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ARTICLE I.

*J. A. Thomwell*

VALIDITY OF POPISH BAPTISM.

[CONTINUED FROM PAGE 207.]

II. To make acceptance with God dependent upon personal holiness, is to repudiate the distinction between depravity and guilt, and to endorse the detestable doctrine of the Socinians, that repentance is an adequate ground of pardon, since it effaces those moral qualities the possession of which is what renders men liable to punishment. Rome and the Fratres Poloni differ, not in the principle on which justification immediately proceeds—both ascribe it to inherent righteousness—but in the source whence the principle in reference to the fallen derives its efficacy. The change of character, which is supposed to be inseparably connected with the favor of God, and a title to happiness, is, according to the Socinian hypothesis, attainable by the strength of nature, without the assistance of grace. Rome, on the other hand, contends that, although free will has not been extinguished in men by the fall, yet they have become so completely the slaves of sin and the subjects of the devil, that neither Jews nor Gentiles, independently of the passion of Christ and the aid of the Spirit, could be restored to liberty and peace. The inherent righteousness, by which we are justified, is, in the theology of Rome, the *infusion of grace*; in the theology of Socinus and his followers it is the product

## ARTICLE V.

Prof. R. V. Brown

## EVIDENCE OF THE DEGRADATION OF ANIMALS.

1. *The Foot-Prints of the Creator, or the Asterolepis of Stromness.* By HUGH MILLER, Author of the *Old Red Sandstone, &c.* Boston: 1850.
2. *The Epoch of Creation. The Scripture Doctrine contrasted with the Geological Theory.* By ELEAZOR LORD. With an Introduction. By R. W. Dickinson, D. D.; New York: 1851. 1 vol. 8vo, pp. 311.
3. *Course of Creation.* By J. ANDERSON, D. D., of Newburgh Manse. Cincinnati: 1851. pp. 384.
4. *Indications of the Creator; or Natural Evidences of Final Cause.* By GEORGE TAYLOR. New York: 1851. 1 vol. 8vo, pp. 282.
5. *The Ancient World; or Picturesque Sketches of Creation.* By O. T. ANSTED, M. A., F. R. S., F. G. S. London: 1847. 1 vol. 8vo, pp. 408.

It is not our purpose to review critically the works at the head of this article. We mean simply to use them as the last we have perused, that bear directly on a subject in which we have been deeply interested, and which has, we think, most important relations to theology;—*the evidence of the degradation, in past periods of geologic time, of certain types of animals, from a higher to a lower rank in the great system of organic existence.*

In the July number, we gave an outline of that part of the Foot-Prints, in which Mr. Miller met, with signal success, the challenge of the author of the "Vestiges of Creation." This ingenious champion of the Theory of Development, after he had been driven, by Sedgwick and others, from all other periods of time, of which geology furnishes a distinctly legible record, boldly planted his standard on the oldest fossiliferous strata, the Lower Silurian and Cambrian systems of rocks, and said, in his volume of "Explanations," "I fix my opponents down to the consideration of this fact, THE EARLIEST FORMATIONS CONTAIN NO FISH."

In that article, we accompanied Mr. Miller to the very bottom of the earliest fossiliferous formations. In these he demonstrated the existence of the remains of families and genera of large fishes, (*Placoids*, fishes like existing sharks,) which must, according to all principles of classification, rank high in organization. In size, brain, organs of circulation and generation, and efficient means of offence and defence, the first known fossil species were not inferior to the most perfectly organized existing fishes.

Having vanquished the challenger, and forced him to retire from the fossiliferous strata, Mr. Miller did not permit him to occupy even the lower and older crystalline, metamorphic rocks, though most geologists believe that in them "not only life, but the conditions of life, are at an end." He knew well the character of the advocates of the theory of development, and that they would attempt the defence of their dangerous doctrines by such arguments as these:

We admit now, as the result of recent palæontological discoveries, the existence of several species of placoid fishes, in the first Silurian ocean. This fact, however, does not demonstrate the falsity of the theory of development. It proves merely that vertebrate animals inhabited the planet—were developed—earlier, far earlier, than has hitherto been supposed. The fishes, whose bones have been found, were the descendants, by a long process of development by law, of points of vitality—monads, the lowest forms of animal life—that began their career in remote periods of past duration, and inhabited the oceans in which the crystalline stratified rocks were slowly deposited. These rocks have an aggregate thickness of several miles. All geologists admit that they are composed of the fragments of pre-existing rocks, and that the oldest were spread out on the beds of oceans long anterior to those of the Cambrian and Silurian periods. Their crystalline character was caused by the protracted influence of agencies—heat, pressure, chemical affinity, electric attraction, crystallographic forces—which may have effaced all traces of organic existence. Besides, it must not be forgotten that the theory supposes the first living beings to have been very small and low in organization. All visible traces of their existence were, therefore, more easily obliterated than those of the more fully developed beings of subsequent periods. Moreover,

before a final decision of the question can be made, on scientific grounds, a more thorough and extended examination of the rocks must be had, especially with the microscope; for your learned and ingenious arguments against the law of development are based on the recent discovery of a singularly interesting series of facts, which show that the bones of fish abound in rocks more than a mile, perhaps two miles, in thickness, below the lowest geological point at which such remains had been found ten years ago. Your facts and arguments prove only that highly organized beings swarmed in oceans and beautified continents during periods in the history of the planet inconceivably far back in past duration. Those facts, however, though they may modify, cannot subvert our beautifully simple theory. Future discoveries in science, especially relative to the enormously thick beds of gneiss, mica-slate, slate, quartz-rock, hornblend slate, and other stratified rocks, which underlie the fossiliferous strata, will enable philosophers to demonstrate the reality of a great unbroken chain of vitality, beginning "at a point of immeasurable remoteness in terrestrial antiquity," and linking together, in one common brotherhood, the successive stages of vegetable and animal development, up to man himself, "who has not been created, but developed." And very few geologists deny that, during the deposition of successive series of fossiliferous formations, both plants and animals became more and more complex and perfect; or, as Sir H. Davy expressed it, that there has been, from the earliest geologic eras, "a gradual approach to the present system of things."\* And though we may admit, with Cuvier, that "life has not always existed on the globe," we deny the correctness of Lyell's inference, from geologic phenomena, that each existing species "was endowed, at the time of its creation, with the attributes and organization by which it is now distinguished;"† and that of De La Beche, that fossil species appear to have been created "as the conditions arose, the latter not causing a modification in previously existing forms productive of new species."‡

\* *Consolations in Travel.*

† *Principles of Geology*, 8th London Edition, p. 589.

‡ *Geological Researches*, 1st Edition, 8vo., p. 239.

These objections to the positive evidence of geology can easily be spread out, by such learned and ingenious writers as Oken and the author of the "Vestiges," over hundreds of pages, so as to mislead not merely young men and mechanics, but even statesmen and philosophers, who have not given special attention to geology and various branches of physical science. "Strange and beautiful, yet imperfect and dangerous theory; how many noble minds have stumbled over thee into the unknown future! Wise in every thing but the one great essential—in that foolish."\*

To answer these objections, and to drive the advocates of the theory of transmutation and development from the non-fossiliferous strata also, is one object of the latter half of the "Foot-Prints." To effect this purpose, the author appeals "to the test of what may be termed homological symmetry of organization." In the discussion of this test he unfolds and sustains, with an irresistible array of facts and arguments, his striking and deeply interesting Theory of Degradation.

We are aware that, by many highly cultivated minds, all theory is regarded with distrust. Geological theories, especially, are viewed by them as vain and groundless assumptions—dangerous, often, in their tendency; and such minds are apt to ask:

"Where is the consistency of geological theories? If Smith may conflict in his geological views with Buckland, and Lyell with Lamarck; or, if the author of the 'Foot-Prints' may oppose the development theory of the author of the 'Vestiges,' with what propriety, we ask, can either demand that we shall substitute his understanding of the Mosaic record of the creation in the place of our own, or forfeit the respect of *scientific* men?" †

This passage is a fair specimen of the many sweeping and undistinguishing denunciations of scientific theories, which are still made by men obviously ignorant of science. Smith and Buckland, as any one knows who has read their works, agree in all essential points. Both defend ably a literal interpretation of the Mosaic record of creation. Both believe the plenary inspiration of Scripture; and they differ chiefly in regard to the meaning of the word *earth* in Genesis—the former believing that it

\*Indications of the Creator, p. 109. †Epoch of Creation.

may be limited to a portion only of the planet—"a large part of Asia"—which God, at the human era, "was adapting for man and the animals connected with him." Lyell proposed several theories in explanation of geological facts, but not certainly in that part of the *Principles of Geology*\* in which he disproved the Lamarckian hypothesis of transmutation, by an appeal to scientific facts and principles, which show that "species have a real existence in nature," and "that the varieties of form, color, and organization of different races of men are perfectly consistent with the generally received opinion, that all the individuals of the species have originated from a single pair." And Hugh Miller met the challenge of the author of the "*Vestiges*," not with ingenious speculations, but with numerous facts, which prove that bones of large fishes are abundant in strata, which the adversary of revealed truth had said did not contain any.

A more philosophical view of the nature and value of geological theories is presented by the Rev. J. Anderson, D. D., an eminent Scotch clergyman, whose late work† shows him to be profoundly acquainted with geology in all its scientific and theological relations. Having traced the progress or course of creation through successive cycles of unknown duration, as exhibited in the rocks of Scotland, England, France and Switzerland, all attesting the great antiquity of the planet, and the recent creation of our race, he discusses calmly the several modes or theories that have been proposed for reconciling the science with the Mosaic account of creation, and says:

"These are some of the methods, by which the geologist aims to bring the conclusions of his science within the scope of the Mosaic record, and to free his speculations from all their incumbrances and responsibilities. There is still a great deal to be accomplished, even with all these approximations, toward a right and full and literal comparison with the sacred text. There is indeed no real conflict between the discoveries of geology and the declarations of the divine oracles; and with so many doors of retreat from, or avenues of approach into, the inviting fields of its research, no friend of the truth need be afraid of an excursion through the most intricate depths of creation's works. Mean-

\* Eighth London Ed., p. 544 to 589.

† *Course of Creation.*

while, the metaphysicians have all been driven from the field, with all their untenable dogmas about the eternity of matter. Geologists repudiate the doctrine, and their science refutes it."

Indeed, even the authors of the Epoch of Creation, though their acquaintance with any science is obviously very limited, could not deny that no science is so full of theory as metaphysics; nor has any given birth to so many ingenious hypotheses, adverse to the theology of the Bible. Will any one, on that account, denounce the science of metaphysics as a mass of infidel speculations? Every philosophic inquirer knows that all science, psychological or physical, is necessarily incumbered, in its present immature state, with assumptions, hypotheses and theories;—for we are finite, and can know in part only; and it is a law of our minds, as Humboldt says, that "besides the pleasure derived from acquired knowledge, there lurks in the mind of man, and tinged with a shade of sadness, an unsatisfied longing for something beyond the present—a striving towards regions yet unknown and unopened." We can no more cease to theorize, than to think and investigate. Indeed, if what Herschel said be true, "that all human discoveries seem to be made only for the purpose of confirming more strongly the truths contained in the sacred writings," then scientific speculations may be regarded as a religious duty; for it is very certain no real advance in science can be made without using theories as means of discovery. The subject is so elegantly discussed by Dr Harris, in the "Pre-Adamite Earth," that we extract the entire paragraph:

"As surely as the mind is one, the truth to which the mind is pre-configured is one. On this ground it is that we argue from the known to the unknown; approach a subject of inquiry, under the guidance of an antecedent probability, as to what we shall find in it, and employ analogy and hypothesis as instruments of scientific discovery. 'How,' inquires Plato, 'can you expect to find, unless you have a general idea of what you seek?' 'The mind,' says Lord Bacon, 'must bring to every experiment a 'precogitation,' or antecedent idea, as the ground of that *prudens questio*,' which he pronounces to be the prior half of the knowledge sought, '*dimidium scientiæ*.' Indeed, is not the *Novum Organum* itself of hypothetical origin? 'When Newton said 'Hypothesis non fingo,' he did not mean that he de-

prived himself of the facilities of investigation afforded by assuming, in the first instance, what he hoped ultimately to prove. Without such assumptions, science could never have attained its present state; they are necessary steps in the progress to something more certain; and nearly everything which is now theory was once hypothesis. Even in purely experimental science, some inducement is necessary for trying one experiment rather than another.\* These hypotheses, as the language implies, are only provisional. They must be of a nature to admit of verification, and be actually subjected to a test which shall confirm or explode them."

No one will deny, we presume, that a theory, evil in general design and tendency, may be productive of much good, by establishing more firmly the foundations of truth, and causing that truth to be more generally and earnestly studied, and more clearly and fully comprehended. It requires something striking to arouse to mental activity the sluggish masses of mankind; and, in exposing error, even the learned are led to scrutinize carefully—to examine in all possible lights—the foundations of their opinions. And often, in eager controversies on theoretical questions, while error is refuted, the sharp concussions of excited intellects evolve unexpected scintillations of truth. Thus, Hume's *Essay on Miracles* caused the laws of evidence to be re-examined, restricted and amended, and the miraculous evidence of Scripture to be more generally studied and thoroughly understood. And the startling character of the Lamarckian hypothesis of transmutation, aroused both the enemies and friends of the Bible to a most earnest, laborious and protracted investigation of Nature's works, organic and inorganic, with a special reference to the bearing of the results on the inspired record; and hence, in part, the accumulation of an immense mass of evidence, which is now being employed successfully in demonstration of a wonderful connexion between "the truths of revelation and the discoveries of science;"—showing "that the book of revelation and the book of nature were written by the same infinite and unerring hand;—and each day adds some new proof of their divine origin. As science interprets the sacred record, its truths are better understood, and their in-

\* Mills's System of Logic, vol. 2, p. 18.



fluence more deeply felt. The two voices—the one from above, the other from beneath and around us—seem to unite; but, notwithstanding all space and all matter are full of their eloquence, man has been slow to understand their language, and reluctant to acknowledge the truths which they unitedly teach.”\*

Both teach that the created material universe is a divinely established plan of manifestation, to created moral intelligences, of the infinite perfections of Deity,—infinite in resources, in power, in wisdom, in benevolence, in duration,—a plan which can never, by any possibility, approach its termination. Such a plan must consist of an infinite number of connected, dependent, active, continuous, analogous parts, in ever varying progress,—some, having accomplished the purpose for which they were designed, giving place to others. This is precisely what the theory of degradation assumes. It supposes that while the animal kingdom, viewed as a whole, has been steadily advancing, in all geologic time, to perfection in organization, certain minor divisions of it—parts of the great terrestrial whole of sentient existence—have, in each period of the earth’s eventful history, accomplished the object of their creation, and undergone extinction and degradation, in order to admit of a further unfolding of the plan of manifestation by the introduction of new forms of life.

All naturalists admit the reality of symmetry of organization, and that it has an important relation to animal rank. Cuvier recognized it as “a principle peculiar to Natural History,” and termed it “the conditions of existence.” “On it,” he says, “are based the fundamental relations” and “the essential resemblances of beings.” From these are derived “the surest means of reducing the properties of beings to general rules,” and of establishing “the principle of the subordination of characters,” which may be employed successfully, on many occasions, in the classification of animals. “The incorporation of the laws of observation with the general laws, either directly or by the principle of the conditions of existence, would complete the system of the natural sciences, in rendering sensible, in all its parts, the mutual influence of every being.

\* *Indications of the Creator*, p. 279.

*To this end should those who cultivate these sciences direct all their efforts.*

Naturalists have not yet fully ascertained the character and extent of this principle, nor the relative importance of its results, in different parts of the complex system of organic existences. Mr. Miller's view of its character and of its effects, in the different periods of geologic time, on the rank of the ichthyic class especially, is peculiarly important and interesting. He contends that "homological symmetry of organization is the proper ground on which the standing of the earlier vertebrata should be decided." The fundamental principle of his theory is not based on groundless hypothesis or ingenious speculation. It comes within the strictest rules of logic, and being of "a nature to admit of verification," it may "be actually subjected to the test" of such a multiplicity of palæontological facts, as must either confirm or explode it."

Nor must the reader infer that the principle of the gradual *degradation*, during the successive eras in the immeasurably protracted periods of geologic time, of whole classes of animals, from higher and more perfect to lower and less symmetrical types of organization, was first ascertained and applied by Mr. Miller, in the work before us. True, geologists have been eagerly employed in collecting facts relative to extinct races; and zoologists and comparative anatomists have been as earnestly occupied in studying, classifying, and describing existing beings. The progressive state of these sciences has, till within a few years, militated against the formation of theory of the soberer character. Facts were comparatively limited, and those who were best acquainted with them were too intent on adding to them, to give much attention to the chronology of organized existence, with a view to deduce principles applicable to earth's tenants, in all periods of past duration. Still, the principle which Mr. Miller has so forcibly illustrated, and which gives to his work the charm of novelty, has long been known to palæontologists. It was distinctly stated by Dr. Buckland, fifteen years ago, in the Bridgewater Treatise on Geology and Mineralogy.\*

\* Vol. 1, p. 293-4, Second Edition, London.

"From no kingdom of nature does the doctrine of gradual development and transmutation of species derive less support, than from the progression we have been tracing in the class of fishes. The Sauroid fishes occupy a higher place in the scale of organization, than the ordinary forms of bony fishes; yet we find examples of Sauroids of the greatest magnitude, and in abundant numbers in the carboniferous and secondary formations,\* whilst they *almost disappear, and are replaced by less perfect forms in the tertiary strata, and present only two genera among existing fishes.*

"In this, as in many other cases, a kind of *retrograde* development, from complex to simple forms, may be said to have taken place. As some of the more early fishes united, in a single species, points of organization which, at a later period, are found distinct in separate families, these changes would seem to indicate in the class of fishes *a process of division, and of subtraction from more perfect, rather than of addition to less perfect forms.*

"Among living fishes, many parts in the organization of the cartilaginous tribes, (e. g. the brain, the pancreas, and organs subservient to generation,) are of a higher order than the corresponding parts in the bony tribes; yet we find the cartilaginous family of squaloids co-existing with bony fishes in the transition strata, and extending with them through all geological formations, unto the present time.

"In no kingdom of nature, therefore, does it seem less possible to explain the successive changes of organization, disclosed by geology, without the direct interposition of repeated acts of creation."

So, Ansted, speaking of the whole animal kingdom, said correctly, "a general advance in point of organization is, in one sense, a method observed by nature;" yet, he qualified this general law of "progression,"† and recognized distinctly a co-ordinate law of retrogradation, by which classes of animals, types of organization, were, at various periods, reduced gradually in the scale of being. In closing his description of the inhabitants of the Silurian seas, he says of the Cephalopoda, the highest class of the Mollusca, that they "at once assumed an importance, which hardly increased, though it varied, for a long period,

\* We have seen that they have since been found in the Devonian, upper Silurian, lower Silurian and Cambrian systems. See July No., p. 136.

† Ancient World, p. 102.

and at length actually became less."\* In grouping the fishes of the carboniferous era, he says :

"Innumerable sharks (Placoids) of all sizes, and perhaps of many forms, rapid and powerful swimmers, fiercely and insatiably carnivorous, were associated with huge, monstrous fishes, (Ganoids, similar to the sturgeon,) *more resembling reptiles* than any of their own class at the present day, and incredibly powerful and voracious. *The fishes at this time had attained, it would seem, their maximum of development in point of vigor, and in some respects (though in some respects only, and by analogy) in structure; and it is not a little interesting to find that, at this point, so far as we can tell, the true reptiles were actually introduced.*"†

Lest this should be misunderstood and supposed to favor the theory of development—that fishes were employed as agents, in introducing a higher reptilian group—he asserts that these first reptiles were less analogous to the sauroid fishes of the carboniferous and Devonian periods, than the reptiles which appeared at a much later period :

"The reptiles thus appearing were not, however, members of that group through which the passage from sauroid fishes to true saurians takes place, but belonged to a *higher form, and to a complicated type of that form.*"

"It is very curious and interesting," he remarks in another place, "to watch the progress of the transition. The fishes in the carboniferous rocks include many shark-like and reptilian groups. In the sandstone, above the coal, and in the magnesian limestone, are many nearly allied fishes, although of much smaller size, *but all the more advanced types seem to fail.* In the same newer beds, however, (of rocks of the first epoch) appear true reptiles, not indeed of large size, but of complicated dentition, and the representatives of a high bird-like group; while in the beds of the secondary period, (second epoch) the reptiles *at first* exhibit high analogies, and then pass off into a magnificent series, including true representatives, *both of the earlier sauroid fishes and the later aquatic mammals.*"‡

In Ch. XI. on "General Considerations concerning the Second Epoch, and the Circumstances of its Termination," he uses very definite language relative to the types of vertebrate animals, that successively appeared during that long "reptilian period," which succeeded the first or

\* Id., p. 55.

† Id., p. 102.

‡ Id., p. 114.

palæozoic epoch, called the "reign of fishes." And as, at the close of the first, fishes retrograded in organization, though their numbers were multiplied; so, in the second, reptiles *declined* in perfection of type, while first birds and then mammals appeared:

"One thing is perfectly clear in the midst of all this change, introduction, and substitution of species—namely, that there was, on the whole, no true advance in the perfection or even the complication of organic reptilian forms, between the commencement and close of the epoch; for, at the outset, we find evidence of the existence of reptiles of the *two extremes of organization*; in the middle we have merely a vast multiplication of reptilian species, exhibiting very interesting and remarkable modifications, but no new type; while toward the close *these all cease, and we revert to the same, or nearly the same, modifications of lacertian structure as at first*. Neither in size, number, or affinity to higher forms, nor, indeed, in any conceivable point, can we trace systematic advance in organization in the reptiles of this great *saurian period*."

"Nor do we find any different result if we examine the other groups. The birds exhibit indications of their existence by a few foot-steps in the new red sandstone, *at the commencement of the epoch*, and a very few isolated bones obtained from the chalk give evidence of their presence scarcely more distinct at its close. No such remains at all have yet been found in any of the intermediate deposits. Just so it is with the mammals. In the lower beds of *the middle part of the series* we have a few but distinct traces of their presence; these, however, are totally lost in the newer beds, and even in the weald, a fresh-water deposit, we are still without a single fragment that can be supposed to have belonged to any quadruped, the companion on land of the gigantic dinosaurians."\*

Ansted's design, in the work from which we have cited the preceding passages, was to present to the general reader, as the great results of geological investigations, "picturesque sketches of creation"—"groups of animate beings"—characteristic of each period. To accomplish this object, he restricted himself to facts; and, of course, in his exposition of facts, gave merely a summary of the conclusions arrived at by geologists and palæontologists.

\* Id., p. 258.

He simply stated facts, and the principles deduced from them.

One of these principles asserts that, from the earliest period, of which any records are found in the rocks, to the living creation, the animal kingdom, like the mineral and vegetable, affords indubitable evidence of modification, substitution, enlargement, and advance. Hence, if we examine the relics of either radiate, articulate, or molluscous animals, we find those of no two periods identical. Thus, the orthoceratite preceded the goniatite, as the latter did the ammonite. So the trilobite preceded the order (Malacostraca) to which the crab belongs. And fishes, reptiles, birds, mammals and man, appeared in succession. This is called the law of *progression*, and does not teach that there ever has been any real advance in organization in *any one type* of organized existence. The first fish, reptile, bird, mammal, or man, was as perfect in symmetry of structure *as any successor of the same type*. For a clear, full, and fascinating illustration of this law, in all its aspects, as well as for a learned, candid and able exposition of its relations to the Christian religion, we refer the reader to the Pre-Adamite Earth, by the Rev. John Harris, D. D.

The second principle is sustained by evidence of the same kind, and equally conclusive. It asserts the simultaneous retrogradation in organization of whole classes of animals, even while they increased in size, were varied in structure, and multiplied in countless numbers. A single order of fishes (Placoids, like sharks,) first appeared, high in organization. The forms of the class were afterwards varied by the gradual addition of three other orders, Ganoid, Ctenoid and Cycloid;\* and though fishes ultimately became monsters in bulk, and swarmed in incredible numbers in every sea, so far from advancing in organization, they obviously retrograded, especially after a few species of a single order of the class of reptiles, and allied to lower rather than

\* Fishes form a *class* of the vertebrate division. The class is divided by Agassiz into the four *orders* named above; these orders into families; families into genera, and genera into species. The orders take their names from the scale: Placoids, whose scales are irregular enameled plates; Ganoids, whose scales are bony plates covered with enamel; Ctenoids, with scales like a comb; and Cycloids, with circular scales. These orders were not created at once. The Placoids, like sharks, appeared first; next came the Ganoids, like the sturgeon, but much larger.

to higher fishes, came on the stage of action. Without any advance in organization, the reptiles, too, exhibit, in the next epoch, numerous modifications of form, size, habits and structure; and it is a curious and instructive fact, that when a few small genera of marsupial mammals first inhabited the Oolitic continents or islands, a small and anomalous saurian genus, (Pterodactyl) having striking affinities to both birds and bats, was so singularly constituted as either to swim in the sea, crawl on the land, or fly in the air. And surely no geologist can fail to see, in the alligators, toads, turtles, snakes and lizards of the present era, a degraded class of beings—degraded in organization as well as in size. This is the principle of *degradation*, so ingeniously and learnedly employed by Mr. Miller in defence of revealed truth. And, in penning the preceding pages, it has not been our purpose to detract aught from his fame, by showing that he did not first perceive and apply the principle. It has been our aim to convince the reader that his demolition of the last stronghold of the defenders of development by law, was effected by the skilful use of weapons, which geologists—Lyell, Buckland and Ansted—and palæontologists—Agassiz and Owen—had laboriously prepared for him. Mr. Miller himself must smile at the ignorance of science displayed by such writers as the authors of the “Epoch of Creation,” how learned soever they may be in theology, when they speak of the degradation of certain types of animals as an assumption, and of him as the assumer.

Having shown that theory is an indispensable means of advancing science, and that retrocession, retrogradation in parts of the animal creation, is a fact proved long since by palæontologists, and recognized now by geologists, we proceed to examine Mr. Miller’s explanation of it in determining the rank of the earliest vertebrata—fishes especially—*his theory of degradation*, as it is now called, though he professed to write merely “*the history and progress of degradation*.” The principle was established by others. He has ingeniously applied it as a principle of classification. In this sense only is he the author of a theory.

Divisions, classes, orders and families of animals, are not arbitrarily formed. They express, each, the opinions of naturalists, as to certain principles of organization, more

or less comprehensive, according to which each group is constructed, and from which each derives its rank in the great scale of being.

What the principle is, in the ichthyic class, has been matter of doubt; for, as we have seen in a former article, naturalists have not agreed fully in their systems of classification; some regarding one organ, and others another, as entitled to preponderance, in determining the rank of fishes. Mr. Miller has sought it in those organs, and we think successfully, which give man decided superiority of organization,—the nervous masses, head, spine and extremities. On the position of the limbs, relatively to the other parts of the skeleton, depends, Mr. Miller thinks, the *homological symmetry of organization*; and this test, united to that of brain, intelligence, he employs in determining the rank of the earliest fishes. We will allow him to explain it to the reader in his own felicitous way; and as we cannot agree with the authors of the Epoch of Creation, that “the mysteries of God’s works are as far above our conceptions as the mysteries of His nature,” we think the christian world will thank Mr. Miller for a most lucid scientific illustration of a principle, which at once overthrows infidelity, and imparts new interest to the Mosaic account of the fall of man. Mr. Miller says:

“Though all animals be fitted by nature for the life which their instincts teach them to pursue, naturalists have learned to recognize among them certain aberrant and mutilated forms, in which the type of the special class to which they belong, seems distorted and degraded. They exist as the monster *families* of creation, just as among families there appear from time to time monster *individuals*—men, for instance, without feet, or hands, or eyes, or with their feet, hands or eyes grievously misplaced—sheep with their fore legs growing out of their necks; or ducklings with their wings attached to their haunches. Among these degraded races, that of the footless serpent ‘which goeth upon its belly,’ has been long noted by the theologian as a race, typical in its condition and nature, of an order of hopelessly degraded beings, borne down to the dust by a clinging curse; and, curiously enough, when the first comparative anatomists in the world, give *their* readiest and most prominent instance of the degradation among the denizens of the natural world, it is this very order of footless reptiles that they select. So far as the geologist



yet knows, the ophidians (an order of reptiles including serpents) did not appear during the secondary ages, when the monarchs of creation belonged to the reptilian division, but were ushered upon the scene in the times of the tertiary deposits, when the mammalian dynasty had supplanted that of the Iguanodon and Megalosaurus. Their ill-omened birth took place when the influence of their house was on the wane, as if to set such a stamp of utter hopelessness on its fallen condition, as that set by the birth of a worthless or idiot heir on the fortunes of a sinking family. The degradation of the ophidians consists in the absence of limbs; an absence total, in by much the greater number of their families, and represented in others, as in the boas and pythons, by mere abortive hinder limbs concealed in the skin; but they are thus not only *monsters through defect of parts*, if I may so express myself, but also *monsters through redundancy*, as a vegetative repetition of vertebra and ribs, to the number of three or four hundred, forms the special contrivance by which the want of these is compensated. I am also disposed to regard the poison-bag of the venomous snakes as a mark of degradation; it seems, judging from analogy, to be a protective provision of a low character, exemplified chiefly in the invertebrate families—ants, centipides and mosquitos, spiders, wasps and scorpions. The higher carnivora are, we find, furnished with unpoisoned weapons, which, like those of civilized man, are sufficiently effective, simply from the excellence of their construction, and the power with which they are wielded, for every purpose of assault or defence. It is only the squalid savages and degraded boschmen of creation that have their feeble teeth and tiny stings steeped in venom, and so made formidable. *Monstrosity through displacement of parts* constitutes yet another form of degradation; and this form, united, in some instances, to to the other two, we find curiously exemplified in the geological history of the fish—a history which, with all its blanks and missing portions, is yet better known than that of any other division of the vertebrata. And it is, I am convinced, from a survey of the progress of degradation in the great ichthyic division, a progress recorded as “with a pen of iron in the rock forever,” and not from superficial views, founded on the cartilaginous or the non cartilaginous texture of the ichthyic skeleton, that the standing of the kingly fishes of the earlier periods is to be adequately determined. Any other mode of survey, save the parallel mode, which takes developement of brain into account, evolves, we find, nothing like principle, and lands the enquirer into inextricable difficulties and inconsistencies.”

“In all the higher non-degraded vertebrata, we find a certain uniform type of skeleton, consisting of the head, the vertebral column, and four limbs; and these last, in the various symmetrical forms, whether exemplified in the higher fish, the higher reptiles, the higher birds, the higher mammals, or in man himself, occur always in a certain determinate order. In all the mammals, the scapular bases of the fore limbs begin opposite the eighth vertebra from the skull backwards, the seven which go before being cervical or neck vertebrae; in the birds a division of the vertebrata that, from their peculiar organization, require longer and more flexible necks than the mammals; the scapulars begin at distances from the occiput, varying according to the species, from opposite the thirteenth to opposite the twenty-fourth vertebra; and in the reptiles, a division which, according to Cuvier, “presents a greater diversity of forms, characters and modes of gait, than any of the other two,” they occur at almost all points, from opposite the second vertebra as in the frog, to opposite the thirty-third or thirty-fourth vertebra as in some species of plesiosaurus. But in all, whether mammals, birds, or undegraded reptiles, they are so placed that the creatures possess *necks*, of greater or less length, as an essential portion of their general type. The hinder limbs have also, in all these three divisions of the animal kingdom, their typical place. They occur opposite, or very nearly opposite, the posterior termination of the abdominal cavity, and mark the line of separation between the vertebrae of the trunk (dorsal, lumbar, and sacral) and the third and last, or *caudal* division of the column—a division represented in man by but four vertebrae, and in the crocodile by about thirty-five, but which is found to exist, as I have already said, in all the more perfect forms. The limbs, then, in all the symmetrical animals of the first three classes of the vertebrata, mark the three great divisions of the vertebral column—the division of the *neck*, the division of the *trunk*, and the division of the *tail*. Let us now inquire how the case stands with the fourth and lowest class—that of the fishes.

The four orders of fishes—Placoids, Ganoids, Ctenoids and Cycloids—occur in succession in the rocks, in the order in which we have named them. Remains of Placoidians only have been found in the earliest formations, the Silurian and Cambrian. These first fishes have been ascertained by Agassiz and Egerton to belong to the Cestraciont family. Of this family, which exhibits, according to Sedgwick, Egerton, Wilson, and other naturalists, “the highest type,” the Port Jackson shark, is “the *sole survi-*

*ving species.*" "With this (cestraciont) family, so far as is yet known, ichthyic existence first began. It does not appear that on the globe which we inhabit, there was ever an ocean tenanted by living creatures at all, that had not its cestracion—a statement which could not be made regarding any other vertebrate family." They alone, Agassiz has shown,, "sweep across the entire geological scale." Hence, as only one species still lives, and that of small size, it is of great importance to ascertain its rank.

The Ganoidians, of which we have living examples in the sturgeon, cat-fish and pike, came on the stage of action in the Devonian period; and afterwards both Placoids and Ganoids were multiplied through all the succeeding palæozoic and secondary depositions, many of the latter being monsters in size, till reptiles of enormous magnitude were commissioned to restrain excessive multiplication of the tenants of the deep. Near the close of the secondary periods, the Ctenoids, of which the perch is a living example, appeared; and finally, during the deposition of the tertiary strata, the Cycloids were created. Since that time the four orders have existed in every sea, the two latter having true bony skeletons, and greatly preponderating in numbers. Hence, the Placoids and Ganoids "were naturally looked on as of comparatively small importance, so long as only the existing species of fishes were known—for they contain, with the exception of the sharks and Rays, but very few species, and these are neither abundant nor widely spread.\*

If the development hypothesis be true, the most perfectly organized existing fishes should be Ctenoidians and Cycloidians. Is this the case? Their bony skeletons, vast numbers, and other minor circumstances, seemed, at first, to require an affirmative answer. If, however, brain, intelligence, organs of circulation, and weapons of defence, and not bone, be made the test of ichthyic rank, as in other vertebrate creatures, the Placoidians, though few in number, and possessed of a cartilaginous skeleton, the bone being on the skin, must be regarded as exhibiting the highest type. The question was beset with many perplexing difficulties, and the arguments on opposite sides seemed to

\* Ancient World, p. 61.

be nearly equal—Agassiz himself having, at one time, regarded a cartilaginous skeleton as a mark of inferiority—a stage in embryonic development. To remove all doubt on the subject, Mr. Miller applied “the test of homological symmetry of organization” to existing and extinct fishes, and found the results to correspond with those of the test of brain, organs of generation, and means of defence.

In existing sharks of the highest type, the anterior and posterior fins (*pectoral and ventral*) occupy the places, relative to the vertebral column, of the limbs “in symmetrical mammals, birds and reptiles.” They have a neck consisting of from twelve to fourteen cervical vertebrae. The ventral fins are nearly opposite the base of the abdomen. The caudal vertebrae extend into the tail fin, and are not abruptly cut off, as in the salmon, trout, perch, and an immense majority of existing species. The mouth, too, in the Port Jackson shark, opens “in a broad, honest-looking muzzle, very much resembling that of the hog.” In all these respects they approach nearest to the standard of perfection in man—and such was the type of all the earliest fishes. No example of monstrosity of misplacement, defect or redundancy of parts, can be predicated of any of them. All present “the homological symmetry of organization, typical of that vertebral kingdom to which they belong.”

In the Rays, however, Placoids also, and which did not appear till a much later period, the pectoral fins, fore limbs, are attached to *one* long cervical vertebra; and in the Chimeridæ, which first appear about the same time, there is a still greater departure from symmetry—for the limbs or fins corresponding to the human arms are attached to the “hinder part of the head,” there being no neck at all.

But we must return to the Ganoids; for various remarkable genera of that order,—*Asterolepis*, *Coccosteus*, *Pterichthys*, and several others,—were abundant in the Devonian oceans, long before the Rays and Chimeridæ appeared as degraded families of Placoidians. In the Ganoid genera are found the first examples of “monstrosity through displacement of parts.” In all except two, “the fore limbs are brought from their typical place, opposite the base of the cervical vertebrae, and stuck on to the oc-

cipital plate. The whole order presented from the first "such a departure from the symmetrical type, as would take place in a monster example of the human family, in whom the neck had been annihilated, and the arms stuck on to the back of the head." Now this fact is worthy of particular notice, that misplacement or retrogradation began, not in the first but the second order of fishes. If the second were developed from the first, it is strange that some of the parts, the vertebrae of the neck, on which the symmetry of all animals of a higher type depends, were obliterated by the process.

Nor is this all. Mr. Miller finds in two of the earliest Ganoid genera the first examples "of degradation through defect." Though thousands of individuals have been examined, no trace has been found in the *Pterichthys* of "hinder limbs;" none in the *Coccosteus* of fore limbs. One is compared to a human monster without legs—the other, to one without arms.

The progress of ichthyic degradation, in later periods, is given so succinctly by Mr. Miller, that we cite the entire passage :

"Ages and centuries pass, and long unreckoned periods come to a close—and then, after the termination of the palaeozoic period, we see that change taking place in the form of the ichthyic tail, to which I have already referred, as singularly illustrative of the progress of degradation. Yet other ages and centuries pass away, during which the reptile class attains to its fullest development, in point of size, organization and number; and then, after the Cretaceous deposits have begun, we find yet another remarkable monstrosity of displacement introduced among all the fishes of one very numerous order, and among no inconsiderable proportion of the fishes of another. In the newly introduced Ctenoids, (*Acanthopterygii*), and in those families of the Cycloids which Cuvier erected into the order *Malacopterygii sub-brachiati*, the hinder limbs are brought forward, and stuck on to the base of the previously misplaced fore limbs. All the four limbs, by a strange monstrosity of displacement, are crowded into the place of the extinguished neck. And such, at the present day, is the prevalent type among fishes. Monstrosity through defect is also found to increase—so that the snake-like *Apoda*, or feet-wanting fishes, form a numerous order, some of whose genera are devoid, as in the common eels and the congers, of only the hinder limbs—while in others, as the genera *Muraena*

and Synbranchus, both hinder and fore limbs are wanting. In the class of fishes, as fishes now exist, we find many more evidences of monstrosity, which results from the displacement and defect of parts, than in the other three classes of the vertebrata united; and knowing their geological history better than that of any of the others, we know, in consequence, that the monstrosities did not appear *early*, but *late*—and that the progress of the race, as a whole, though it still retains not a few of the higher forms, has been a progress, not of development from the low to the high, but of degradation from the high to the low.”

In many fishes, as the flounder, plaice, halibut, and turbot, degradation of distortion is superadded to that of displacement and defect. The creature is twisted half round and laid on its side. All the fins are misplaced, and the dorsal and anal have changed places and functions with the pectoral and ventral fins. The tail has not the vertical position of other fish tails, but is horizontal. The head partakes of the general twist. Half its fractures are twisted to one side, and the other half to the other—causing such a change as would occur in the human cranium, should “the eyes be drawn toward the left ear and the mouth to the right.” The eyes are squint, the mouth wry, and the jaws so asymmetrical, that “scarcely in the entire ichthyic kingdom are there any two jaws that less resemble one another, than the two halves of the jaw of the flounder, turbot, halibut or plaice.

Moreover, the *bilateral symmetry*, so invariably characteristic of all the higher vertebrata, scarcely has a place in the asymmetrical head of the flounder. In nearly all fishes, the two bones that compose the anterior half of the lower jaw, are as much alike as the right hand of man is to the left. In the flounder, on the contrary, one is a short, broad, nearly straight bone, with from four to six teeth only, while the other is longer, narrower, bent like a bow, and contains from thirty to thirty-five teeth:

“There exists,” says Mr. Miller, “in some of our north country fishing villages, an ancient apologue, which, though not remarkable for point or meaning, at least serves to show that this peculiar example of distortion the rude fishermen of a former age were observant enough to detect. Once on a time the fishes met, it is said, to elect a king, and their choice fell on the herring. ‘The

*herring king!* contemptuously exclaimed the flounder, a fish of consummate vanity—'where then am I?'—And straightway, in punishment of its conceit and rebellion, 'its eyes turned to the back of its head.' Here is there a story palpably founded on the degradation of misplacement and distortion, which originated ages ere the naturalist had recognized either the term or the principle."

This view of the subject, novel and striking, as all naturalists will admit, must shake to its foundation the principle assumed by some distinguished comparative anatomists, and even by Owen, though it is rejected by Agassiz, that the attachment of the fore-limbs and the scapular arch to the occipital bone is the normal one, and that the removal of these limbs further down, as in all reptiles, birds and mammals, *is a natural dislocation of them*;—some regarding the dislocation as the result of the slow operation of the law of development—others, as the gradual enlargement, by divine agency, of the great plan of the vertebrate creation. These comparative anatomists take, as their starting-point, that form or peculiarity of structure which is *lowest* in the vertebral skeleton, and thence deduce the higher types and their relations and homologies. Beginning at the lowest in the scale of being, they pass upwards through the intermediate forms to the other extreme. The geologist assumes a different principle. He confines his attention to one class of animals, as fishes, and traces the changes of that class in the successive periods of geologic time. Mr. Miller says:

"It is with *time*, not with rank, that he has to deal. Nor is it in the least surprising that he should seem at issue with the comparative anatomist, when, in classifying his groups of organized being, according to the periods of their appearance, there is an order of arrangement forced upon him, different from that which, on an entirely different principle, the anatomist pursues. Nor can there be a better illustration of a collision of this kind, than the one furnished by the case in point. That peculiarity of structure which, as the lowest in the vertebral skeleton, is to the comparative anatomist the primary and original one, and which, as such, furnishes him with his starting-point, is to the geologist *not primary, but secondary, simply because it was not primary but secondary in the order of its occurrence*. It belongs, so far as we yet know, not to the *first* period of vertebrate existence, but to the second."

We will conclude this part of the subject with a quotation from the Foot-Prints, which opens to the reader, in a few sentences, a clear synoptical view of the progress, simultaneously, in the whole vertebrate creation, of both great laws, *progression* and *retrogradation*, during the immeasurably protracted periods of past duration, in which the Creator has already been displaying to moral intelligences His infinite power, wisdom and benevolence—All Sufficiency. The philosophic mind is overwhelmed with reverence, awe and humility, in contemplating the subject: for vast as may seem the number and variety of beings inhumed in the rocks; endlessly multiplied as have been the changes both of advance and retrocession discovered in their organization; and protracted as must have been the periods required for their creation and extinction, our knowledge is limited to one of the smallest of myriads of worlds, and to a mere point of time; for infinite duration still remains, in which the Divine manifestation will proceed, after our race shall have become extinct, to give place, in turn, to higher types of organization:

“This fact of degradation, strangely indicated in geologic history, with reference to all the greater divisions of the animal kingdom, has often appeared to me a surpassingly wonderful one. We can see but imperfectly in those twilight depths to which all such subjects necessarily belong; and yet at times enough does appear to show us what a very superficial thing infidelity may be. The general advance in creation has been incalculably great. The lower divisions of the vertebrata preceded the higher; the fish preceded the reptile, the reptile preceded the bird, the bird preceded the mammiferous quadruped, and the mammiferous quadruped preceded man. And yet, is there one of these great divisions in which, in at least some prominent feature, the present, through this mysterious element of degradation, is not inferior to the past? There was a time in which the ichthyic form constituted the highest example of life; but the seas during that period did not swarm with fish of the degraded type. There was, in like manner, a time when all the carnivora and all the herbivorous quadrupeds were represented by reptiles; but there are no such magnificent reptiles on the earth now as reigned over it then. There was an after time, when birds seem to have been the sole representatives of the warm-blooded animals; but we find, from the prints of their feet left in the sandstone, that the tallest men might have

‘Walked under their huge legs, and peeped about.’



“Further, there was an age when the quadrupedal mammals were the magnates of creation ; but it was an age in which the sagacious elephant, now extinct, save in the comparatively small Asiatic and African circles, and restricted to two species, was the inhabitant of every country of the Old World, from its southern extremity to the frozen shores of the Northern Ocean ; and when vast herds of a closely allied and equally colossal genus occupied its place in the New. And now, in the times of the high-placed human dynasty—of those formally delegated monarchs of creation, whose nature it is to look behind them upon the past, and before them, with mingled fear and hope, upon the future—do we not as certainly see the elements of a state of ever-sinking degradation, which is to exist forever, as of a state of ever-increasing perfectibility, to which there is to be no end? Nay, of a higher race, of which we know but little, this much we at least know, that they long since separated into two great classes—that of the elect angels, and of angels that kept not their first estate.”

In all these passages, and, indeed, throughout the work, the word *degradation* is used in its literal sense, and means more than retrogradation or retrocession, as employed by Buckland, Ansted, and other geologists, to whom we have referred. They employ it to denote the *fact* of “subdivision,” “subtraction,” “reduction,” “diminution,” “distortion” in the successive species of a class of animals ; and this fact is certainly sufficient to overthrow the theory of transmutation and development, with all its ingenious qualifications and disingenuous subterfuges—for neither Maillet, Lamarck, Oken, nor the author of the *Vestiges*, was a geologist. Indeed, like the authors of the “*Epoch of Creation*,” they were ignorant of the science ; and hence, misunderstood and perverted its facts and principles. And we believe the latter treatise, in which many material facts in the history of theologic science seem to have been intentionally concealed, especially with regard to the exegesis of the first chapter of Genesis, and also with regard to Biblical Chronology, is more dangerous than the “*Vestiges*” itself in the hands of the young student of Geology, (and all educated young men and many mechanics and others now study the science.) Assuming that the common (and we may say *modern*) interpretation of the Mosaic account of creation is alone compatible with faith in revelation, Messrs. Lord & Dickinson treat all as secret enemies to the Sacred Volume, who adopt a different inter-

pretation,—who maintain that the material universe is not said by Moses to have been created out of nothing, about six thousand years ago, but at some indefinite period of the past, termed “the beginning.” Nor do they, in any part of the “Epoch,” ever allude to the fact, that that interpretation has been maintained by Christian writers in all periods of the Church—by many long before geology was known as a science. Are Messrs. Dickinson & Lord ignorant of the fact that their interpretation of Genesis was rejected by Theodoret, Augustine, Rosenmuller, Bishop Patrick, Bishop Berkley, Bishop Horsley, Bishop Whately, Milton, Dathe, Doederlin, Knapp, Faber, Keith, Dr. Chalmers, &c. &c.?

Mr. Miller means, as he tells us, “not only reduction but also degradation.” And descanting on the *fact*, that fishes, reptiles, and even mammals, dwindled in size and sank lower in other important characters, though species and genera may have been greatly increased in number, just anterior to the human era, he asks why these classes, especially the first two of them, “should have become the receptacles of orders and families of a degraded character, which had no place among them in their monarchical state.” “Nor did the hand that makes no slips in its workings, ‘form the crooked serpent’—footless, groveling, venom-bearing—the authorized type of a fallen, degraded creature, until after the introduction of the mammals. What can this fact of degradation mean?” “What reason, what *final cause* can be assigned for it?”

This question cannot be answered by saying, that degradation is merely one of the modes of filling voids in the chain of being; for geologists all reject this absurd hypothesis of Bolinbroke, their science having made them familiar with the truth, that the chain has been too repeatedly broken by the extinction of species, genera, families and orders of animals—the links of the assumed “graduated chain of Bolinbroke” having sunk, in all geologic ages, “fractured and broken into the rocks below.” Besides, the mere filling up of blanks could have been as readily effected by elevation—by the interpolation of links from the lower end of the chain. Mr. Miller thinks, therefore, degradation “is associated with certain other great facts in the moral government of the universe.” He says:

“The special lesson which the adorable Saviour, during his ministry on earth, oftenest enforced, and to which all the others bore reference, was the lesson of a final separation of mankind into two great divisions—a division of God-like men, of whose high standing and full orbéd happiness man, in the present scene of things, can form no adequate conception; and a division of men finally lost, and doomed to unutterable misery and hopeless degradation. There is not in all Revelation a single doctrine which we find oftener, or more clearly enforced, than that there shall continue to exist, throughout the endless cycles of the future, a race of degraded men and of degraded angels.

“Now, it is truly wonderful how thoroughly, in its general scope, the revealed pieces on to the geologic record. We know, as geologists, that the dynasty of the fish was succeeded by that of the reptile; that the dynasty of the reptile was succeeded by that of the mammiferous quadruped; and that the dynasty of the mammiferous quadruped was succeeded by that of man, as man now exists—a creature of mixed character, and subject, in all conditions, to wide alternations of enjoyment and suffering. We know, further, so far at least as we have yet succeeded in deciphering the record, that the several dynasties were introduced, not in their lower, but in their higher forms; that, in short, in the imposing programme of creation it was arranged, as a general rule, that in each of the great divisions of the procession the magnates should walk first. We recognize yet further the fact of degradation specially exemplified in the fish and the reptile. And then, passing on to the revealed record, we learn that the dynasty of man, in the mixed state and character is not the final one, but that there is to be yet another creation, or, more properly, *re-creation*, known theologically as the Resurrection, which shall be connected in its physical components, by bonds of mysterious paternity, with the dynasty which now reigns, and be bound to it mentally by the chain of identity, conscious and actual; but which, in all that constitutes superiority, shall be as vastly its superior as the dynasty of responsible man is superior to even the lowest of the preliminary dynasties. We are further taught, that at the commencement of this last of the dynasties, there will be a re-creation of not only elevated, but also of degraded beings—a re-creation of the *lost*. We are taught yet further, that though the present dynasty be that of a lapsed race, which at their first introduction were placed on higher ground than that on which they now stand, and sank by their own act, it was yet part of the original design, from the beginning of all things, that they should occupy the existing plat-

form; and that redemption is thus no after-thought, rendered necessary by the fall, but, on the contrary, part of a general scheme, for which provision had been made from the beginning; so that the Divine man, through whom the work of restoration has been effected, was in reality in reference to the purposes of the Eternal, what he is designated in the remarkable text, '*the Lamb slain from the foundations of the world.*'"

This new and striking view of the subject is a bold and ingenious hypothesis, which must lead to important results, by causing a more profound examination of palæontological phenomena, on the great principle of the conditions of existence, in their relation to what Mr. Miller terms "the chronology of organized existence." His speculations may be false; but the facts of retrogradation, on which they are founded, are incontrovertible. The reasons assigned, why the four classes of vertebrate animals came on the stage of action at certain periods, and in ascending series,—fish, reptiles, birds, mammals, man, some being degraded and others elevated—may be set aside by future investigations. The facts, however, already known, form unquestionably an outline of the chronology of the events of the natural history of the planet; and future discoveries can have no other effect than to elucidate and improve—to add distinctness and connexion to—the stony record. Degradation in some sense, and for some reason, has been proved. This drives the advocates of the theory of development by law from the oldest stratified non-fossiliferous rocks; for if it be true, that the class of fishes most highly organized in the earliest Silurian period, has gradually retrograded in all subsequent geologic ages, we may safely admit that animals existed in the first oceans in which strata were deposited, and that their remains have been obliterated by various causes. Even the advocates of development must admit, that the earliest known fishes were not developed from any of their Silurian contemporaries. And if the first appearance of fishes was indefinitely, not infinitely, remote in past duration—coeval with the first of the long periods of metamorphic deposition, the facts in regard to the retrogradation of the class lead irresistibly to the conclusion, that their remains, should we procure any, would prove them to have been more elevated in the scale of being than those whose re-

mains have been found. Just as the secondary rise in rank above the tertiary fishes, the Devonian above the secondary, and the Silurian above the Devonian, so would those of the oldest rocks take precedence of all in organization.

The facts to which our attention has been directed have another important bearing. They force on the philosophic mind the conviction, that geologists have nearly or quite ascertained the era in past time, when organic existence began. The four orders of fishes appeared in a succession corresponding nearly to the appearance of the four classes of the vertebrata. The Silurian period, during which Placoid fishes alone seem to have existed, must have been immeasurably protracted. It must have been quite as long as that which intervened between the first Ganoid and the first Ctenoid fish; between the first fish and the first reptile, the first reptile and the first bird, the bird and the mammal, the mammal and the creation of Adam. These and numerous other facts in geology, induce us to infer that geologists have nearly or quite reached the terminus—the dawn—of organic existence.

*Columbia, S. C.*

R. T. B.

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## ARTICLE VI.

### CRITICAL NOTICES.

1. *Living or Dead? A series of home truths.* By the Rev. J. C. RYLE, B. A., Rector of Helmingham, Suffolk. New York: Robert Carter & Brothers. 1851. pp. 360, 12mo.

Under the following titles, "Living or Dead," "Consider your Ways," "Are you Forgiven?" "Are you Holy?" "Only one Way," "Christ and the two Thieves," "Faith's Choice," and "Remember Lot," the writer has addressed his readers, in the most faithful and pointed manner, respecting their eternal interests. From