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ORDINARY MEETING, MAY 7, 1883.

H. CADMAN JONES, ESQ., IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following elections took place :—

ASSOCIATES :—The Right Rev. J. W. Beckwith, D.D., Bishop of Georgia, United States ; the Rev. E. F. Burr, D.D., United States ; Rev. W. A. Candler, United States ; Rev. E. A. Hildreth, United States ; G. Watson James, Esq., United States ; J. P. Maclean, Esq., United States ; Rev. T. M. B. Paterson, Scotland ; Rev. Professor E. B. Thwing, United States ; Prof. H. Shaler Williams, United States ; Rev. H. Woodward, Liverpool ; Rev. W. F. White, Stonehouse ; Miss Beales, London.

Also the presentation of the following works for the library :—

" Proceedings of American Geographical Society."	*From the same.*
" American Antiquarian."	*From the Editor.*
" Mound Builders," by J. P. Maclean.	*From the same.*
Two Works from the library of the late W. H. Ince, Esq.	*From Mrs. Ince.*

The following Paper was then read by the Author :—

Dr. J. L. PORTER.—Some years ago Professor Tyndall delivered the opening address at a meeting of the British Association, held at Belfast, and it produced a great and serious effect, especially on the working classes of Belfast, and also on the public generally throughout the north of Ireland. I had an opportunity of meeting with a very large number of students in a college containing nearly six hundred, and I found that fully one-third of them had been more or less affected by the address in question. This will explain, to some extent, the origin of the paper I am now about to read.

THE TEACHING OF SCIENCE NOT OPPOSED TO THE FUNDAMENTAL TRUTHS OF REVELATION.

—By the Rev. J. L. PORTER, D.D., LL.D., President of Queen's College, Belfast.

THE controversy between Science and Revelation will probably go on indefinitely. Science is advancing with rapid strides, new facts are being discovered, new truths developed, and new theories in still greater numbers are being propounded. Biblical criticism also is not stationary. Sounder canons of exegesis are now adopted ; while researches among the monuments and records of Egypt, Assyria, Babylonia, and Palestine, are year after year shedding fresh light upon the languages, history, literature, and teachings of the

Bible. It is not strange, therefore, that new subjects of controversy should spring up, and new difficulties meet us from time to time, as we attempt a critical survey of the border-land of Science and Revelation.

After a somewhat minute examination of the whole question I have been led to the conclusion that the alleged differences between Science and Revelation are only apparent. They originate mainly, on the one hand, from confounding the theories of scientific men with the demonstrated facts of Science itself; and, on the other hand, from a misunderstanding of the real teachings of the Bible. There is what may be called a traditional interpretation of certain portions of the early books of the Bible, which does not agree with the results of modern criticism; and we must be careful, in these days, to distinguish what is merely traditional from what is now known to be the real sense. I feel myself fully justified in affirming that there is no real discrepancy between scientific facts logically proved, and Bible teachings rightly interpreted.

Much evil has arisen from parading the crude theories of scientific men before the world, as if they were established facts. We have, for example, the atomic theory of the old philosophers, Leucippus, Democritus, and Lucretius, which proposed to trace the origin of the universe—the stars in their wondrous orbits, the delicate organisms of the vegetable world in all their variety and surpassing beauty, animals of every species, man himself with his genius, his culture, his aspirations after immortality,—to trace all to a fortuitous concourse of material atoms; thus setting aside, by a stroke of imagination, the idea of Creation and a Creator. It is right to observe that physical Science in propounding such a theory as this virtually contradicts itself, for its own principles forbid it to entertain an inquiry into the origination of things. It is concerned with the observation of material objects, and its legitimate investigations continually suggest the existence of some unseen power dominating matter, and of some supernatural beginning of the universe of nature as it now exists.

Then, again, we have theories of the origin of life, developed with so much skill and ingenuity by Huxley and others, in their exhaustive researches into the mysteries of protoplasm—researches which, unfortunately, fail them just at the point they wish to establish, namely, the evolution of life from dead matter. Their own researches show, as far as they go, that pure materialism has no sound philosophical basis. We have also the theory of the origin of species from natural selection and the survival of the fittest, propounded by Darwin, and illustrated by a long series of observations and experiments,

which have justly gained for their illustrious author a first place among naturalists. But Darwin himself never said that his arguments amounted to absolute proof. Then we have the most wonderful theory of all, propounded in glowing language by Tyndall, that "not alone the mechanism of the human body, but that of the human mind itself—emotion, intellect, will, and all their phenomena—were once latent in a fiery cloud." We need not wonder that, after enunciating such a dogma to the assembled scientific magnates of the British Association, he should have intimated that to man there is, or may be, no future, except "to melt away into the infinite azure." * To this may be attached another theory of a kindred type, that there is nothing in this world of ours but matter, force, and necessity; and that consequently, as Huxley has put it, "the thoughts to which I am now giving utterance, and your thoughts regarding them, are the expression of molecular changes in that matter of life which is the source of our other vital phenomena."† All these, it will be observed, are *theories*. No scientific man of recognised position will affirm of any one of them that it is an established fact. It is useless, therefore, as I shall show more fully in the sequel, to argue that the truths of Revelation are, or can be, affected by them. It is with the facts of Science alone that we have to deal.

We shall now consider for a moment what are the teachings of the Bible upon those great problems which lie on the border-land of Science. There is, I venture to think, no little misapprehension prevailing with regard to them. The Bible is not a systematic treatise upon theology, much less is it a text-book of Science. Its teaching was progressive, beginning with simple elements and gradually developing truths more and more clear, and more and more profound, during a long succession of ages. God revealed Himself in His nature and providential dealings at such times and in such ways as man required the revelation. Another marked characteristic of Divine Revelation was, that its language was largely figurative. The fundamental truths of salvation were at first chiefly embodied in types and symbols and metaphorical language. The great doctrines were not as a rule laid down in logical propositions, but were shadowed forth in symbolic acts, the real significance of which could only be ascertained by spiritual illumination. These must all be interpreted, not in their literal, but in their symbolic or figurative sense.

So, in like manner, we are warranted in interpreting certain

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* Address at Meeting of British Association in Belfast.—*Original edition.*

† *Lay Sermons*, p. 138.

portions of the language of the Bible which refer to and describe the phenomena of nature. Its teaching upon those subjects was also to some extent figurative and symbolical; and it is important for our present purpose that we carefully extract from metaphor and symbol wherever employed those sublime truths regarding the being and nature of God, and the origin of the universe, which are revealed in the Bible. It is not difficult to do so. We have the fundamental doctrine of the existence, unity, and personality of God, standing out prominently in every part of Holy Scripture:—"Hear, O Israel; the Lord our God is one Lord" (Deut. vi. 4). We have the doctrine of Creation enunciated in the opening words of Genesis, and repeated in various forms, and under various metaphors, by successive writers, until at length the Author of the Epistle to the Hebrews, with philosophic acumen, distinguishes the teaching of the Spirit of Revelation from the theories of Greek scientists:—"By faith we understand that the worlds have been framed by the word of God; so that what is seen hath not been made out of things which do appear" (Heb. xi. 3). It has been rightly said that the first chapter of Genesis furnishes the only satisfactory standpoint from which to take a view of the constitution of the world, and of the relation between the world and man and God. The passage I have just quoted gives a logical exposition of the narrative of Creation in Genesis. The time of Creation is not indicated, and we have no data to fix it. It is simply said: "In the beginning, God created the heaven and the earth." When that beginning was we know not. It may have been millions of years before the story of our race began. The fact of the creation of the heaven and the earth at some undefined past epoch is revealed; and then this revelation is followed by another—that from some cause not explained, the earth having been reduced to a state of chaos, God put forth once again creative power, re-formed and probably re-peopled the world. The period of this new creative work is not fixed, nor is its duration. The language of the narrative in the first chapter of Genesis, as it seems to me, indicates progress—not evolution, however,—progress from the lower to the higher forms of life, and may embrace those countless ages during which the wonderful strata of the earth's crust were formed. To attempt a literal interpretation of the seven days' work is, in my opinion, to do violence to the analogy of Scripture exegesis, and to the genius of the inspired Word. The sacred writer simply indicates successive stages in the creative work, commencing with that forth-putting of Divine power—*force*, shall I call it?—which initiated motion in the universe of inert matter, and terminating with man, of

whom it is said emphatically, "God created man in His own image," making him thus essentially different from all His other creatures — the possessor of mind, moral feeling, conscious immortality. The stages of this mysterious creative development are dimly indicated, each the direct product of Divine agency. But the duration of each stage or period is shrouded in darkness. We know not what period the Creation "day" may represent; we know not what isolated, or progressive and long-continued action each day's work may indicate. One thing, however, is clear; that LIFE, in all its forms—vegetable, animal, human—is ascribed by the sacred writer to the direct *fiat* of God. Vegetables and animals did not derive, or receive, their being—were not evolved—from matter, but were formed by the creative word of God operating upon matter. Matter was the material basis: the word of God was the creative energy.

Then again, it is important to observe how, according to the inspired writer, God originated each form of life in its own place, in its own sphere:—"And God said, Let the earth bring forth vegetation;" "And God said, Let the waters bring forth the moving creature that hath life. And God created every living creature that moveth, with which the waters abound;" "God made the beast of the land after his kind;" "God created man in His image, and breathed into his nostrils the breath of life." It is a sublime record. The life, the soul of man, was a direct emanation from the eternal life of God. His intellect, his will, his conscience, were moulded after the Divine original.

Such then is the teaching of the Bible. Is the teaching of Science different? Do the established facts of Science contradict any of the grand truths here set forth? These are the questions I now propose briefly to discuss. I confess to you freely that early training, that Christian intercourse of long standing, that cherished ecclesiastical sympathy, combine to induce me to answer each of these questions in the negative. But, to borrow the impressive language of Professor Tyndall, used in another connexion:—"There is in the true man a wish stronger than the wish to have his beliefs upheld; namely, the wish to have them true. And this stronger wish causes him to reject the most plausible support if he has reason to suspect that it is vitiated by error." * Laying aside all prejudice, all preconceived opinion, all mere feeling or sentiment, I shall endeavour to investigate and decide in a purely philosophic spirit.

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* *Address at Belfast.*

It is only right to observe at the outset, that it is not always easy to define the exact border-line of any science, or department of knowledge. Not unfrequently departments of Science, in themselves distinct, have some things in common. The fields of investigation over-lap; but the method of investigation in each department is different. The scientist examines natural objects through the medium of his senses; his mind, under the guidance of its intuitions, interprets the nature and bearing of the observations, compares and classifies them. Then he frames generalisations to which he gives the name of laws; and these, when thoroughly tested and proved, are accepted as facts of science. In the department of psychology and natural theology a different method is followed, because the subjects with which they are concerned are, for the most part, presented directly to the mind, and not to the senses or the logical faculty. They can only be grasped and comprehended in their entirety by abstract thought and reflection—quickened and guided in the case of theology by Divine illumination. It consequently happens, not unfrequently, that minds trained to scientific research alone, and habitually occupied with the severe and exact demonstrations of geometry, or with the palpable forms of matter, encounter an almost insuperable difficulty when they attempt to enter the field of abstract thought. They cannot place the problems of metaphysics and theology under the microscope, nor can they apply to them the test of pure mathematical demonstration, and, therefore, they cannot always comprehend, and will not receive them. And yet, to those who are intellectually fitted for this higher department of knowledge, and thoroughly trained in it, the sublime truths which it embraces become as definite and as convincing as the truths of physical science. It is a well-known fact that "each man is strong in that he is trained in, weak in other regions—so much so, that often the objects there seem to him non-existent." *

All this shows the necessity of confining Science and Theology each to its own proper sphere. Scientific men often complain, even in this age and this country of freedom, that theologians are despots, that they would fetter free thought, that they would rivet the shackles of ecclesiastical authority upon the mind of each daring inquirer. I would, therefore, take the liberty of warning earnest Christians not to offer, or even give the appearance of offering, any opposition to the fullest scientific investigation. Let us look upon the sphere of Science

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* Shairp, *Culture and Religion*, p. 80.

as a friendly territory,—a province of God's universe where His footprints can be traced, and where His wisdom can be discerned. But then, on the other hand, is it not clear that scientific men are at this moment committing the very error with which they are charging theologians? They are attempting to invade the province of Revelation, and to sweep away its most sublime doctrines by theories and speculations. As a theologian I have no wish to fetter true Science. I accord to it the utmost liberty. In its own field it does noble service to my cause, enabling me to reason with logical precision, from clear manifestations of design in every department of nature, to the existence of an Omnipotent Designer. But when Science leaves its legitimate field to assail revealed truth—when the scientist, having reached the limit of experimental evidence, refuses to stop, and attempts to prolong the vision into the unknown, so as to discern in matter the promise and potency of all terrestrial life;* then, as a theologian, and in the name of Science itself, I place an arrest upon him, as he would do upon me; and if he will not desist, I shall consider it my duty to warn the public that his so-called conclusions, however skilfully framed and eloquently expressed, are no more worthy of belief than the splendid creations of a poet's fancy. And in adopting such a course I have the high authority of Tyndall himself, who says:—"The profoundest minds know that nature's ways are not at all times their ways, and that the brightest flashes in the world of thought are incomplete until they have been proved to have their counterparts in the world of fact."†

Still another point I feel bound to notice. Scientists complain that their conclusions are criticised and called in question by many who acknowledge that they have never conducted a single investigation, physiological, chemical, or anatomical; and they denounce in no measured terms such presumptuous criticisms. The complaint is plausible, but not very logical. I shall show this in a sentence or two. The scientist by his researches establishes certain facts. He explains those facts in intelligible language. Then he proceeds to deduce from them inferences with regard, say, to the origin of life, to the origin of species, or to the origin of mind. Now, I take his facts as established and explained by himself; and I maintain that I am as competent to test the accuracy of the conclusions he professes to deduce from them as he is. It is not practical science that is here required, it is logic, and scientists will not surely lay claim to a monopoly of this faculty. So then, in prosecuting my critical examination, I shall not attempt to

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* Tyndall, *Address.* † *Fragments of Science*, p. 111.

enter the domain of the student of pure physical science. I shall accept his own observations and demonstrations—not his theories, nor his speculations, nor the results of the prolongation of his mental vision into the unknown—and I shall place them side by side with the conclusions he has deduced from them, and submit the process to a searching logical analysis. Surely this is not presumption. If it be, then Herbert Spencer is liable to the charge of presumption, for this is the plan he has pursued in his profound treatise on biology. He thus writes :—"We confess that nearly all we know of this department of biology has been learnt from his (Owen's) lectures and writings. We pretend to no independent investigations, but merely to such knowledge of the phenomena as he has furnished us with. Our position, then, is such that had Professor Owen simply enunciated his generalisations, we should have accepted them on his authority. But he has brought forward evidence to prove them. By so doing he has tacitly appealed to the judgment of his readers and hearers—has practically said, 'Here are the facts: do they not warrant these conclusions?' And all we propose to do, is to consider whether the conclusions are warranted by the facts brought forward."

I shall now endeavour to examine critically, according to the plan adopted by Herbert Spencer, the attempts made by scientists to solve certain great problems, and to solve them in a manner directly opposed to the teaching of the Bible. The problems are as follow :—

I. The Origin of Matter and of the Existing Material Universe.

II. The Origin of Life.

III. The Origin of Species.

IV. The Origin of Mind; and connected therewith, the Conceptions of a God and of a Future State.

I. The Origin of Matter and the Existing Material Universe.

I. The teachings of scientists on matter and the existing material universe are not uniform. Nearly every scientific man has a theory of his own; and it so happens that the several theories are inconsistent with each other, and in some cases mutually destructive. Democritus, a Greek sage, who lived about B.C. 400, propounded a theory of the universe, which he seems to have derived from Leucippus. It was substantially adopted by the Latin poet Lucretius, whose object was thereby to banish for ever from the mind of man all idea of a creating and superintending Deity. Its latest expounder is Professor

Tyndall; and its leading principles are as follow:—Matter is eternal; it has two characteristics—1. Quantitative relations, which are original; 2. Qualitative, which are secondary and derived. According to this theory creation is a myth, and the distinction between matter and mind is abolished. Matter consists ultimately of *atoms*, which were originally distributed through empty space; they are homogeneous in quality, but heterogeneous in form; motion is the eternal and necessary result of the original variety of atoms in the vacuum; the atoms are impenetrable, and therefore offer resistance to one another; all existing forms and beings in the universe,—the stars, the planets, the earth, plants, animals, mind itself,—are evolved from these atoms; the process of evolution began by the atoms striking together, and the lateral motions and whirlings thus produced were the beginnings of worlds; the varieties of things depend on the varieties of their constituent atoms; the first cause of all existence is necessity,—that is, the necessary succession of cause and effect. To this succession the name *chance* is given, as opposed to the term *mind* (νοῦς) as employed by Anaxagoras. The soul consists of fine, smooth, round atoms, like those of fire. They interpenetrate the whole body, and in their motions the phenomena of life arise. The atoms of Democritus are individually without sensation; they combine in obedience to mechanical laws; and not only organic forms, but the phenomena of sensation and thought are the result of their combination. Empedocles introduced the notion of love and hate among the atoms to account for their combination and separation. Lucretius rejected the notion of any interfering Deity, and affirmed that the interaction of the atoms throughout infinite time, rendered all manner of combinations possible; of these the fit ones persisted, while the unfit disappeared. From all eternity they have been driven together, and after trying motions and unions of every kind, they fell at length into the arrangements out of which the present system of things has been formed. So that we owe the present universe of matter and mind to the self-evolved action of a fortuitous concourse of atoms.*

And this most fanciful theory, or rather aggregate of theories, is put forward in the name of Science! What are its proofs? We cannot, as I have stated above, admit a mere theory as possessing any authority in our present investigation. What is the proof that matter is eternal? There is none; and from the very nature of the thing, there can be no scientific

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* Tyndall, *Address*, pp. 1–9; Lucretius, *De Rerum Natura*, i.

proof. All that Science can prove is, that matter has existed so long as man has existed to observe it. To affirm that it is eternal is an assumption, which has no more weight than the counter affirmation that it is not eternal. Herbert Spencer rightly says, that the eternity or self-existence of matter is unthinkable; and he argues that "the assertion that the universe is self-existent does not really carry us a step beyond the cognition of its present existence; and so leaves us with a mere re-statement of the mystery."* And besides, while Science is unable to advance one step towards proof of the eternity of matter, some of the most eminent scientific men of the age affirm that atomism itself affords strong presumptive evidence of Creation and a Creator. Clerk Maxwell, at the meeting of the British Association in 1873, said:—"We are unable to ascribe either the existence of the molecules (atoms) or any of their properties to the operation of any of the causes which we call natural." On the contrary, the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel affirmed, "the essential character of a manufactured article." And Herbert Spencer has laid down an abstract principle which points in the same direction:—"To conceive self-creation is to conceive potential existence passing into actual existence by some inherent necessity, which we cannot do. We cannot form any idea of a potential existence of the universe, as distinguished from its actual existence. . . We have no state of consciousness answering to the words—an inherent necessity by which potential existence became actual existence. To render them into thought, existence, having for an indefinite period remained in one form, must be conceived as passing without any external or additional impulse into another form; and this involves the idea of a change without a cause; a thing of which no idea is possible."† Tyndall himself admits a principle which saps the foundation of this atomic theory:—"In the course of scientific investigation," he says, "we make continual incursions from a physical world where we observe facts, into a super or sub-physical world, where the facts elude all observation, and we are thrown back upon the picturing power of the mind. By the agreement or disagreement of our picture with subsequent observation it must stand or fall."‡ Just so; it is observed fact alone which substantiates the truth of a theory in Science, and when observation utterly fails, as it does in this phase of the atomic

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* *First Principles*, p. 32. † *Ibid.*, p. 32.
‡ *Crystalline and Molecular Forces*, p. 9.

theory, the theory vanishes "like the baseless fabric of a vision." The most careful study of matter, whether we regard it in its supposed atomic elements, or in its grand combinations governed by wondrous laws, or in its beautiful and complex organisms, leads inevitably to the conclusion that there is a Power and a Wisdom infinite above and beyond it. "We cannot," says Herbert Spencer, "think at all about the impressions which the external world produces on us without thinking of them as caused, and we cannot carry out an inquiry concerning their causation without inevitably committing ourselves to the hypothesis of a First Cause."* So much, then, for the teaching of Science as to the eternity of matter, and the formation of the material universe.

But we return for a moment to this atomic theory. Democritus, following Leucippus, held that atoms were originally scattered throughout empty space, and that they combined in obedience to mechanical laws. Empedocles, a Sicilian philosopher of the same age, could not believe this possible, and suggested that the atoms possessed original and elementary powers or sensations of love and hate, and that influenced by these they combined or separated. Lucretius conceived the atoms falling eternally through space, and their interaction throughout infinite time forming the worlds. It was a truly poetic conception, worthy of its author. Clerk Maxwell supposed the atoms to have been created, or, as Herschel says, "manufactured articles," and endowed with certain powers, under the guidance of which they gradually evolved those complex forms now presented to the eye of the student of nature. Tyndall, again, though he speaks with considerable hesitation, as if groping his way through the cloud-land of hypothesis, suggests that the atoms may possess some inherent energy or life; and hence he professes to discern in "molecular force the agency by which both plants and animals are built up,"† though he does not tell us whence this molecular force has come; indeed, he intimates that it is "wholly ultra-experiential."

I do not profess to reconcile these discordant theories, I leave the task to scientists; and I venture to think they will find it no easy one. My sole object is to submit them, one and all, to the test of scientific proof. As to atoms themselves, they have never been absolutely discovered. Scientists have searched for them, the highest powers of the microscope, and

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* *First Principles*, p. 37. † *Address*, p. 52.

the utmost skill of the chemist, have been tried in vain. Tyndall tells us that "Loschmidt, Stoney, and Sir William Thomson have sought to determine the sizes of the atoms, or rather to fix the limits between which their sizes lie;" * but he tacitly admits that they failed. Their very existence, then, is a hypothesis,—a hypothesis, too, which has no clear logical connexion with any observed fact. The idea of an atom is, as it seems to me, inconceivable, or, as Herbert Spencer would say, "unthinkable." An atom, if the word has a meaning at all as a scientific term, must mean an ultimate indivisible particle of matter—a unit of matter. Now, to conceive of a piece of matter, having necessarily, because it is matter, length and breadth, and yet as being indivisible, is, as I think, impossible. And if we adopt the view of Faraday, that atoms are "centres of force," the difficulty remains. A centre of force must be either material or immaterial; if material, the absurdity remains as before; if immaterial, then no aggregate of the immaterial could form the material universe. Science is thus completely at fault regarding these hypothetical atoms.

And when we proceed to test this atomic theory in its development, evolving worlds and systems, and organisms, and animal life, difficulties accumulate at every step. It is held that atoms—whether eternal (that is, self-existent), or "manufactured articles"; whether inert, or gifted with feelings of love and hate; whether destitute of power, or possessing inherent potency—have arranged themselves by chance friction and spontaneous interaction throughout the infinite past, into those forms of wondrous beauty and delicate and complicated mechanism which we now see in every part of the universe, and which are all guided by wise laws, and adapted to wise ends. What is the scientific proof of this theory? There is none, and there can be none. No scientist professes to have seen atoms building up worlds, or spontaneously evolving new forms. The very nature of the theory places it beyond the range of Science, relegating it away to the infinite past. And besides, the notion of matter arranging itself spontaneously into systems governed by exact law, and organisms exhibiting the most beautiful design, is not only unsupported by scientific observation, but it is opposed to the whole analogy of experience. Spontaneous action is, as Huxley rightly says, action without a cause, which is unscientific and impossible. It is impossible to conceive of a

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* *Address*, p. 26.

change taking place without a cause, and action necessarily involves change, so that spontaneity in matter is an impossibility.* The idea of spontaneity in matter is not one of those physical theories which, as Tyndall says, lie beyond experience, but is yet derived by a process of abstraction from experience. No process of abstraction can derive from experience anything which is contrary to the entire analogy of experience. Take as an illustration of the impossibility of conceiving mere matter capable of spontaneously evolving an object familiar to us all—the human eye; and I here borrow the words of one of the most distinguished of modern naturalists, Professor Pritchard:—"From what I know, through my own speciality, both from geometry and experiment, of the structure of the lenses of the human eye, I do not believe that any amount of evolution extending through any amount of time, could have issued in the production of that most beautiful and complicated instrument, the human eye. The most perfect, and at the same time the most difficult, optical contrivance known is the powerful achromatic object-glass of a microscope; its structure is the long unhoped-for result of the ingenuity of many powerful minds, yet in complexity and in perfection it falls infinitely below the structure of the eye. Disarrange any one of the curvatures of the many surfaces, or distances, or densities of the latter; or, worse, disarrange its incomprehensible self-adaptive powers, the like of which is possessed by the handiwork of nothing human, and all the opticians in the world could not tell you what is the correlative alteration necessary to repair it, and, still less, to improve it, as a natural selection is presumed to imply."†

Tyndall himself is forced to admit that the structure of the universe is an insoluble mystery; and Huxley, after placing the dogma of "Atheistic materialism" in its strongest light, says:—"But, if it is certain that we can have no knowledge of the nature of either matter or spirit, and that the notion of necessity is something illegitimately thrust into the perfectly legitimate conception of law, the materialistic position that there is nothing in the world but matter, force, and necessity, is as utterly devoid of justification as the most baseless of theological dogmas." ‡ I am content to leave the theory of atomic, or Atheistic materialism, in the position thus assigned to it by one of its most accomplished exponents.

Here again we see that the solution of the grand problem

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* See Herbert Spencer, *First Principles*, pp. 32, *seq.*

† Paper read at Brighton, 1874.

‡ *Lay Sermons*, p. 144.

of the origin of the universe is beyond the range of Science. Science indicates the necessity of something—some self-existent, infinite, originating Power, above and beyond matter. Herbert Spencer has put the case very forcibly :—"Here then, respecting the nature of the universe, we seem committed to certain unavoidable conclusions. The objects and actions surrounding us, not less than the phenomena of our own consciousness, compel us to ask a cause; in our search for a cause, we discover no resting-place until we arrive at the hypothesis of a First Cause; and we have no alternative but to regard this First Cause as infinite and absolute." * The inferential teaching of Science, as Herbert Spencer and others admit, is not exhausted in a merely negative result. It reveals in nature everywhere the existence of what is now technically called *force*. However far its observations are carried back, force cannot be eliminated or dispensed with. It is involved in the motion of a grain of sand as fully as in the circling of the spheres; and if Science here attempt to pass beyond the range of sense, and to theorise about force existing in atoms, we follow it and say, You are but shifting the mystery, and we press the natural question, What put force in the atoms? Whence came it? Thus we drive the scientist back and back through every province of his own legitimate domain; we drive him back, too, through those regions of hazy theory and dim speculation in which he loves to expatiate, until at last by an inexorable logic we compel him to admit, as Herbert Spencer shows, an Author of force. Tyndall has virtually admitted this in his lecture on *Crystalline and Molecular Forces*:—"And, if you will allow me a moment's diversion, I would say that I have stood in the springtime and looked upon the sprouting foliage, the grass, and the flowers, and the general joy of opening life. And in my ignorance of it all I have asked myself whether there is no power, being, or thing, in the universe whose knowledge of that of which I am so ignorant is greater than mine. I have asked myself, can it be possible that man's knowledge is the greatest knowledge—that man's life is the highest life? My friends, the profession of that Atheism with which I am sometimes so lightly charged would, in my case, be an impossible answer to this question." Now what is the possible, the certain answer, to this touching cry of an exponent of, if not believer in, "Atheistic materialism"? It may thus be taken from the

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* *First Principles*, p. 38.

first record of Divine Revelation :—"In the beginning GOD created the heaven and the earth. . . . . And the SPIRIT OF GOD moved upon the face of the waters. . . . . And GOD said, Let the earth bring forth grass. . . . . And GOD created every living thing that moveth. . . . . And GOD created man in His own image."

II. THE ORIGIN OF LIFE.

The origin of life is a still deeper problem than the origin of matter and of the material universe. Owen, Darwin, and Huxley may be regarded as among the leading men, at least in England, in physiological research. Tyndall follows in their wake. But Herbert Spencer is the philosopher who, systematising the results of their profound researches, and deducing from them general principles, endeavours to trace life to its source, and to reveal its cause. I shall try to show you the line of argument, and to test the accuracy of the conclusions arrived at.

In attempting to discover the origin of life, the eye of the biologist is naturally turned to the germ in which the life power, if I may so speak, lies, and in which it begins to develop; his ultimate aim being to ascertain how it springs into existence, and what is its primary cause. Huxley's description is clear, and I give it in full :—

"Examine the recently-laid egg of some common animal, such as a salamander or a newt. It is a minute spheroid in which the best microscope will reveal nothing but a structureless sac, enclosing a glairy fluid, holding granules in suspension. But strange possibilities lie dormant in that semi-fluid globule. Let a moderate supply of warmth reach its watery cradle, and the plastic matter undergoes changes so rapid, and yet so steady and purpose-like in their succession, that one can only compare them to those operated by a skilled modeller upon a formless lump of clay. As with an invisible trowel, the mass is divided and subdivided into smaller and smaller portions, until it is reduced to an aggregation of granules not too large to build withal the finest fabrics of the nascent organism. And then it is as if a delicate finger traced out the line to be occupied by the spinal column, and moulded the contour of the body—pinching up the head at one end, the tail at the other, and fashioning flank and limb into due salamandrine proportions in so artistic a way that, after watching the process hour by hour, one is almost involuntarily possessed by the

notion that some more subtle aid to vision than an achromatic would show the hidden artist, with his plan before him, striving with skilful manipulation to perfect his work." And then, to sum up the results of his investigations, he adds:—"What is true of the newt is true of every animal and of every plant; the acorn tends to build itself up again into a woodland giant, such as that from whose twig it fell; the spore of the humblest lichen reproduces the green or brown incrustation which gave it birth; and, at the other end of the scale of life, the child that resembled neither the paternal nor the maternal side of the house would be regarded as a kind of monster. . . . It is the first great law of reproduction, that the offspring tends to resemble its parent or parents more closely than anything else." *

But what light does all this beautiful description throw upon the origin of life? None. Huxley adds, to be sure, that "Science will some day show us how this law is a necessary consequence of the more general laws which govern matter; but, for the present, more can hardly be said than that it appears to be in harmony with them. We know that the phenomena of vitality are not something apart from other physical phenomena, but one with them; and matter and force are the two names of the one artist who fashions the living as well as the lifeless." This has a scientific sound, as if the philosopher were enunciating an observed fact; but in reality it is a theory, originating in Huxley's foregone opinion, and having no logical connexion with his observations. The fact is, his observations tend to a widely different conclusion. They show us the guiding power which that mysterious entity we call life exercises upon matter, moulding it into forms of exquisite beauty, and yet wide diversity; they show us that life cannot be a unit—that is, a thing of one essence and type, emanating from matter; for were it so, its operations upon matter would be uniform, and there would be but one class of organisms in the universe. Or, suppose we admit, with Herbert Spencer, that the life principle is modified to meet the requirements of its environments; then the nature of the full-grown animal could never be predicted, as that would depend on the environments which accident, or the deliberate operation of some other power, might entirely change. On the contrary, Huxley's investigations prove that there are essentially distinct types of life, though all appear to the scientist to have the same elementary material basis; and

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* *Lay Sermons*, pp. 261, 262.

that each type operates upon matter—the very same matter, too—with such irresistible guiding potency as to build it up into forms exactly corresponding to the parent stock. Science cannot, in this respect, control it; it may extinguish it; it may dwarf it; but it cannot confer upon it the power or capability of building up an organism different from that of its parent. Matter—all life's visible environment—can do nothing but supply the raw material of construction. Life guides the moulding and building in entire independence, alike of man and of matter; and all scientific investigation proves that life—pre-existing life—is essential to the production of living organisms.

But scientists have tried to go deeper, and we must follow them. The material basis of life, or *Protoplasm* as it is called, has been subjected to most minute examination by the microscope, and to the most searching analysis of the chemist. Its constituent elements have been discovered and described, and the results are interesting and instructive. Huxley says, "that all the forms of protoplasm which have yet been examined contain the four elements—carbon, hydrogen, oxygen, and nitrogen—in very complex union." * In whatever form it appears, "whether fungus or oak, worm or man," its elements are the same; and when life in it becomes extinct, it "is resolved into its mineral and lifeless constituents." † It is admitted, of course, that carbon, hydrogen, oxygen, and nitrogen are lifeless bodies, and that they all exist previous to their union; "but when they are brought together," says Huxley, "under certain conditions, they give rise to the still more complex body, protoplasm; and this protoplasm exhibits the phenomena of life." ‡

Would it not, at first sight, seem from these words that Science had at length succeeded in solving the mystery of the origin of life? It knows all the elements of protoplasm; and there is no lack of them in nature. They exist everywhere around us. "With my own hands," writes Professor Pritchard, "a quarter of a century ago, I obtained all the elements which I found in an egg and in grains of wheat, out of a piece of granite and from the air which surrounded it—element for element. It has been one of the most astonishing and unexpected results of modern Science that we can unmistakably trace these very elements also in the stars." § So, then, the elements are known, and are at hand; Science can easily put

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* *Lay Sermons*, p. 130. † *Ibid.*, p. 131. ‡ *Ibid.*, p. 135.
§ Paper read at Brighton, 1874.

them together; and Huxley says, "I can find no intelligible ground for refusing to say that the properties of protoplasm" —that is, life—"result from the nature and disposition of its molecules."* Yet he is unable to produce life from these materials. Science here utterly fails him. Its field, alike of potency and of knowledge, is at this point shut in by an impassable barrier. Huxley confesses that pre-existing living matter is necessary to the development of the phenomena of life; and he admits that its influence on the material basis "is something quite unintelligible;"† while Pritchard affirms that "no chemist, with all his wonderful art, has ever yet witnessed the evolution of a living thing from those lifeless molecules of matter and force."‡

So far, then, as Science is concerned, we are as remote as ever from the solution of the problem of the origin of life. Scientists have neither been able to produce life, nor to trace it; they have only been able to observe its phenomena. They can see motion and development in the living protoplasm; but these are the effects of a life already in existence, not the essence of life itself. Herbert Spencer describes life as "a continuous adjustment of internal relations to external relations"; but this Delphian utterance, if it has any meaning at all, can only refer to the phenomena of life; it does not touch its essence, nor does it throw one ray of light upon its origin. That the life is inherent in, or evolved by, matter is inconceivable, for the living protoplasm often dies, and then, though all the material elements are still present, development ceases at once; the power which moulds and builds has gone mysteriously as it came, and no human agency can again vitalise the dead mass, which now obeys the ordinary laws of matter, and is resolved into its mineral constituents. "The living body resists the chemical agencies that are ready to attack it; the dead body at once succumbs to these agencies." Life is the power which moulds and builds up organisms, and preserves the matter of which they are composed from the dissolving force of the ordinary laws to which mere matter is subject. The teaching of Science, therefore, is, that life is something apart from matter; but what it is, whence it comes, and whither it goes, Science cannot tell. Its operation on matter is wonderful. It guides the chemical forces so as to arrange inert matter into shapes of the most exquisite proportions, and organisms of the most delicate and complicated mechanism—

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* *Lay Sermons*, p. 138. † *Ibid.*, p. 137.
‡ Brighton paper.

all of which are entirely distinct from those normal forms which the constituent elements would assume, if uncontrolled by the life-principle. And then, again, when the life departs, the very matter in which it existed, and which it moulded with such mystic power, speedily becomes a mass of loathsome rottenness, and dissolves into its original elements. Huxley is compelled to admit all this; but he yet tries to save his favourite theory by affirming,—not in accordance with, but in spite of logical sequence,—that the phenomena presented by protoplasm, living or dead, are its properties; and that all vital action may be said to be the result of the molecular forces of the protoplasm which displays it.* How, I ask, can vital action be the result of the molecular forces alone, when, according to his own admission, the influence of pre-existing living matter is shown by scientific observation to be necessary to vital action? The vital action is clearly the result, not of molecular forces, but of the life-principle operating on the molecules. In denying this Huxley sacrifices his logic to his theory; and he would do well to remember Tyndall's striking words:—"There is in the true man of science a wish stronger than the wish to have his beliefs upheld—namely, to have them true. And the stronger wish causes him to reject the most plausible support, if he has reason to suspect that it is vitiated by error. Those to whom I refer as having studied the question, believing the evidence offered in favour of spontaneous generation to be thus vitiated, cannot accept it. They know full well that the chemist now prepares from inorganic matter a vast array of substances which were some time ago regarded as the sole products of vitality. They are intimately acquainted with the structural power of matter as evidenced in the phenomena of crystallisation; they can justify, scientifically, their belief in its potency, under proper conditions, to produce organisms; but in reply to your question they will frankly admit their inability to point to any satisfactory experimental proof that life can be developed save from demonstrable antecedent life." And his final deliverance is contained in these words:—"In fact, the whole process of evolution is the manifestation of a power absolutely inscrutable to the intellect of man. As little in our days as in the days of Job can man by searching find this power out. Considered fundamentally, then, it is by the operation of an insoluble mystery that life on earth is evolved."† To the same effect Herbert Spencer writes:—"The consciousness of an inscrutable power mani-

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* *Lay Sermons*, p. 137. † *Address.*

fested to us through all phenomena, has been growing ever clearer. . . To this conclusion Science inevitably arrives as it reaches its confines."*

This is enough for my purpose. The limits of the province of Science are here drawn rigidly. Science shows that life is an entity, a power, apart from and above matter, but that in its essence it eludes the keen eye of the philosopher; that it cannot be discovered by the researches of the physiologist; that it will not emanate from the retort of the chemist, however skilfully he may arrange and manipulate the elements of its physical basis; that, in fact, it lies hid among those sublime mysteries of nature which human wisdom utterly fails to penetrate, and which the infinite wisdom of the Great Creator can alone reveal to the yearning spirit of His faithful creature. The whole teachings of Science are, so far as they go, in harmony with that sublime record:—"And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul."

III. The Origin of Species.

Darwin is the Apostle of the doctrine of Evolution, though the idea was broached by Lucretius nearly two thousand years ago. To the naturalist, Darwin's book on *The Origin of Species* is one of the most important contributions to modern Science. As a scientific observer, an acute, laborious, profound student of nature, Darwin has no superior. The range of his researches, too, has been wonderful; he has travelled over the world to sift materials; he has recorded the results with a lucidity which leaves nothing to be desired; and yet one can, with perfect logical consistency, admit the whole of his observed facts, and reject the whole of his hypotheses. He and his disciples have a strange way of overlooking what logicians call the middle term—the connecting link between the fact established by scientific observation, and the conclusion which they profess to deduce from it. Professor Huxley, who may be regarded as Darwin's ablest interpreter, virtually acknowledges this when he says, "that notwithstanding the clearness of the style, those who attempt fairly to digest the book find much of it a sort of intellectual pemmican—a mass of facts crushed and pounded into shape,

* *First Principles*, p. 108.

rather than held together by the ordinary medium of an obvious logical bond." Then, after a lengthened critical analysis of Darwin's plan, investigations and reasoning, and after treating all opponents of the theory of evolution, and more especially Biblical scholars, with no small amount of scorn and ridicule, and after lavishing upon them a very ample vocabulary of hard names and epithets, Huxley, with admirable simplicity and praiseworthy candour, concludes as follows:—"There is no fault to be found with Darwin's method, then; but it is another question whether he has fulfilled all the conditions imposed by that method. Is it satisfactorily proved, in fact, that species may be originated by selection? that there is such a thing as natural selection? that none of the phenomena exhibited by species are inconsistent with the origin of species in this way? If these questions can be answered in the affirmative, Darwin's view steps out of the ranks of hypotheses into those of proved theories; but, so long as the evidence at present adduced falls short of enforcing that affirmation, so long, to our minds, must the new doctrine be content to remain among the former—an extremely valuable, and in the highest degree probable doctrine, indeed the only extant hypothesis which is worth anything in a scientific point of view; but still a hypothesis, and not yet the theory of species. After much consideration, and with assuredly no bias against Mr. Darwin's views, it is our clear conviction that, as the evidence stands, it is not absolutely proven that a group of animals, having all the characters exhibited by species in nature, has ever been originated by selection, whether artificial or natural. . . . . Mr. Darwin is perfectly aware of this weak point, and brings forward a multitude of ingenious and important arguments to diminish the force of the objection. We admit the value of these arguments to the fullest extent; nay, we will go so far as to express our belief that experiments, conducted by a skilful physiologist, would very probably obtain the desired production of mutually more or less infertile breeds from a common stock, in a comparatively few years; but still, as the case stands at present, this 'little rift within the lute' is not to be disguised nor overlooked."*

The essence of Darwin's hypothesis is, that all forms of life, from the humblest zoophyte up to man, have evolved from one primordial germ. All species, he maintains, have been produced by the development of varieties from common stocks by the conversion of these first into permanent races and then

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* *Lay Sermons*, pp. 294, *seq.*

into new species, by the process of natural selection, which process is essentially identical with that artificial selection by which man has originated the races of domestic animals—the *struggle for existence* taking the place of man, and exerting, in the case of natural selection, that selective action which he performs in artificial selection.*

The crucial point in this hypothesis is, that species may be originated by natural selection. But Huxley, and Darwin himself, admit that this has never been proved. Darwin, it is true, draws largely upon an infinite past. He says, "Nature grants vast periods of time for the work of natural selection;" and again, "The mind cannot possibly grasp the full meaning of a hundred million of years. It cannot add up and perceive the full effects of many slight variations accumulated during almost an infinite series of generations." Now as to this "almost infinite past," Sir Wm. Thomson, probably the most profound of our physicists, has dissipated all such speculation by showing that life-forms such as Darwin postulates could not have existed during an infinite past; "because, assuming that the heat has been uniformly conducted out of the earth, as it is now, it must have been so intense within a comparatively limited period, as to be capable of melting a mass of rock equal to the bulk of the whole earth." † But, be this as it may, one thing is clear, that Darwin and his fellow scientists admit their inability to *prove* the truth of the Evolution Hypothesis.

Another point set forth by Darwin is worthy of notice. In answer to the question, How do groups of species arise? he replies, "From the struggle for life. Owing to their struggle for life, any variation, however slight, and from whatever cause proceeding, if it be in any degree profitable to an individual of the species, in its infinitely complex relations to other organic beings and to external nature, will tend to the preservation of that individual, and will generally be inherited by its offspring. The offspring, also, will thus have a better chance of surviving." ‡ The essence of this most remarkable hypothesis is, that all the wonderful adaptations which we find in the physical structure of the various species of animals, to the conditions in which they are placed, to the work they have to do, to the wants they have to supply, have sprung from a long and fortuitous sequence of natural events, to which Darwin gives the name Natural Selection. If this be true, then the

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* See Huxley, *Lay Sermons*, pp. 292, *seq.*

† Frazer, *Blending Lights*, p. 4. ‡ *Origin of Species*, p. 61.

most beautiful and complex organs of animals—the heart and veins, the nervous system, the human hand, the eye, the mind itself, with all its faculties—have been constructed, not by the infinite wisdom of an Almighty Creator, adapting every part, organ, and faculty, with requisite skill, to the office it was designed to fill, but from a medley of blind chance, countless blunders, and innumerable minute accidental modifications, which occurred in the struggle for existence during myriads of past ages. The fish was not designed for the water; the bird was not designed to fly; the ear was not designed for hearing; the eye was not designed for seeing; all these, says Darwin, are just the fortuitous products of organised matter pushing its way at random, and after incalculable instances of trial and failure, during incalculable ages, at last hitting on what was best.*

And what is the scientific proof of this most wonderful conception? Nothing short of actual observation of the whole alleged process would make such a theory even credible. There has, of course, been no such observation. There could be none, for an "almost infinite series of generations" is postulated; and that lies outside the domain of Science. "By the theory of natural selection," says Darwin, "all living species have been connected with the parent species of each genus, by differences not greater than we see between the varieties of the same species in the present day."† Here, as it seems to me, lies the fundamental logical fallacy. He argues from the existence of slight varieties in the same species to the entire transmutation of species. The former is admitted on all hands; the latter has no logical connexion with it, and has no basis in scientific investigation. Yet Huxley records his conviction that this theory of Darwin, which traces all organisms and species to fortuitous trials and combinations, has given a death-blow to Teleology, that is, to the doctrine of design in nature, and of final causes.

Huxley's argument on this point deserves special attention. It is one of the most remarkable specimens of scientific reasoning it has ever been my good or evil fortune to read. It is as follows:—"The teleological argument runs thus: an organ or organism is precisely fitted to perform a function or purpose; therefore it was specially constructed to perform that function. In Paley's famous illustration, the adaptation of all the parts of the watch to the function or purpose of showing the time,

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* See *The Darwinian Theory Examined*, p. 286.
† *Origin of Species*, p. 281.

is held to be evidence that the watch was specially contrived to that end; on the ground that the only cause we know of, competent to produce such an effect as a watch which shall keep time, is a contriving intelligence adapting the means directly to that end. Suppose, however, that any one had been able to show that the watch had not been made directly by any person, but that it was the result of the modification of another watch which kept time but poorly; and that this again had proceeded from a structure which could hardly be called a watch at all, seeing that it had no figures on the dial, and the hands were rudimentary; and that, going back and back in time, we came at last to a revolving barrel as the earliest traceable rudiment of the whole fabric. And imagine that it had been possible to show that all these changes had resulted, first, from a tendency in the structure to vary indefinitely; and, secondly, from something in the surrounding world which helped all variations in the direction of an accurate time-keeper, and checked all those in other directions; then it is obvious that the force of Paley's argument would be gone. For it would be demonstrated that an apparatus thoroughly well adapted to a particular purpose might be the result of a method of trial and error worked by unintelligent agents, as well as of the direct application of the means appropriate to that end. Now, it appears to us that we have here, for illustration's sake, supposed to be done with the watch what the establishment of Darwin's theory will do for the world."*

Well, if Paley's argument remain in force until we are able to produce a developed watch, my impression is it will last a long time; and, if Darwin's theory must wait for proof until that watch is discovered, then the process of proof will reach at least as far into the future as the process of the evolution of species reaches into the past. True, Huxley puts this illustration forward as a supposition; but, I ask, does it not seem like an insult to common sense? Teleology remains unmoved by such theories as these,—theories which one can only rightly describe, in the graphic phrase of Carlyle, as "diluted insanity."

We have now considered Huxley's opinion of Darwin's researches and theories; but how very differently some men of the highest scientific attainments interpret them may be gathered from the following eloquent words of Professor Pritchard:—"I know of no greater intellectual treat—I might even call it moral—than to take Darwin's most charming book on *The Fertilisation*

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* *Lay Sermons*, pp. 301-2.

of Orchids, and his equally charming and acute monograph on the Lythrums, and repeat, as I have repeated, many of the experiments and observations therein detailed. The effect on my mind was an irresistible impulse to uncover and bow my head, as being in the too immediate presence of the wonderful prescience and benevolent contrivance of the UNIVERSAL FATHER. And I think such, also, would be the result on the convictions and the emotions of the vast majority of average men. I think the verdict would be that no plainer marks of contriving will exist in a steam-engine, or a printing-press, or a telescope."

Design in nature can be seen by every unprejudiced man who observes nature, or who thoughtfully reads the recorded observations of others. Every fresh discovery in physiology; every inquiry of the scientist into the mechanism of the animal frame; every inspection of the marvellous adaptation of insect organisms to the complicated structure of flowers; in a word, every new achievement of the naturalist in exploring the domain of nature, reveals more clearly, and establishes more firmly, the presence everywhere, and in everything, of an infinitely powerful and infinitely wise Designing Mind. Unseen by human eye, undiscoverable by scientific research in the mystery of its working, we yet discern the impress and recognise the beneficent control of that Infinite Mind in earth, and sea, and sky.

IV. THE ORIGIN OF MIND AND ITS CONCEPTION OF GOD.

The origin and nature of mind constitute the highest problem with which Science has ventured to grapple. Democritus, as I have said, held that the mind consists of fine, smooth atoms, like those of fire. Huxley seems to affirm that "those manifestations of intellect, of feeling, and of will, which we rightly name the higher faculties," are known only as transitory changes in the relative positions of parts of the body.* "Matter and spirit," he adds, "are but names for the imaginary substrata of groups of natural phenomena." Tyndall is a little more explicit when he thus writes:—"Not alone the mechanism of the human body, but that of the human mind itself,—emotion, intellect, will, and all their phenomena,—were once latent in a fiery cloud."†

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* *Lay Sermons,* pp. 122, 143. † *Address.*

These are startling statements, and read like a confession of a material atheism. But as the language is somewhat hazy, and as Tyndall and Huxley seem indignant that they should be charged with holding such a dogma, I leave them to explain their own meaning, and to give to the world, if they so desire, their scientific creed in intelligible language. One thing, however, is clear; whatever view of the origin and nature of the human mind the words are intended to convey, they do not even attempt to establish it by scientific proof. No observation has ever yet reached, or can ever reach, to the development of a fiery cloud into emotion, intellect, will, and all the phenomena of the human mind. It is a daring flight of imagination, and nothing more. Tyndall himself seems to shrink from it in moments of thoughtfulness, when imagination is restrained by judgment:—"What baffles and bewilders me, is the notion that from these physical tremors, things so utterly incongruous with them as sensation, thought and emotion can be derived. . . . You cannot satisfy the human understanding in its demand for logical continuity between molecular processes and the phenomena of consciousness. This is the rock on which materialism must inevitably split whenever it pretends to be a complete philosophy of life."* Herbert Spencer is right in asserting that of the substance of mind nothing is known, or can be known by Science. The faculties of the mind lie outside the field of pure Science.

This suggests another and most important point. It is by the mind the scientist obtains his knowledge of nature; all his knowledge, in fact, must come through that channel. The senses are only the material avenues through which the mind apprehends physical phenomena. The senses observe, but to their observations must be added primary beliefs or intuitions, ere any intelligible interpretation, even of the simplest phenomena, can be given. It is from intuition we derive our knowledge of the reality of the external world and everything in it; for sensation is only the apprehension by the mind of an impression made on the sensorium, and it is the mind itself which intuitively forms the conception of the reality of the object that made the impression. So, in like manner, from intuition we get our knowledge of the properties of matter, such as weight, extension, and force; it is by intuition we form comparisons; and it is from intuition we obtain our ideas of cause and effect. The senses, on whatever object exercised, and though aided by the utmost experience of the

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* *Address.*

physicist, and the utmost precision of instruments, merely make certain impressions on the mind; and those impressions must be interpreted by our intuitions ere they can be of use in science. So then, after all, our primary beliefs, or the intuitions of our mind, form the foundation of all scientific reasoning. Dr. Carpenter set this matter in its true light, when he said to the British Association (1872) :—"Even in astronomy, the most exact of the sciences, we cannot proceed a step without translating the actual phenomena of nature into intellectual representations of those phenomena. It is this fundamental truth which gives rise to most of those differences which exist among scientists. The minds of some men are warped by theories; others entertain peculiar views regarding primary beliefs; and hence they interpret the very same natural phenomena in widely different ways. Darwin, for example, interprets certain observed phenomena so as to support his favourite theory of evolution; while Kölliker, a German naturalist of great eminence, interprets the same phenomena in such a manner as to favour an opposite view."

One point of supreme importance in regard to our intuitions I must notice ere I close. Among the most potent of our primary beliefs is that of *cause and effect*. It is, in fact, irresistible. Herbert Spencer thus describes it :—"We cannot think at all about the impressions which the external world produces upon us, without thinking of them as caused; and we cannot carry out an inquiry concerning their causation, without inevitably committing ourselves to the hypothesis of a First Cause."* Science, by itself, does not reveal, because it cannot reach, that First Cause; but Science, as we have seen, reveals phenomena which, being rightly interpreted, lead by sound logical sequence to a belief in that First Cause. And the mind by its irresistible intuitions leads us back to the conviction that the First Cause must be in every sense perfect, complete, total; including within itself all power, and transcending all law. It must be one and absolute; it must, in a word, be the God of Revelation.

And, further, the mind has other primary beliefs intimately associated with the belief in a First Cause. It has a belief that it is dependent upon a Higher Being, and that it owes allegiance to Him; it has a consciousness of a moral law, that man is responsible for his obedience or disobedience, and that there is a future state of reward and punishment. This belief in a future state we cannot quench. Do what we will, reason as we will, our higher nature looks away onward, with

* *First Principles*, p. 37.

earnest, irrepressible, unceasing yearning, to immortality in another sphere. Tennyson has expressed this beautifully :—

"Thou wilt not leave us in the dust ;
Thou madest man, he knows not why :
He thinks he was not made to die :
And Thou hast made him ; Thou art just.

"We have but faith ; we cannot know ;
For knowledge is of things we see ;
And yet we trust it comes from Thee,
A beam in darkness ; let it grow."

Science opens no field to which these intuitions belong, or in which they can find a resting-place. It cannot satisfy them. It leaves us in the dark, helpless and hopeless, on those very points which, constituted as we are with yearning affections and boundless aspirations, are of supremest importance. That very theory of "the survival of the fittest" is here completely at fault; for it would represent a series of beliefs to have been developed in the mind, which are yet useless and deceptive. No effort of genius, no perverse skill of sophistry, can ever reconcile these beliefs with any theory of evolution; for if this be the ultimate result of the latest combinations of atoms, if this be all that nature has done or can do, then this ultimate result is human life without adequate motive, "affections with no object sufficient to fill them, hopes of immortality never to be realised, aspirations after God and godliness never to be attained; and thus, too, myriads of myriads of other nebulæ may still be the potentials of delusions, and their outcomes the kingdom of despair."*

But a sounder and a higher philosophy, the philosophy embodied in the Revelation of God, gives far other teaching. It tells man that those grand intuitions were not implanted in vain. It leads him to look beyond the material universe for the satisfaction of his profoundest thoughts, and the realisation of his most earnest longings. It sees exhibited in some form by every nation, tribe, and family of mankind, a feeling of dependence on One greater than man, and of moral obligation to One holier than man. This feeling arises with the earliest development of consciousness, and it grows and strengthens with our mental growth. We cannot repress it; and the mind which is compelled to interpret the impressions received through the senses, as proofs of the reality of the material world, is in like manner compelled to interpret the intuitions

* Pritchard, *Address at Brighton.*

of dependence and moral obligation, as proofs of the reality of a spiritual world. And thus, as Mansell says, "In the universal consciousness of innocence and gilt, of duty and disobedience, of an appeased and offended God, there is exhibited the instinctive confession of all mankind, that the moral nature of man, as subject to a law of obligation, reflects and represents the moral nature of a Deity by whom that obligation is imposed." *

We now see the legitimate province of Science, in which it reigns supreme, and beyond which it cannot pass. In this province, in all its grand discoveries, we bid it God speed, for it is the handmaid to a knowledge higher than it can reach. Science shows the wondrous structure of vegetable and animal organisms, and the evidences of design in them all. Science unfolds the mechanism of the heavens, and the sublime simplicity of the laws that guide the stars in their orbits. Science reveals a harmony and a unity in all nature, adapting each particle of matter—each insect, plant, and animal—each planet, star, and constellation—to its own place, and making it fulfil its own mission in the universe. Science shows that there is nothing defective, nothing redundant. Science thus leads us up, step by step, to the culminating point of man's intellectual interpretation of nature—his recognition of the unity of the Power of which her phenomena are the diversified manifestations.*

Here, however, Science leaves us, and Revelation perfects our knowledge. Revelation solves the highest problems that occupy human thought—the origin, duty, and destiny of man, and the being and nature of God. The origin of intellect and conscience, with all their conceptions of law, obligation, a future state, and a holy God, is revealed in one pregnant sentence:—"God created man in His own image." And of these sublime truths, Revelation is the sole and complete exponent. Its expositions, too—whether of law, or morals, or worship, or faith, or hope, or charity—find such a response in our own profoundest feelings and loftiest aspirations, that we instinctively bow before it as a message replete with the infinite wisdom and goodness of God. While Science disappoints our most momentous inquiries, while Philosophy leaves an aching void in the human heart, Revelation fulfils all our desires, and satisfies all our hopes. It enables us to look through the dark vista of this life's labours and sorrows, to

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* *Bampton Lectures*, p. 113. † Carpenter, *Presidential Address.*

another where labour shall have its reward and sorrow shall be unknown. It opens before us a sphere where the perfect knowledge after which we here vainly toil, and the perfect happiness after which we as vainly strive, shall be fully and for ever realised.

The CHAIRMAN (Mr. H. Cadman Jones).—I am sure I may return the hearty thanks of this meeting to Dr. Porter for his exceedingly able paper. Before calling on those present to discuss it, I would venture to call attention to the question whether it can fairly be said that the hypothesis of the existence of atoms "has no clear logical connexion with any observed fact." If the connexion between the observed law of chemical combination in definite proportions and the hypothesis of the existence of atoms be not strictly logical, at all events that hypothesis furnishes, as I believe, the only explanation of the law that has ever been suggested. It is therefore a hypothesis which has strong claims to our attention. I cannot agree in the idea that an atom is unthinkable. Dr. Porter says :—"Now, to conceive of a piece of matter, having necessarily, because it is matter, length and breadth, and yet being indivisible, is, as I think, an absurdity." For my part, I cannot see that it is so. You cannot conceive of matter having length and breadth, and yet of its being inconceivable and theoretically impossible that it should be divided, but it is perfectly possible to conceive an atom which has length, and breadth, and depth, and which is yet so physically constituted that it cannot be divided ; and this is all that is necessary for the atomic theory. Not that an atom is something which cannot theoretically be divided, and must be conceived incapable of subdivision ; but something which cannot by any existing causes in nature be divided. I have now to invite remarks on the subject of the paper from any of those present.

The Bishop of BALLARAT.—We are greatly indebted to Dr. Porter for the luminous style of his paper, and for the well-selected quotations, by means of which he has put the views of eminent men which he combats before us in their own words. On page 44, near the bottom, the persistence of the "fit" is noticed as part of the theory of the universe expounded form Lucretius by Tyndall. It always seems to me that it postulates a God to provide that the "fit" should be the "good." The struggle for existence which, as I think Kingsley remarks, of itself would yield the survival of the biggest, the most brutal or most unscrupulous, issues on the large scale in the triumph of that which corresponds to our moral idea of the *best*. Why should "blind combinations" do that? Dr. Porter sums up section ii. by quoting, as the Bible philosophy of life, in contradistinction to theories which make it a property of protoplasm, the passage describing God's bestowal of "life" on *man*. Was not this a different bestowal from that on the "moving creature that hath life"? And does Scripture anywhere record the bestowal of "life" on vegetables? If, therefore, protoplasm could even be shown to have life as a property in vegetation,

this would not contradict the Scripture teaching, that *man's* life was a special endowment. I will just refer to page 63, near the bottom, where Dr. Porter alludes to man's universal sense of his dependence on God. This is true even of the Australians, a very humble and slenderly-equipped branch of the human family. I may here remind you of the absence of any indication whatever of emergence from an ape condition, even among the most backward of mankind. The phenomena show the Australians to have been degraded, not exalted, from their past condition. And their religious ideas exhibit an extraordinary incrustation of splendid primitive truths—reminiscences of some grand and even Scriptural beliefs—with the most grotesque and contemptible subsequent additions. The cave paintings of Australia point to a superiority in the past inhabitants of the land. Before I sit down, may I ask whether the marsupium of the Australian animals is not better explained by teleology than by mere natural selection? A kangaroo's pouch seems a provision for a waterless or droughty country, where a kangaroo mother might have to travel a hundred miles for water. If she left her young at home they would not be alive on her return. The natural perambulator enables her to take them with her in her search for this necessary of life. I leave to learned naturalists to say how far the development of this organ has been traced to purely natural combinations, but am old-fashioned enough to see in it myself a special provision for a special need, by One whose tender mercies are over all His works.

Mr. J. HASSELL: What is indicated on the second page of the paper is I think, important,—namely, that evolution is only an hypothesis, not a demonstrated fact. A short time ago, I met a book by a French author, and was much amused by his theory to account for the existence of mammals on the earth at the present time. His line of argument was as follows:—At some period in the far distant past, a number of fishes were lef by the tide in shallow water, and, as the gills would not perform their proper functions, imperfect respiration was carried on by means of the swim-bladder, and this was repeated again and again until ultimately true lungs were developed. Now, let this theory be tested by fact. When fish come to the surface of the water to obtain more oxygen than their native element contains, it results, not in the development of the swim-bladder, but in inflammation of the gills, and in course of time the fish dies. The writer then goes on to show that, when the fish have developed the swim-bladder into a breathing organ, and so cease to be fish, they became reptiles first, and then by degrees are developed into mammals. It is the duty of those people who believe in Creation to show the fallacy of such theories as these. With regard to a point referred to on page 42 I would say that, when these evolutionists ask us to believe that life is the result of molecular motion, or combination, they are really asking us to believe a greater miracle than that which we ask their assent to when we say that God gave life; because, if life resulted from the non-living, it would be a greater miracle than for God, who is Life, to put life not matter. (Hear.) If we are taunted as being credulous because we believe

in miracles, then, may we not charge those who believe in life resulting from the non-living with being far more credulous? Early in Section 3 reference is made to one of the fundamental doctrines of evolution, namely, that all the changes which have taken place must have been for the ultimate benefit of the creature. Well, then, may we not ask: Of what benefit could it be to any terrestrial or aquatic mammal with four limbs to give up the use of the two hind limbs in order that it might be converted into a whale? One would think that the four limbs would be better than two, yet we are asked to believe that certain four-limbed animals left off using their hind limbs so that they became altogether obliterated, and that the product was a whale. Again, of what use could it be to the ape to lose the grasping power of the hind hand? Surely the monkey tribe were better off with a quadruple grasping power than with a dual; but, if it be true that man was developed from the ape, then he must have lost the use of the hind thumbs, retaining the power of grasping in the two fore ones only. Beyond all this, of what benefit could it be to the race to lose the hairy covering of their bodies? Surely it must have been better to possess a hairy covering than to have a bare back; and yet, according to the hypothesis, it must have been otherwise. I was reading to-day in Dr. Pusey's sermon on "Unscience, not Science, antagonistic to Revelation," a quotation from the late Dr. Darwin, who, speaking of the work he had been doing, said, "I have at least, I hope, done good service in aiding to overthrow the dogma of separate creations." Now if that was his object, it was not a very noble one, and if he has overthrown the dogma—which I don't think he has—he must have done a wonderful work. I believe that, as long as common-sense men and women see in the wonderful creatures around them such extraordinary examples of the adaptation of means to ends, we shall be able to look the evolutionists in the face and tell them that they never will be able to overthrow the truth —I will not say dogma—of separate creations. I feel deeply grateful to Dr. Porter for his valuable paper, and hope it will be widely circulated, as it shows that those who come forward as our teachers in these matters do not agree among themselves, and that they are endeavouring to make men believe that mere assumptions are demonstrated facts.

Mr. H. C. DENT.—I had the advantage of perusing Dr. Porter's paper before coming here, and did so with the greatest pleasure and delight. The paper, in my humble opinion, is a very clear statement of some of the grandest truths of science, the aims of science, and the metaphysical deductions drawn from the researches of science — all urged with irresistible force on our minds. I propose only to refer to one or two points in respect to the origin of species and natural selection. Dr. Porter says :—

"The crucial point in this theory is, that species may be originated by natural selection. But Huxley, and Darwin himself, admit that this has never been proved. Darwin, it is true, draws largely upon an infinite past. He says: 'Nature grants vast periods of time for the work of natural selection.' And again: 'The mind cannot possibly grasp the full meaning of a hundred million of years. It cannot add up and perceive the full effects of many slight variations accumulated during almost an infinite series of generations.'"

As to this almost infinite past, I hope to say a word in a minute or two. Later on in the paper we find this quotation from Darwin :—

"By the theory of natural selection, all living species have been connected with the parent species of each genus by differences not greater than we see between the varieties of the same species in the present day."

Now, what says Sir Charles Lyell on species? He says: "Species have a real existence in nature. Each was endowed, at the time of its creation, with the attributes and organisation with which it is now distinguished." And Darwin, in his book, even admits that the most eminent palæontologists, have unanimously maintained the immutability of species, though Sir Charles Lyell, in his old age, supported the other side. Tyndall (Belfast Address, British Association, 1874) says :—

"Natural selection acts by the preservation and accumulation of small inherited modifications, each profitable to the preserved being"; (and Wallace): "It is a fundamental doctrine of evolution that all changes of form and structure, all increase in the size of an organ, or in its complexity, all greater specialisation, or physiological divisions of labour, can only be brought about inasmuch as it is for the good of the being so modified."

Then we ought to have a regular and systematically arranged order between every kind of species. But Professor Alleyne-Nicholson, in his *Manual of Zoology*, says this is not the case, and he adds :—

"For instance, Vertebrates belong to a higher morphological type than Molluscs, but the higher Molluscs, *e.g.*, the cuttle-fish, are far more highly organised, as far as their type is concerned, than the lowest vertebrate. Therefore, it is obvious that a linear classification is impossible, for the higher members of each sub-kingdom are more highly organised than the lower forms of the next ascending sub-kingdom ; at the same time, they are constructed upon a lower morphological type."

Then I should like to read two or three very brief extracts from Mr. Wallace's work on *Natural Selection*, as applied to Man. While upholding natural selection, as an evolutionist naturally would, he somewhat doubts when he comes to Man. He says :—

"It seems to me to be absolutely certain that natural selection could *not* have produced man's hairless body by the accumulation of variations from a hairy ancestor. Had it been abolished in ancestral tropical man, it is inconceivable that, as man spread into colder climates, it should not have returned under the powerful influences of reversion to such a long-persistent ancestral type."

Then again he says :—

"That the perfectly erect form, short arms, and wholly non-prehensile foot so strongly differentiate man from the arboreal apes, that if continued researches in all parts of Europe and Asia fail to bring to light any proof of man's presence, it will be at least a presumption that he came into existence at a much later date, and by a much more rapid process of development. It will be a fair argument that just as he is in his mental and moral nature, his capacities and aspirations, so infinitely raised above the brutes, so his origin is due in part to distinct and higher agencies than such as have effected their development."

Again he says :—

"Man is to be placed apart, as not only the head and culminating point of the grand series of organic nature, but as in some degree a new and distinct order of being."

I will not keep you more than one moment longer. I wish just to refer to Darwin's "almost infinite series of generations." One of Darwin's very difficult points is the sudden appearances of new groups of animals. He says that if this occurred it would be entirely destructive of his theories, and the only ground on which he rests the apparent finding of sudden enormous numbers of new species is, that the intermediate links have not been preserved. But if we go back to the Cambrian epoch, we find that enormous numbers—I think four out of five kingdoms of invertebrates—are fully representative and are in the highest perfection, and there is no record whatever in the underlying strata of any predecessors of them.

Dr. PORTER.—There is not very much for me to reply to ; but the first point I would venture to touch upon has reference to the remarks which you, Sir (the Chairman), have offered on the subject of atoms. I listened carefully to the words you used, and I thought there was one expression which seemed to grant all I ask. You said there are no appliances with which we are at present acquainted which would enable us to separate or divide an atom of matter, although you did not go so far as to say it was inconceivable that an atom of matter should be divisible.

The CHAIRMAN.—I contend only that there is no *à priori* reason why atoms should not exist which cannot be divided by any of the forces actually at work in the universe. I admit it to be unthinkable that there should be any portion of matter which you cannot conceive to be divisible.

Dr. PORTER.—That is all I ask. I think it inconceivable that a particle of matter, which as matter must possess length and breadth, is not capable of subdivision. Nobody has ever yet discovered an atom of matter. As to another point—that we are able to bring out the great facts that are taught in regard to nature and man in the Bible—facts as to the being of God, the origin of man, the origin of life—these are all things that are stated, and that we ascertain from the Bible, rightly interpreted. With reference to the question of life, various forms of life have been referred to. My object was to show that the origin of all life is to be traced to the distinct *fiat* of God—that no life, vegetable or animal, or human, which is the highest development of animal life, can have been derived from or evolved by mere matter. I might have entered into fuller explanations on this point, but time did not permit. May I say in conclusion that with regard to the proof of fundamental truths by history, history will not exactly reach all the truths I have referred to in my paper. The fundamental truths I speak of in it are these—the origin of matter and of the existing material universe. History cannot reach back to the creation ; neither can science. Creation is a matter of revelation, and as a matter of necessity all our knowledge must be derived from revelation. I look on that as a fundamental truth of Scripture. It involves the idea of the

creation of man by God. The origin of species is a lower doctrine ; but at the same time it involves the truthfulness of what is stated in the early chapters of the *Book of Genesis*, where we find each individual species traced to a Divine Author. As to the origin of mind, and of man himself, and the perceptions formed of the mind of God—these I regard also as fundamental truths which science cannot reveal to us, but which the Bible does. I have now to express my thanks to the meeting for the kindness with which I have been listened to. I am afraid my paper was rather long and that some parts of it were rather dry ; but my connexion with young men, and my responsibility in guiding them as far as possible in regard to these things, have led me to study the subject, and to prepare the paper I have read this evening. (Applause.)

The meeting was then adjourned.

NOTE.—The following letter from Dr., now Sir Andrew Clarke, Bart., F.R.S., was read at a recent public meeting :—"I take advantage of this hurried note to express the hope that in dealing with the relations of science and religion some one will point out what I have not myself seen pointed out—(1) that there is nothing absolute in the whole objective world; no absolute standard of mass, quality, or duration ; that the knowledge of an absolute primitive weight of atom is impossible, and that what we call the ordinary weight of a body is not a thing of itself alone, but a product of the body by which it is attracted, the distance between them, and the disturbances occasioned by other invisible but active forces ; (2) that the assumption constituting the fundamental axioms of modern physics, that all true explanations of natural phenomena are mechanical is incompatible with demonstrable facts ; (3) that the progress of chemistry is becoming more and more irreconcileable with the theory of the atomic constitution of matter ; (4) that there is no law of physics, not even the law of gravitation, without great growing exceptions, and no theory of physical phenomena, not even the undulating theory of light, which is not now becoming more and more inadequate to explain the facts discovered within its area of comprehension ; (5) and that, therefore, the boasted accuracy and permanency of so-called physical laws and theories is unfounded ; that very probably the greater part of the so-called axioms of modern physics will be swept away as untenable ; that theories of natural phenomena, apparently the most comprehensive and conclusive, are merely provisional ; at present finality in this region is neither visible, attainable, nor clearly conceivable, and that after all there may be methods of spiritual verification which, within their condition, scope, and use, may compare not unfavourably with the methods so confidently depended upon in physical research."