for that future they tell him to prepare.

The CHAIRMAN.—In asking you to return your thanks to the author of this Paper and also to Mr. Walter Brodie for reading it, I may observe that Dr. Gladstone's Paper, which is to follow, is of such a cognate character, that, unless any one wishes now to make some observations upon the Paper just read, I think it will be more convenient to take the discussions on both papers together. (Hear, hear.)

The following Paper was then read :—

ON THE MUTUAL HELPFULNESS OF THEOLOGY AND NATURAL SCIENCE. By JOHN HALL GLADSTONE, ESQ., PH. D., F.R.S., *Mem. Vict. Inst.*

MAN, God's child, is put to school in this world, and among the books which he has to study is the varied volume of Nature. There he finds endless pictures to arouse his infant wonder; and there, if he read thoughtfully, he may learn much, not only of the mysteries of the universe, but also about the wisdom, power, and goodness of its Architect, and his Father. But this child is a rebellious one, and in order to restore him to the position which he has forfeited, and to reveal more fully the Father's will, message after message has been sent him from on high. In the book of Nature he finds a multitude of facts which he combines as he best can, and the result is Natural Science: in the volume of grace he finds a number of facts and statements, from which he builds up Theology. The lessons in either department, as God gives them, can scarcely be conceived as otherwise than absolutely true; but as apprehended by man, they are necessarily subject to human error; and thus his systems of Theology and Natural Science must always admit of correction and enlargement.

In this essay I propose to confine my attention to these two parts of man's curriculum—the knowledge of Nature and the knowledge of God; and I shall endeavour to show in what way they are mutually helpful.

The great difference between the two books is in the subject treated of; the resemblance is in their indications of the character and mind of their Author.