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ARTICLE VII.

SCIENCE AND THE BIBLE. NUMBER II.

WITH FURTHER REMARKS ON "THE SIX DAYS OF CREATION" OF PROF. TAYLER LEWIS.[1]

By James D. Dana, LL. D., Silliman Professor of Natural History, Yale College.

"Is RELIGION, then, so false to God as to avert its face from science? Is the church willing to declare a divorce of this holy marriage tie? Can she afford to renounce the external proofs of a God having sympathy with man? Dare she excommunicate science, and answer, at the judgment, for the souls which are thus reluctantly compelled to infidelity? We reject the authority of the blind scribes and pharisees who have hidden themselves from the light of Heaven under such a darkness of bigotry. We claim our just rights and our share in the church. The man of science is a man, and knows sin as much as other men, and equally with other men he needs the salvation of the gospel. We acknowledge that the revelations of the physical world are addressed to the head, and do not minister to the wants of the heart; we acknowledge that science has no authority to interfere with the Scriptures and perplex the holy writ with forced and impossible constructions of language. This admission does not derogate from the dignity of science; and we claim that the sanctity of the Bible is equally undisturbed by the denial that it was endowed with authority over the truths of physical science. But we, nevertheless, as sons of men, claim our share in its messages of forgiveness, and will not be hindered of our inheritance by the unintelligible technicalities of sectarianism; as children, we kneel to the church and implore its sustenance, and entreat the constant aid and countenance of those great and good men who are its faithful servants and its surest support, whose presence and cheering

[1] Along with the work already mentioned, we here include the letter in reply to our review published in the last number of this Journal, page 471.

sympathies are a perpetual benediction, and among whom shine the brightest lights of science as well as of religion. Moreover, as scientific men, we need the Bible to strengthen and confirm our faith in a supreme intellectual Power, to assure us that we are not imposing our forms of thought upon a fortuitous combination of dislocated atoms, but that we may study His works humbly, hopefully, and trusting that the treasury is not yet exhausted, but that there is still left an infinite vein of spiritual ore to be worked by American intellect."

Such are the words, rather the devout thoughts of Science, as expressed by Prof. PEIRCE of Cambridge, in his Address, in 1854, before the American Association for the Advancement of Science; and there were few among his hearers on that occasion, who did not cordially respond to them. He spoke with earnestness; for, if there is any charge against science, fitted to stir the soul to its depths, it is that asserting the hostility of science and the Bible. The student of nature, accustomed to search for knowledge with a scrutiny and precision that has hardly a parallel in other departments of study, so as even to incur, at times, by his untiring labors among the merest minims of existence, the contempt of many a haughty intellectualist, can but look with indignation upon those who pronounce him faithless to the truth, and his studies at war with the sacred word. With such an exhibition of the Bible thrust upon him, its enmity with science insisted upon, if he is not so grounded in faith as to be sure his opponent is wrong in this hostility, he will feel forced to stand by nature, God's acknowledged work, *versus* the Bible, "the Book."

Prof. Lewis, by his sneers at science, which commence on the first page of his "Scriptural Cosmology," and stream out, as from a bitter fountain, all through the volume, has thus done a lasting injury to the cause of the Bible. However sacred his intentions, or excellent his private character (which we believe to be irreproachable), this is *one* of the ways in which *the influence of his work is infidel.*

But the uncertainties of science seem, to many minds, to authorize skepticism with regard to its results; and upon this subject some explanations may be instructive.

There are two modes of arriving at the philosophy of nature; and, correspondingly, there are two kinds of philosophers. The one is ever breeding "elephants" and "tortoises;"[1] the other, is "conceptionless," perhaps, but humble and believing. The one, in self-sufficiency, looks within for knowledge; the other, seeks to learn the true philosophy of nature from nature herself, God's appointed means. The one boldly assumes a position by the side of the Deity, and pronounces on the plans of the Creator, in the light of mind alone, as if sharing in the Divine omniscience; the other looks up reverently to the hand-writing of God in nature, and patiently endeavors to decipher the wondrous record. The one soars aloft, in dignified contempt of plodding science; and the other knows *that* to be the way of ignorance and folly.

In the remarks which follow, we propose to show, briefly, (1) how the finite mind of man is adapted to nature; (2) how nature is adapted to the finite mind; then to point out (3) the methods in which the mind studies nature, mentioning examples; (4) the certainty of error when mind ventures to theorize on matter, alone, without the guidance of nature; (5) the necessary limit to the excursions of the mind, and the consequences of attempting to pass that limit; and, finally (6), to consider the alleged infidel tendencies of science.

(1) The human mind, as has been often said, may mould material within its knowledge, or form new combinations; but it cannot rise even to a conception of a new principle in matter, or a new order of existences, or a new sense in the kingdom of life. Its appointed arena is the earth, and here alone can it gather strength for its upward flight. Being

[1] We quote from Prof. Lewis to explain this allusion to such as may not have read our former review. "We may smile," he says, "at the old quackish story of the earth's standing on the back of the elephant, and the elephant standing on the head of a tortoise, etc.; but in our gravities, our magnetisms, our series of fluids, ever requiring other fluids to explain their motions, we have only introduced a new set of modern equivalents."

made in the Divine image, it is fitted to study and comprehend the Divine laws, whether physical or moral.

Within the soul, as part of its nature or of this Divine image, there are certain principles which are a basis of all reasoning about nature: as that, leading to a recognition of a higher Power above, the infinite God, the Cause of causes; that, leading to a recognition of the relation of cause and effect in consecutive events; that, leading to a recognition of the truthfulness of the God of nature, demanding faith in return from his creatures; of the unity of nature, its oneness in plan as in Author, and thence the harmony of all laws, systems, or events in nature. And besides these, there is a recognition of the relations of units or numbers, from which has proceeded the whole fabric of mathematics; and an appreciation of harmonies in form, color, and sound, whence comes the sense of natural beauty in these several departments.

These intuitions and decisions do not characterize all minds alike. They are but germs or principles, which are active only when developed, and are seldom truthful in their operation, without large accessions of knowledge and freedom from moral obliquity. In the natural differences as to the appreciation of harmonies of sound, we learn the diversity that may exist in minds as to other qualities; the diversity, in this case, ranging from just above zero, to a height of perfection that responds instantly to all the intricacies of musical harmony without study or thought.

Only the most profound minds, or those of the highest grade, are so possessed with the idea of the unity of plan and profound harmonies in nature as thereby to be urged forward to a high range of philosophical discovery; and moreover, in these, the idea will be mainly a result of study and observation. Yet there are few that are not under the influence of this principle; few that do not recognize some system or relation in things and events around them. Lord Bacon, indeed, dwells upon the influence of this tendency to find harmonies or parallelisms among observed facts, under the name of "Idola Tribus" (Idols of the Tribe), remarking upon the "spirit of system" as one of the great sources of

error; and this it undoubtedly is. But while often an occasion of error, it was the same principle that penetrated the soul of Kepler, and led him through his long calculations to the great laws which bear his name.

(2) On the other side, nature is adapted to our finite minds, as we to nature. Her laws are expressed in simple, finite numbers, or ratios, and so are directly fitted to our comprehension, as observed by Professor Peirce in his address referred to above.

In music, the succession of tones is made through the simplest possible ratios in the number of vibrations,—the ratios of 1 : 1, 1 : 2, 2 : 3, etc. In crystals, the modifications of form are based on similar simple ratios between the axes, and the axes have specific dimensions. In the vibrations on which the phenomena of light depend, there are definite measurable lengths. In chemistry, substances have their unvarying combining weights, which we may ascertain by a simple process of weighing; and their combinations with one another take place in simple multiples of 1 : 1, 1 : 2, 2 : 3, etc. Plants grow by a law of spiral development, defined, with the same precision, in numbers. In all beauty or harmony of form, there are simple ratios; the features of the human face having ratios of 1 : 1, 1 : 2, etc.; all true curves in nature admitting of mathematical expressions; and those of the same animal or plant being an outflow or evolution of a single system, so that, even in the most unwieldy of beasts, there is the beauty of harmony in all outlines and structure.

Thus, whether we consider the kingdoms of life, the vibrations of air producing sound, or the vibrations evolving the colors of light, or regard the invisible constituents of matter, and, we might add, the spheres in space, there is everywhere a system of simple ratios and fixed dimensions; not merely a mathematical basis, but a *simple* mathematical basis. Nature is thus specially adapted to our finite minds.

It is hence plain that Nature is an intelligible minister appointed to lead us up to God, being a revelation of him in one range of his attributes, his power and wisdom, brought

down to our comprehension, as the Spirit, and the manifestation of the Divinity in Christ, are our means of rising to a knowledge of God in his holiness and love, and of man in his duty and destiny. Even nature, also, is radiant with God's love; for the earth's history evinces that man's welfare was regarded in the whole progress of creation; but Christ is the only expression of the infinite fulness of that love. In these two ways we gather strength, from the earth about us and God above, for the progress of the human soul.

While there is this kind of simplicity in the system of nature, its readings are more and more profound, as we pass beyond the more obvious phenomena, and rise, in our generalizations, to higher and higher principles: and just as we cannot, by searching, find out God, so we cannot fathom the depths of nature. There is an infinite range before us.

(3) To show that we do not claim too much for science, we will illustrate, briefly, its modes of research by reference to a few examples. It will appear that the methods employed are simple and truthful, being strictly readings from nature in accordance with the laws of mind; and that they reach onward towards truth instead of error: while pseudo-philosophy looks upon nature with reverted eyes, sees only its own vain imaginings, and tends necessarily to the false in its views of nature.

In investigating heat, for example, it is observed that matter changes size with change of temperature. Selecting some substance for experiment, we apply our measures — measures so improved by modern skill as to mark discrepancies of 100,000ths of an inch; we note the precise amount of expansion for given increments of temperature. Thus, after a while, we decipher one law by literally reading off the rates of expansion. Having made a scale of temperature, we next note, perhaps, the point of ebullition, or that temperature at which each substance passes to the state of vapor, and observe its constancy for each kind of liquid; and so read the facts that represent another law. The mind then makes comparison of the facts with one another and, as science advances, also with the chemical constitution of the

substances operated on, etc.; and so finds, as another lesson, a definite and simple relation between chemical constitution and the boiling points of compounds, — a profounder law.

Again, we note the amount of heat absorbed when substances pass from a liquid state to that of a vapor, or from a solid to a liquid; find the amount 1000 deg. F. in the former case, and 142 deg. in the latter, and observe that this heat absorbed (or given out in the reverse changes) does not vary the temperature of the substances undergoing the change. In this way we ascertain another law of heat, called the law of *latent heat.*

We observe again, making our measurements with extreme care, that *different* substances expand *unequally* with the same addition of heat; and, therefore, that there are specific differences between substances. In this way we read off what is called the *specific heat* of those substances, and, by comparing, arrive at its general law. The chemical philosopher, with this law and its details in mind, observes that there is a close relation between these specific heats and the combining weights of elements, so exact that one is directly deducible from the other. Thus he opens a new chapter in the chemistry of nature; or, rather, nature throws a flood of new light into his mind.

When searching out the constitution of matter, he simply divides the compound into its constituents, by processes carefully studied, and then weighs those constituents, having balances that will weigh to thousandths of a grain. By weighing in one case after another, and setting down the amounts, he reads, again, a grand truth, that the elements and their compounds have definite combining weights. Then, pursuing it farther, the law of simple ratios, in the combinations of each element, is deciphered.

The investigation of nature is thus carried on by applying our weights and measures, as much so as in measuring a piece of cloth or weighing a pound of lead; and the generalizations, called laws, are the results of comparisons among these measurements. The mind rises, through natural induction, from specific to comprehensive truths.

Another example, bringing out a few facts in the history of chemistry, will exhibit the contrast between this style of philosophy and that egotistic method which puts its own conceptions in place of nature.

Chemistry made its earliest beginnings as a science in the last century. Then man first commenced to read nature on the subject. There had been mingling of acids and salts, and much torturing of nature to wrench out impossibilities, or obtain chance-results. But until then, there had hardly been one who was willing patiently to find out the letters of the alphabet and seek for word after word until a sentence was deciphered.

One question came up about the middle of that century: Why magnesia or lime was sometimes caustic and sometimes not? It was the subject of profound thought: mind went at it with vigor, and proved itself finite. Dr. Black took a given quantity, by weight, of the magnesia of the shops, not caustic, and heated it in a retort; it became caustic, as usual, from the action of heat. He then weighed it, and found it had lost weight, showing that something had gone from it as a consequence of the heating, and here was a probable cause suggested; something invisible, and therefore *gaseous*, had escaped. Thinking to obtain the gas, he tried an acid upon a portion of the original magnesia, and succeeded; he called it *fixed air*, as it was air or gas fixed in the solid state, — a great truth for the age. This was the first knowledge of *carbonic acid*. Then, by simply collecting the gas, as it escaped during the heating of the magnesia, he obtained the same *fixed air*, and completed the chain of evidence. In this way a sure step was taken towards a knowledge of the cause of causticity, and real progress made in chemical science.

The change of the metal mercury to a black or red earthy substance in different processes, had long puzzled the alchemists, and was among the facts that suggested the idea of the transmutation of the metals. No mind among the many that had delved within their own precincts or indulged in hap-hazard observation, had solved the mystery. Priestley

took some of the *red precipitate of mercury* and exposed it to heat in a small flask, having made arrangements for collecting any vapor or gas that should pass off. Air, he says, was readily expelled, showing that the red mercury contained a gaseous ingredient in addition to mercury. He examined the air, found, to his surprise, "that a candle burned in it with a remarkably vigorous flame," and thus brought to light the gas *oxygen*. He obtained the same result with *red lead* and some other substances.

By similar searchings, Priestley made additional discoveries; experimented on the composition of the atmosphere and the respiration of plants; and, in this last research, first opened out to the world the grand fact, that vegetation, by contributing oxygen to the atmosphere, counterbalances the reverse influence of the respiration of animals. Bergman, Scheele, and others, added to these facts; and before the century closed, Lavoisier pointed out the true relations of oxygen to other elements, and its part in combustion, giving the science of chemistry its first distinct shape or system.

The world had had its millions and millions of minds for nearly fifty-eight hundred years, and conceptions respecting nature had followed conceptions; yet the efforts of human genius, in this line, had accomplished almost nothing. We see mind alone utterly impotent; but at once becoming mighty when taking nature (that is, God's display of himself in his works) as its guide and fountain of strength.

Thus, by readings of nature, chemistry continued its progress. Law rose into view beyond law. Electricity, magnetism, attraction, became terms representing systems of laws.

And it is clear, to the student of science, where research is still tending; — not to a demolition of these systems, but to simpler and wider enunciations, embracing the laws now known, as subordinate propositions or principles; NOT TO PROFOUNDER AND PROFOUNDER ERROR, NOR FROM ONE SPECIOUS ERROR TO ANOTHER; BUT, BY AN ELIMINATION OF ERROR, TO HIGHER AND HIGHER TRUTHS.

(4) The contrast between the kind of philosophers illustrated, and the "elephant" breeders of old or modern times,

is sufficiently obvious. The world owes more curses — if curses were ever right — to these pseudo-philosophers than to any other class of men that have existed. Yet we would be slow to blame, knowing the strong proclivity to such error in the human mind. Bergman, in the latter half of the last century, well observed: "A tendency to Cartesianism still exists; and, upon attentive consideration, it will not appear wonderful that the human mind should delight to indulge in this method; for, on the one hand, the way of experiment is expensive, troublesome, and tedious; all minds, therefore, are not capable of enduring it; many are without the proper instruments; others want the necessary dexterity: but the most universal defect is that of patience and perseverance, so that if the experiment does not at once succeed, it is abandoned in disgust. Man in his ordinary state seems, by nature, prone to indolence. On the other hand, the contemplative method favors the desire of knowledge. By pretending to unlock the secrets of nature with ease and expedition, it soothes the natural rage of explaining all things; and by supposing everything accessible to the human intellect, administers pleasing flattery to vanity and arrogance."

The chains thrown around the mind by this species of philosophy have been one of its most depressing means of bondage. At the time when the first aspirings of chemistry were about to make themselves apparent, in the seventeenth century, even a hundred years before Priestley wrote, a true theory of combustion was well nigh reached through the researches of Hooke and Mayow. But not long after, as the century drew towards its close, the hypothesis of *phlogiston* was ushered on the world by Beccher and Stahl of Germany. Offspring of aspiring mind, it haunted like a nightmare the opening science, blinding Priestley, Bergman, and others, to the true bearing of the facts they observed. And not till many an investigator had gone to nature for truth, and facts had been largely gathered in, to the help of the science, was the evil power destroyed and chemistry left free to expand.

The same disposition to give the fancy wings, is still ob-

structing progress. But light is so far let in upon science, and observers have so multiplied all over the civilized world, that the baneful influence is now comparatively short-lived, if not confined to its author. The reverence for truth, which the study of nature inspires, makes scientific men critics upon one another; and it is now well apprehended that there is a common court of appeal as to truth, — even nature herself. The written law is not more decisive in its judgments, than the law of God in his works; and it cannot be more faithfully regarded than the latter, by true students of nature. They know whereon they stand; and they rejoice in the light that is daily coming to their minds from the eternal source of all light.

Mind was long in the world in ignorance of the world. It lay dreaming of the deep unknown, taking only dim and lazy views into the darkness around. Latterly, it has broken loose from the case in which it was revolving upon itself. It has found that God's hand is outstretched to touch our blind eyes, and help us onward; that the way is strown with flowers, gushes with fountains of wisdom, and leads directly towards the eternal throne. By making use of the proffered means, mind has greatly enlarged its range, and that range is still extending.

(5) But there are remains of the old obscurity, profound depths, indeed, in which sight fails of distinct images; and the complete dissipation of this obscurity cannot be hoped for, although circle after circle may be gradually penetrated by science. This is a dream-land, into which mind may take its excursions; yet the true philosopher will think deeply, and speak cautiously.

To this dream-land, moreover, there is a limit, beyond which mind cannot go, even in its fancies; for, in making the attempt, it only turns back upon itself. The leadings of nature offer no aid to those who would pass the boundary. On the hither or finite side of that limit are the laws of matter, which mind is exploring; on the farther or infinite side, the essence of matter, out of the range of knowledge. On the finite side are the laws of mind; on the infinite,

spirit in its nature or essence. On the finite side, created things and laws of progress in creation; on the infinite, the mode of creating matter or the living germ or spirit, and their period of origin.

The beneficent Author of all things, through the way already mentioned, offers us help, it is true, in looking upward beyond the sphere of nature; but only along one line, and that for the soul rather than the intellect, — presenting to view the moral attributes of God instead of his creative power, teaching the spiritual relations of man rather than the spiritual essences of existence in general, and lighting the pathway to eternity instead of opening the spirit-world to our gaze.

We may, even now, go many stages on the way towards the boundary of knowledge; but only presumption will think to pass that boundary. Analogies from matter or corporeal existences have been appealed to in reasonings on spirit; but no satisfactory ground for faith in such reasonings can be shown, and not even a moderate degree of presumption in their favor. We may conceive of spiritual entities preceding material living forms, and thus believe we jump the line and comprehend creation the better. But it is a conclusion without premises, like the old "elephant;" a figment of the mind, and not a truth educed from any sure source of knowledge. Of those who talk of such entities, they alone are consistent with the laws of the mind who claim, like Swedenborg, to receive their views by direct Divine communication; and the defect in such a case is, that the claim is not substantiated. It is only a claim, and worth little as a basis for faith.

(6) Treatises on science of the present day touch but lightly upon the hypothetical, and draw a broad line between ascertained laws and suspected truth. FARADAY, of England, is one of the faithful students of nature, ever interrogating, never dictating. Voluminous as his writings are, he has published few pages which are not directly based on readings from nature. In his interpretations, he acknowledges that he may, sometimes, be mistaken. But he turns back and

reads and compares, with untiring scrutiny, sure that the truth will sooner or later speak audibly to the willing ear.

The philosopher, worthily so called, has faith in God; faith in nature; a subjection of self to the love of truth; unflagging patience in investigation; a clear apprehension of the true perspective among facts and principles, and of the resemblances, analogies, or harmonies they present, — in which faculty lies his inspiration and his inventive genius; and a cautiousness in testing all analogies, not by their seeming beauty, or by abstract argument, but by strict appeals to observation: — perfections, it is true, not often combined in one individual.

We could wish that all who are sedulous in reading the first revelation, were imbued with the truths of the written word, which so vastly transcends nature in its displays of God and in its ennobling view of man. The philosopher who can look upward with filial affection, whose soul is a fountain of love, supplied from the eternal fountain through Christ our only salvation, whose aim is truth, that he may better fulfil his duty to humanity and rise to a more perfect union with the Source of all truth, finds nature glorious with the reflection of the Divine image, and the Bible more sacred and sublime through nature's revealings of God the Creator.

But if all are not thus instructed, it is still true that, in no profession but the clerical, in our land, is there so large a proportion of religious men as in that of science. The charge of infidelity, as characterizing the savans of the nineteenth century (implied in the unqualified remark of Professor Lewis, on page 107 of his work), is most unjust to the scientific men of America. Who are these infidels? Is Prof. Silliman, father or son, or President Hitchcock, of the number? or Professor Henry, the able physicist; or Professor Mitchell, Alexander, or Olmsted, among astronomers; or Gray or Torrey, the most distinguished of American botanists; or Redfield, one of the first of meteorologists; all of whom, besides many others, are members, "in good standing," of the same division of the church with Professor Lewis? Is Professor Peirce, preëminent in mathematics, whose writings are quoted

at the head of this Article, among the contemned savans? or Professor BACHE? But it is invidious to cite names; the charge needs no refutation. Professor Lewis would probably say that he did not mean such men, although his slashing sentences strike right and left, without discrimination. Who, then, are these infidels?

A weak book has recently come forth under the garb of science, to which he would probably point. But it betrays its unscientific character in wanting, completely, the cool argument and well-arranged facts of the philosopher, while its pages abound, on the contrary, in vituperations, sneers, and expressions of contemptuous triumph, which show hate to have been the prompter, and not a love of truth. Professor Agassiz's short contribution to the volume is wholly different in its spirit, and is, in fact, altogether out of place, as we believe he himself now regards it. The subject — The Unity of the Human Race — is assuredly a proper one for scientific investigation; this, indeed, has been freely admitted, as regards those who take what is deemed the right side, for facts and reasonings from nature have long been appealed to, in its support; and assuredly he who calmly endeavors to ascertain the exact value of these reasonings by reference to nature, is not, for this, to be denounced. No one but a coward in his religious faith, should fear the result of the freest discussion. We believe that the commonly accepted view will be sustained; but we would not, as we wish truth to prosper, desire those interested in the research to relax one iota of their efforts: "for, if this counsel or this work be of men, it will come to nought; but if it be of God, ye cannot overthrow it" (Acts 5: 38, 39).

Science is often charged with pantheism. But intellectual philosophers first gave the monster birth, long before this age of "infidel Geology." It is a natural product of that philosophy which takes its own visions for truth. And if science found pantheists to interpret her laws in a pantheistic way, does it prove that *science* is infidel? The intellectualists imposed upon her their own folly, and upon them should fall any deserved imprecations. From pantheism

science has fairly escaped, by her own native growth; and, moreover, she is unsettling the very foundations of pantheism itself, through the evidence she affords of a personal and omnipresent Deity, benevolent as well as omnipotent, and the indications everywhere discerned of a spiritual purpose in creation.

The world of mind unavoidably suffers from all false philosophy; and if the infidelity from this source were duly considered, and that also prompted by the natural propensities of man, whatever his pursuits, science, in comparison, would be found to be chargeable with little of the evil. The fact that bad or deceived men now and then misuse her developments, or that wrong deductions are sometimes made, is no apology for the ill temper that often assails science, or the timidity that watches her progress. The scientific writers in our language that aim to exalt the Bible in their works, greatly outnumber those that publish words of detraction. From the past comes the lesson, in distinct utterances, that if her announcements are not of God, they will speedily 'come to nought,' *science herself being the judge;* for her errors have, in no instance, been corrected by outside philosophers. And she makes the needed corrections in far shorter time than happens among intellectual theorists, a few years at the farthest sufficing to erase a false conclusion, while ages have felt the gloom of an error engendered of pseudo-philosophy. Her face is towards the light of truth, and brief are the passing shadows.

After this exposition of the nature of science, its modes of progress, its aims, its limits, and its men, we return now to the subject with which we started, — the influence of the views brought forward in "The Six Days of Creation." Our first proposition, that it exhibits the relations of the Bible to science in a false light, and thereby tends to promote the rejection of the Bible, is abundantly established. But this, it might be said, is involved rather in the drapery of the book than in its principles. Although the two may not be easily disentangled, we will now endeavor to direct attention to its cen-

tral ideas, and, if we do not greatly mistake, shall show that the term "infidel philosophy" was not misapplied.

But one word, first, on the recent Letter of Professor Lewis written in reply to our review. The author implies in this letter, that we have mistaken him on many points. Unfortunately, the quotations he himself makes from his "Scriptural Cosmology," leave the reader's mind in a quandary as to the actual opinions held, the assertions looking one way and the quotations another. We will give the work another chance to express its views, as they stand, by farther citations. As to its obvious teachings, we believe we were right; and, if our readers would peruse the volume, we should have no occasion to add to our remarks. One point in his theory of nature we passed over without giving it a paragraph; we will try to do it justice beyond. Before taking up these subjects, we may mention an example or two of the mode of argument in the Letter.

In our review we observed that, in the scriptural cosmology of Moses, there was, on the sixth day, the creation of "cattle, creeping things, and beasts of the earth," as well as of man; while in the "Scriptural Cosmology" of Professor Lewis, only the creation of man is alluded to, when considering the same day. The author replies, that his object "was not to talk about mammalia," but to explain the use of the word *day*, — an explanation of his state of mind, but no good reason for departing so widely from Moses, in an exegetical work. Substitute for "mammalia" its signification "cattle, creeping thing, and beast of the earth," and the scope of the sentence will be appreciated, while it will have lost its point.

Again, he says, speaking of the creation of man: "The general expressions of formation, as also the word *Adam*, it is well known, have been interpreted (and by authority which Professor Dana eulogizes) of the creation of man generally, or of races, or of many individuals under one general classification, instead of *one* single pair, made to be *one* centre of life for all humanity." The sentence seems to imply that Professor Dana eulogized the authority spoken of,

on the particular point referred to; which is not, in any way or sense, true. This may be deemed an ingenious mode of reply; but is it ingenuous?

We pass on without further interruption of our course of argument.

The erroneous notions respecting science in both the warp and woof of the volume, were illustrated in our former Article. But that they may be distinctly in mind, we again refer to some of the author's statements. We thus read: "What is it, after all, that she [Science] has given us, but a knowledge of *phenomena*, of appearances? What are her boasted laws, but generalizations of such phenomena, ever resolving themselves into some one great fact that *seems* to be an original energy, whilst evermore the application of a stronger lens to our analytical telescope, resolves such seeming primal force into an appearance," etc. (p. 107). "Science may boast as she pleases; but, according to her own most vaunted law, she can only trace the footsteps of a present or once passing causation" (p. 220). "Science is ever showing not only its phenomenal character, but its utter deficiency, when we would make its conceptions identical with, instead of representative of, the fact or facts" (p. 120).

This language is sweeping; and if the author, as may be alleged, had reference only to effective causes, the least we can say is, that, in his ignorance of science, he was not aware that there were any stable laws. In his P p_1 p_2 p_3 $p_4 \cdots p_n \cdots X$, representing error succeeding to error as a necessary result of research, and in his denunciations of the "boasted laws," he evidently aims to shake down the whole fabric of science, deeming it the best way to get rid of its "infidelity."

But, regarding only effective causes, what is there under the terms Heat, Electricity, Crystallization, that is to fall to pieces or vanish away? What is the law, or cause, that is to turn out an "elephant?" The precise nature of Heat, Electricity, Attraction? Suppose a change on such a point, how much of these sciences, that is, of their recognized

laws, would be disturbed or unsettled by the catastrophe, or become an "appearance?"

When an error is discovered in any deduction, science does not name it an *appearance*, a *phenomenon*, but honestly proclaims it an *error*. The conceptions of "phlogiston" and "vortices" were, from the first, false conceptions, and never represented appearances or phenomena. It is true that there were certain appearances, supposed to correspond to the notion of phlogiston; but even the appearances turned against the conception, and it dropped from the world as a blunder engendered through the "elephant" philosophy. The old "elephant" was a false conception, a product of the human mind laboring with itself; and so it was to the end. "Crystallization" is a term standing for the process by which such appearances as crystals are produced, or for the phenomena of the forming of crystals. But the threatened transformation of crystallization, at some future period, into an "appearance" or "phenomenon" is to us unintelligible.

These terms, "appearance," "phenomenon," "conception," in the author's lexicon, mean anything or nothing: *appearance* stands, in fact, for an *actual* or a *false* appearance, or anything the mind has conceived to have been, or to have represented, an appearance, — senses which it can be admitted to have only in a system of philosophy profoundly sceptical.

Science, as we have said, admits that about its confines there is the doubtful, the imperfectly interpreted part of the volume of nature; and is ever looking for more light. But is it true that the human mind is so made, or so adapted to nature, that it can attain only to false theories or laws? or, as regards the profounder causes, that the progress of study is tending, not, as science claims, to an elimination of error and a clearing away of doubts, but, as Professor Lewis holds, to deeper and deeper errors, in endless succession? that the Systema Naturæ which Science believes she is bringing out to view is only a rickety structure, ever tumbling to pieces? that there is no foundation for full faith in the teachings of nature, or the deductions of the human mind

therefrom? If such be actually the end of man's contemplations of the works of his Maker, he would be forced, in just indignation, to write FALSE over the whole face of nature, and to replace the word GOD with that of DEMON. The enlightened mind, perceiving the fatality under which it exists, would naturally sink into hopeless scepticism, as its own powers would be impelling it irresistibly to error. God in nature could not be recognized, and the Bible could have defenders only among the superstitious and unreasoning.

Such is the philosophy we find penetrating through and through the "Scriptural Cosmology;" and this is *a second way in which the influence of Professor Lewis's work is infidel.*

In our review, we explained the general points in the system of nature which Professor Lewis has espoused. We alluded to the plastic power in nature, "given originally by God," her supposed "tendency to decay," and need of revivification from the presiding Deity; her reanimation, or endowment with new powers, at intervals, by "a sudden flashing in of the extraordinary or the supernatural" (p. 98); the introduction and development of generic germs, and the elimination of "species from species." Professor Lewis would have his readers now understand that all his development theory was an *if* in his work. "There is much virtue in an if," and some convenience. It appears here like the cautiousness of one afraid of the judgment that might be passed upon his orthodoxy. We have looked over his work again, and find the theory staring at us in many ways, being argued out warmly and with various apologies; and assuredly the author, like many a lawyer, has presented the wrong side well, if not its real advocate. It falls into his theory of nature so nicely, that it evidently seemed to him to be very naturally a part of it, and worthy of being true if not so; indeed, no matter what science says, or how startling the idea to theologians, he obviously deems it a very good idea, and very probably true. Not one reader in a thousand would gather any other opinion than this from the work.

In his Preface, page v., he says (with truth and apparently

a little uneasiness), "What will most startle some readers, perhaps, is the manner of connecting the Platonic ideas with the unseen entities mentioned by the Apostle;" and again, on the same page, "God makes types, and nature prints them." On pages 3 to 11 he lays out his plan, and, among his heads, enumerates this (p. 11): "The Physical Origin of Man, and what is meant by his being formed from the dust of the earth." On page 40, where he says, "the great generic beginning of animal life may have had many specific beginnings accompanying and following it," the development theory is plainly alluded to; and similar hints appear, at intervals, beyond. Then, in chapters 16, 17, 18, where animal creations are considered, he pronounces "a development theory of species from species" pious enough, and shows how it may be the working of predetermined laws, like that of the "Vestiges of Creation," only originating in the Deity. He closes his explanation of the theory as follows:

"It would be the same *word* repeating, yet expanding itself in every ascending species, just as it is the same specific word repeating itself in every individual birth which the laws of the maternal nature are ever bringing out from the seminal energy" (p. 214).

Then, after thus expounding what science has shown to be false, he continues as follows: —

"What Science would say to this, we do not clearly know, nor are we much concerned about her decisions. An immense time, as well as an immense accumulation of data are required to give them any claim upon our confidence. Neither, on the other hand, if it be most in harmony with the language of the Bible, would we be concerned about the charge of naturalism. A development theory which has no divine Word, is indeed atheism. That which acknowledges only one divine origination, and this from the logical necessity of getting a starting-point for physical speculation, is as near to atheism as it can be. It hath said in its *heart*, There is no God; and the only thing which prevents it from being also the conclusion of the mere scientific intellect, is this logical impediment, which God has mercifully put in its way. But a development theory, in the sense of species from species, as well as of individual from individual, may be as pious as any other. It may have as many Divine interpositions as any other. It may be regarded as a method of God's working; and that, too, as rationally and as reverently as the more limited system to which we give the name of *nature* in its ordinary or more limited sense. *Modern theologians have been too much frightened by certain assumptions and speculations on this field*" (p. 214, 215).

Again, that he may be fully understood (for we would not, knowingly, misrepresent), we quote from the following page:

"It is enough for us to learn, without doing any violence to the language of the account, that the production of the vegetable and animal races are set forth as having been originally a φύσις, or growth — a growth out of the earth, and by and through the earth; in other words, a nature with its laws, stages, successions, and developments.

"There was a previous nature in the earth, whether it had been in operation for twenty-four hours, or twenty-four thousand years. We may compare this to a stream flowing on and having its regular current of law or regulated succession of cause and effect. Into this stream, we may say, there was dropped a new power, supernatural, yet not contra-natural, or unnatural, varying the old flow and raising it to a higher law and a higher energy, yet still in harmony with it. New causations, or new modifications of causation, arise; and, after the successions and steps required, be they longer or shorter, a world of vegetation is the result of this chain of causation in the one period, and through an analogous if not similar process, an animal creation arose in another. Our mode of argument may be denounced as metaphysical, and yet it is but the analysis of a common thought which every man, who examines his own mind, will find that he has in connection with the words *nature*, *growth*, etc.; or the terms that, in all languages, grow out of roots corresponding to those that are here employed in this plain narrative of the Bible."

In the following chapter, he arrives at the profounder conclusion, which we did not discuss in our former review, that spiritual entities preceded material forms. The reader will find the views, at large, in the work; we cite only two or three passages.

Speaking of the principle sustained, he says:—

"It is neither more nor less than the essential act of faith, as Paul sets it forth, Heb. 11: 3, in which we believe that "the worlds (τοὺς αἰῶνας, the æons or ages) were brought out, in order, by the word of God; so that the things *that are seen* were made [or generated] from things that *do not appear*" (ἐκ μὴ φαινομένων). That is, the outward or phenomenal entities were generated born or (γεγονέναι) from the invisible, immaterial, vital powers, principles, laws, σπερματικοὶ λόγοι, spermatic words or ideas, call them what we will, which are, themselves, the first and immediate creations of the Divine Word going forth, before any new agency of nature, whether the universal or any particular nature"[1] (p. 224).

[1] We leave it to others to criticize the liberty taken with the Greek version in transposing εκ and μη in the phrase "εκ μη φαινομενων."

Then, on a following page, in the same chapter: —

"To apply all this to our present argument, we would say, with all reverence, that here, in the works of the third and fifth days, or in the production of life from the earth, the "unseen things that are understood," are the created ideas, or types, the divine seminal powers which are anterior, in time as well as in order of existence, to all natural or outward manifestation" (p. 230).

"However progressive and natural the after-production from the earth, the creation of these seminal types or principles was wholly supernatural, immediate, divine. We do not hesitate to use here the sublime expression of Plato; for we regard it as akin to the thought which Paul presents, in the Eleventh of Hebrews: "God is the Maker of types (τὸν τύπων). He is the architect of ideas;" but not as barren thoughts or speculative theorems. Along with the law and constitutive of it, there is the plastic or formative power, the ruling or directing energy. This, there is no absurdity in saying, was put in the earth to grow; for it means, that by a new power, then given, the earth was made to bring it *forth* or *out*, that is, give it birth in *outward material form*. This was the *genesis* of the first vegetation" (p. 231).

"There is a spiritual reality — shall we shrink from using the term? — or, at least, an immaterial entity, in all, even the lowest forms of vegetable as well as animal organization. * * * * Call it law, idea, power, principle, whatever we may, it is a reality, a high reality, the highest reality connected with the material organization; and this it is which God made before the tree was in the earth," etc. (p. 232.)

Finally, he shows in another chapter how man, as regards his "physical nature," *might* have conformed to the development theory of species from species. We cited his cautious statement in our review. On the next page of the "Cosmology" (p. 249), he adds: —

"From an old organism, there might thus have been made *a new man*. On this head, however, the Bible gives us no distinct information. We can merely say, it *seems* to imply an immediate formation, even of the material nature, as though man were altogether a new thing, wholly severed from all physical connection with any previous states of being; still the language is not inconsistent with the other supposition. In fact, the mention of earth as the material from which the body was made, would appear to intimate some use of a previous nature, together with the laws, the growths, the affinities, the established on-goings, of such previous nature."

Again, on page 251, he says, as he has cited in his recent Letter, that the creation of woman suggests another origin for man's physical nature; but he does not use the fact to

point an argument against the development theory. On the contrary, he aims to take off the edge of the argument which the creation of Eve suggested to his mind; for he continues directly on with the sentence: —

"Still, however formed, there is a deep significance in the phrase "from the dust of the earth." High as may be our celestial parentage, we have an earthly mother. The most touching appellations, in all languages, are expressive of the idea. Man "is of the earth, earthy." He is *Adam*, he is *homo*, *humus*, *humilis*. If he has a spiritual life that connects him with the higher worlds, he has also an animal, and even a vegetable life, that links him with all below."

Then, as if to relieve the pious mind, that had been accustomed to higher thoughts of man's origin, he admits the doubt, and adds a word of comfort, as follows: "Be it, then, when it may and how it may, it is the inspiration of the higher rational life that is the true *beginning* [his own italics] of our distinctive humanity."

Now, why this long disquisition on the development theory, in an exegetical work illustrating a portion of the Bible? Why does the author continue dallying with the subject, until he has suggested that man's body might have been a brute's corpus ennobled? Simply to present, as he states, an "hypothetical argument," in which he meant only to say, "If the Scriptures had clearly taught it, there would be nothing monstrous or incredible in the view?" Would it not be more natural for a disbeliever in the theory to say, Since neither the Bible nor nature teach it, the view *is* both monstrous and incredible?

In fact, the cyclical view of nature, with its spiritual entities and the theory of development, constitutes the fundamental idea of the work, to which all about *days* and *time* is subordinate. To the absorption of the author's mind with this idea, may be attributed the negligent way in which he follows the record in Genesis, giving prominence to those points that bear on the theory, and quite overlooking much that ought to have been brought out in an exposition of the Mosaic narrative, or the true scriptural cosmology.

Science shows, with regard to plants and animals, that God

instituted types; that is, his purpose or plan of creation, embraced certain type-ideas; and that these type-ideas had expressions in entities, when represented in material forms, such as plants and animals. Of any previous existence of created types as spiritual entities, from time to time developed, it tells us nothing. On the contrary, it declares as plainly as it can, that the type-ideas were only purposes in the great unfolding plan of the omniscient Creator, with whom there could be no after thought.

In illustration we direct attention, for a moment, to the Vertebrate type. Consider the range of animals: fishes, reptiles, birds, quadrupeds, man; and conceive, as far as possible, of the type-idea for the vertebrate section of the animal kingdom. This type-idea has been viewed by science, in the light both of existing species and geological history. It has been shown to be represented by a consecutive series of vertebræ, having a brain at the anterior extremity, a bone-sheathed cavity along the back for the great nervous cord, and a larger cavity below, ventrally, for the viscera; and involving in its successive expressions in material forms, modifications of these parts according to a predetermined plan embracing in its purpose systems of subordinate types: these modifications corresponding to variations through coalescence or multiplication in the number of vertebræ, variations of length, form, etc., in their processes and appendages, and analogous variations also of other parts in the type-structure.

The vertebrate type-idea was expressed first in fishes; then in amphibians, reptiles, birds; then in quadrupeds; and finally in man, the last of the series,—the succession taking place according to a system, as mentioned in my former Article. Geology declares, unequivocally, that the new forms were new expressions, under the type-idea, by *created* material forms, and not by forms educed or developed from one another. It also teaches that the first expression of the type-idea, that is, the Devonian fish, suggested a view of the type very inferior to that we now gather from the great range and diversity of existing vertebrates; and our modern species

express a view far below that which the mind derives from the whole series of vertebrate creations in the grand unfolding plan of past time. Thus we learn, from geological history, that in the succession of events, step followed step in progressing order, and ever-rising harmony and grandeur. The material manifestations of the type-ideas were successively made in the progress of creation.

But as to spiritual entities preceding by a period of time the material manifestations, we gather no hints, either from nature's teachings, or the Bible reasonably understood. They are obviously a product of ambitious mind, revolving upon itself, and imagining that, in the movement, it is making progress; and all such efforts of the mind can only produce "elephants." The author denies a knowledge of science, denounces its laws, and the result is, as might have been expected, a clumsy fifth wheel that nature disowns.

In striving to fasten upon the Bible a false development theory, and the idea of nature as a nursing mother, is not the "Scriptural Cosmology" anti-scriptural?

This is *the third way in which the influence of the work is plainly infidel.*

Had any man of science propounded, in a scientific treatise, the very same view of nature, and the same development theory of species from species, admitting the Deity near by, that there might be, at times, "a sudden flashing in of the extraordinary," and also to plant generic germs or spiritual entities, and raise nature from the decay to which she tends, denunciations would have assailed him from every direction. These views have come from one writing as a Biblical student; and even religious Journals, claiming to be guardians of sacred truth, have been so led away, as to abuse science for exposing the doctrines of the author.

The influence of the work in the country we, therefore, pronounce to be largely infidel; infidel through its denunciations of truth and of truthful men; infidel through its teaching that error is the unavoidable end of science; infidel through its theory of nature and its degrading and degraded development theory.

Such an influence, Professor Lewis would regret, we doubt not, as much as any one. He has endeavored, in his writings, to sustain and magnify the word of God. He has brought to the task a mind rich in classic learning and imbued with firm religious faith. He has erred, not in purpose, but, like many others who have disdained science, by regarding mind as, of itself, an absolute source of knowledge with regard to nature, instead of a dependent agency deriving light through the works and workings of God around us. He enjoins humility on the man of science, and will undoubtedly admit that we should all be humble. And if we have not partly failed in our end, he will acknowledge with us, that, in becoming humility, we should seek for knowledge from nature, before attempting to expound her laws, taking God's manifestation of His power and wisdom as our guide to physical truth, as God in Christ is our source of spiritual truth, our light, our life, and our eternal joy.

ARTICLE VIII.

NOTICES OF NEW PUBLICATIONS.

I. THE ROMAN EXILE.[1]

THIS is a volume of rare interest. We had anticipated its perusal with much pleasure, but we have received more delight and improvement from its pages than, in our partiality for its author, we had ventured to expect. Dr. Gajani was educated at the University of Bologna. He is a gentleman of a clear, active mind, excellent culture, and sound religious principle. His charming simplicity of character shines through his style of writing, and delights those of his readers who have no personal acquaintance with him,

[1] The Roman Exile. By Guglielmo Gajani, Professor of Civil and Canon Law, and Representative of the People in the Roman Constituent Assembly in the year 1849. Boston: Published by John P. Jewett and Company. Cleveland, Ohio: Jewett, Proctor and Worthington. New York: Sheldon, Blakeman and Company. 1856. pp. 450. 12mo.