JOURNAL OF

# THE TRANSACTIONS

OF

# The Victoria Institute,

OR

## Philosophical Society of Great Britain.

EDITED BY THE HONORARY SECRETARY,
CAPT. FRANCIS W. H. PETRIE, F.R.S.L., &c.

## VOL. XVII.


LONDON:
(Published for the Institute)
E. STANFORD, 55, CHARING CROSS, S.W.
EDINBURGH: R. GRANT & SON. DUBLIN: G. HERBERT.
PARIS: GALIGNANI & CO.

AUSTRALIA AND NEW ZEALAND:
GEORGE ROBERTSON & CO., LIMITED.

1884.

## ORDINARY MEETING, JANUARY 21, 1884.

THE RIGHT HON. A. S. AYRTON, IN THE CHAIR.

The following paper was read by the author:—

## *HOW DID THE WORLD EVOLVE ITSELF?* By SIR EDMUND BECKETT, Bart., LL.D., Q.C.

I AM asked—probably on account of my little book "On the Origin of the Laws of Nature"*—to write a Paper on what may be called "Undesigned Cosmogony," or the production of the world and all that is therein without the "Intelligent Author" that even Hume believed in, though he believed little or no more about Him. I there discussed that alternative to Creation which is commonly called Materialism, or the "potentiality of self-existing matter," or "self-existing energy" and automatic Laws of Nature; which all practically come to the same thing, however their advocates may try to evade it—viz., that the ultimate atoms of Matter resolved for themselves by universal suffrage from the beginning of all things how they would act for ever in all possible circumstances, distributing themselves first into groups of the sixty-three elements, or whatever may be their number, and somehow acquiring the multitude of properties respectively belonging to them.

Laws of nature are only laws of motion for every kind of atom in all possible circumstances; and they differ from the three mathematical "axioms or laws of motion" established by Newton, in that those are necessary *à priori* truths,† but the laws of natural motions, or of nature, are statements of

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* S.P.C.K., 2nd Ed., 1880. † See page 294.

our experience, and proper inferences from it; and for anything we could tell *à priori* they might all have been different. That great saying of Sir J. Herschel's should never be forgotten, that a sufficiently clever man shut up by himself might conceivably reason out all mathematical truth, up to the highest that will ever be reached; but the cleverest man that ever lived could not divine *à priori* how a lump of sugar would behave when put into a cup of tea. There must also be laws of nature of which we yet know nothing more than that they are wanted to explain some phenomena of which we know no cause. A constant phenomenon can only be regarded as itself a law of nature, until some cause behind it is discovered, which then takes its place. Some physiological phenomena are variable and uncertain, such as the different effects of the same food and medicines on different persons, though they are all doubtless in conformity with some law. The still more precarious phenomena of mesmerism can neither be ignored or got rid of by any rational hypothesis, however often they are tainted with fraud; or of occasional apparitions, and perhaps a few kinds of divination, which are all beyond the reach of any law that is yet known or imagined. All that is quite apart from Miracles, of which I have nothing to say here, especially as I have treated of them in a lately-published S.P.C.K. tract, called "A Review of Hume and Huxley on Miracles."

Laws of Nature are not Axioms.

The argument of the "Origin of Laws of Nature" is, that the only alternatives for cosmogony are, (1) a single Creator who made and maintains the laws of nature; and (2) as many creators as the atoms of the universe, all agreeing how they would behave, and always keeping their resolutions; and they must also have had foresight enough to agree on the laws of nature, or of their respective motions, that would produce all the actual results. As that alternative is hardly possible for any rational man to accept,* it necessarily follows that between those two the other is the true one, viz., that there was one Creator; and a Creator omnipotent enough to make all the laws of nature must, *à fortiori*,

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* And yet I see, from Mr. Goldwin Smith's article on Mr. Leslie Stephen and Herbert Spencer in the *Contemporary Review* of last December, that some philosopher, whom he does not name, has accepted this "pan-atomic" theory as the only logical alternative to a Creator. So far that philosopher is quite right, and it is satisfactory to see it acknowledged. [Nevertheless, a newspaper critic of this lecture said it was absurd to state such an alternative: so much he knows about it.]

The two Alternatives of Cosmogony.

have had the much smaller and approximately human power of calculating or foreseeing their consequences. A power that makes laws of action, foreseeing all the consequences, does *ipso facto* design them.

Nobody has ever attempted to show any fallacy in that argument; and, if it cannot be refuted, it is conclusive on both points, *i.e.*, that there is a Creator, and that he designed everything, and did not blindly start some laws of nature or forces, and leave them to act as they might, and that we merely have the accidental results which have survived; for I need hardly remind you that so-called accidents play a very large part in the only rival theories of cosmogony that are now in fashion, all going under the name of Evolution of one kind or another.

I now propose to go further, and to take up the question of apparent design at some later stages of the universe, and to see how much of it can be accounted for without a vast deal more of creative action than merely starting some kind of force. Many persons fancy that it is quite enough to call any common growth Evolution, and then "spontaneous evolution," and then take that for a proof that everything can come, and has come, by spontaneous evolution from some unknown kind of self-existing matter, with no properties or qualities: which is all a mass of bad logic and absurdity.

For, first, it is a mere perversion of words to call growth Evolution, while it means the increase of some seed or egg without any visible external addition, such as one has to make in order to increase any dead thing. Secondly, it is not true, if it means that the additions to the body are evolved from it as mere changes; for they are added to it by sundry processes, which the writer who is called "the chief apostle of Evolution" pronounces mysterious, and confesses that he is "in the dark" about them, which is an odd way of commending a new philosophy and "unification of all knowledge." Thirdly, whether mysterious or not, each process must have some cause, as much as every other motion in the world. If that cause is a known physical force or attraction, there must still be a prime cause behind it to settle its direction and its intensity and to make it continue to act. Calling it spontaneous is simply saying you know nothing about it, and it is evident nonsense to call that an explanation, or to call growth Evolution; for it is in fact attraction of a very peculiar kind, with selection of the particles to be attracted, and a different selection for every different animal and vegetable.

And further, if growth of offspring exactly like the parents could properly be called by some such name, that would be no reason for applying it to new growths of a different kind, which the automatic evolutionists really want. Every new organ, or ever so small a rudiment of one, is extraordinary at first, and a special cause is wanted to produce—and that is to create it. That cause may be a law of nature beyond our knowledge, but it wanted making and maintaining no less than any other that we do know.

Darwin's theory of "biological evolution" is this, in his own closing words of the Origin of Species: "I view all beings, not as special creations, but as lineal descendants of some few which lived long before the first bed of the Cambrian system was deposited. . . . . There is grandeur in this view of life, with its several powers having been originally breathed by the Creator into a few forms, or into one, and that while this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are, evolved." In short, the ultimate difference between that and the old theory is, that Darwin allows only small changes (which are all no less creations than if an elephant suddenly came out of an egg, or out of the earth), while the old theory allowed creations of any size at once.

The only answer that I have seen to the proposition that small changes require a creative power just as much as large one is the assertion that some changes are always necessarily taking place from the change of circumstances, and that those only survive, or are continued, which are adapted to the new circumstances, while the others die out. But all that involves a variety of causes, of which the evolutionists give us none. They have to explain why any suitable change is ever produced by altered circumstances, such as climate for instance; and, indeed, why any change at all should happen of itself. Adaptation means the creation of suitable changes, none the less because some others that are not suitable are produced also, only to perish in "the waste of nature."

It seems to be admitted too that changes which can hardly be called small sometimes appear quite suddenly; I understand, though I do not remember the passage, that Darwin himself mentions that one branch of a peach-tree occasionally produces nectarines, and that there is no intermediate fruit known. Certainly each of them is a perfect fruit of its kind, and neither can be pronounced superior to the other. And yet they are very different.

Means the Creation of small Changes.

If a child can be born with six fingers, or a "calculating boy," who sees by instinct results which would take a long time to calculate, or men of prodigious strength or genius, from parents who had no such powers, it is plain that entirely new organs and powers can be produced at once, that is, "created," without passing through infinitely small stages of development. Therefore there is some power at work which has made laws of nature beyond our knowledge, capable of producing new creatures, whether fruits, organs, animals, or functions and instincts, complete in themselves, and superior to their parents. If that is not design, what would be?

Nor can the evolutionists account for the still earlier process of any kind of generation without some creative power to produce it. That also they quietly slide over as if its commonness was sufficient to have begun it. And so they do with all the phenomena of "cross-fertilisation," as if it were a self-evident truth or axiom (like "two straight lines cannot enclose a space"), that touching what is called a female seed of one thing with the male seed of another, not too different, must produce offspring more or less like them both. (I use the word "seed" here in its most primitive sense, not that of finished seeds or eggs.) If we are to assume such "mysteries" as these to be necessary truths or automatic processes requiring no designing power to produce them, we might just as well assume the automatic existence of everything at first, with automatic powers of creating their successors; for generation is creation, whether of like or unlike successors.

The old notion of a vast multitude of special creations or complete specimens and parents of new species, from time to time, obviously implies a much lower order of creative design than that which ordained, once for all, the machinery which we call laws of nature, capable of going on from the beginning to the end of time, working out "beautiful and wonderful forms," with some apparently self-acting apparatus for always adapting (which is changing) them, according to all the changing circumstances that arise. This too the evolutionists of all kinds quietly slip over, as if adaptation needed no cause and no explanation because it is done gradually and almost imperceptibly. So quietly does the great machine work, that it appears to go of itself, even while it is turning out prodigious changes. And because it works so smoothly, and never requires meddling with to make it do something new, we are asked to believe that it goes of itself, and made itself, and with no design of producing any particular results. Some go so far as to say that it could not help making itself; for that

all the laws of nature are necessary, self-existent forces, or all came because they could not help it from one force in no particular direction, whose only function is "persistence." Spencerian Evolution,

In fact, that is expressly the Spencerian theory of evolution, which claims to include the Darwinian, not to contradict it. Darwin founded all his conclusions (whether they are all right or not) on the largest induction from facts that he could make; and perhaps no philosopher ever took more pains to investigate them in so many directions throughout nature. The other kind of evolutionary philosophy is entirely different in its mode of proceeding; and all its conclusions simply come to this: that the law of nature which its discoverers from a vast number of experiments call the Conservation or Correlation of forces, or the constancy of the sum of all the forces in the universe, is re-named by Mr. Spencer "The Persistence of force" (which omits Transformation or Correlation), and then pronounced to be the sole fundamental, self-existent, necessary thing or truth; except that he is obliged also to assume some unknown kind of homogeneous universal matter with no properties besides: and these two between them have made all things by the processes which he designates as we shall see. We are allowed, and indeed invited, to put behind Persistent Force something else, which is called the Absolute, Unconditioned, Unknowable, and Unknowing, "universal Immanence," which never did, or does, anything but maintain or start indestructible force. Consequently, for all practical purposes, "the Unknown Reality which works in us," of which matter and motion and force are "the symbols," simply *is* indestructible force: a set of remarkable discoveries indeed—that force is a symbol of force, and that motion is caused by force, and that matter is only cognisable by its properties or forces. And yet his primeval matter was homogeneous, and therefore had to acquire, and therefore did acquire, all its heterogeneous properties somehow from the action of some one force upon it.

Moreover, the only true Religion consists in acknowledging—first, this new kind of Unknowable; and secondly, the impossibility of knowing any more about it. Every religion that professes to know anything more is, *ipso facto*, "irreligious and absurd" (p. 100). Yet that is just what is professed by every religion that is or ever has been, however else they differ. Nay, Mr. Spencer himself is as irreligious and absurd in that respect as the believers in Jupiter or Mormon or Mumbo Jumbo; for he professes to know all the functions of his Supreme Reality and Power—viz., that it "works in us," and made and

And the only true Religion.

maintains, and practically is, persistent or indestructible but transformable Force, and nothing else. We profess to know no more of our Supreme Power than it has told us. Mr. Spencer professes to know everything by the light of his own intellect. Which, then, is the most "irreligious and absurd," according to his own dictum?

The religious or ethical parts of the Spencerian Philosophy have been discussed by former writers and speakers in this Society. For that reason, and also because this particular question of design in creation involves no metaphysics (which only mean interminable discussion), I shall confine myself to the theory of undesigned cosmogony propounded in those "First Principles of Synthetic Philosophy or Unified Knowledge," which I have already described almost in the author's words, only rather more briefly. Whether one of his admirers in a scientific journal is right or not in pronouncing his "work of the calibre of that which Newton did, though it as far surpasses that in vastness of performance as the railway surpasses the sedan chair," he does unquestionably far surpass Newton in vastness of language, both as to quantity and quality. We shall presently see also the real nature of the "clearness of thought and of expression" which it is equally the fashion of his admirers to glorify.

[Other critics find it easier to say that I impute to him opinions which are not his, than to explain how they differ. They evidently do not understand, if they have really read, my arguments; and I doubt very much if anybody understands his. I give them in his own words wherever I can, and it is not necessary to profess to understand what you are demonstrating to be absurd. Nothing can be more futile than for writers ignorant of science, and especially of mathematics, to set up for either defenders or improvers of Spencerian natural philosophy.]

Though it is his philosophy and not his style that we are concerned with here, they are inseparable in this respect, that he claims the right to call everything by new names, and to use old ones in any sense he pleases, and for just as long as he pleases, without prejudice to the right of tacitly resuming the old senses, or intending his readers to do so, whenever he finds it convenient. Thus nobody must suppose that his "Differentiation and Integration," which are the chief agents of Evolution with him, have any kind of relation to their well-known meaning in the only science in which they have hitherto been used. Mathematical "differentiation" means infinitely small variations according to known laws, and

"integration" is the mode of summing them up between any prescribed limits. But with Mr. Spencer, and the automatic school generally, "differentiation" is the functionary always at hand to account for any kind of change that is wanted, large or small, normal or abnormal, and indeed generally the latter. And they always assume that any change they want can come of itself, and requires neither cause nor explanation. He never condescends to define his "differentiation" at all; which again is an odd way of dealing with an old word plainly intended to be used in a new sense, in a new system of Philosophy which is to be the "unification of all knowledge," whatever that means.

Spencerian "Differentiation" and Evolution.

I see that another writer, quite as strong an evolutionist as Mr. Spencer, and much more really philosophical in his mode of reasoning, thinks much as I do of his habit of making definitions to suit his own objects, and then arguing from them as if they were generally accepted. At p. 257 of *Mental Evolution of Animals*, Mr. Romanes says: "The fact that he (Spencer) defines or 'describes' instinct as *compound reflex action* does not carry any proof that his doctrine is correct. To call a spade a club, and then argue that, because it is a club, it cannot be a spade, is futile." All these inventors of new meanings of words resume the old ones whenever they choose, and in that way can prove anything. It requires some experience and attention always to detect the fallacy. I have exposed one or two notable instances of it in my aforesaid *Review of Huxley on Miracles*.

The nearest approach to a definition of integration is this, at p. 281 of the last edition:—"The change from a diffused imperceptible state to a concentrated perceptible state is an integration of matter and dissipation of motion." But what is an imperceptible state of matter? Imperceptible to whom? Does it merely mean diffused too thin for our eyes to see it without, or with, some scientific help? And what has our power of seeing it to do with its integration? That must be something absolute. And why need it involve dissipation of motion? The particles of the thinnest nebula need have no motion at all until gravity is turned in, though the particles of gas kept gaseous by heat have. They may be actually gaining motion only by integration under gravity, which in plain English means no more than "condensation"; and the "imperceptible" means nothing at all.

That is an initial specimen of Spencerian lucidity of thought and diction. But a more important one is the "final formula," or definition of Evolution itself, after 396 pages of preparation

"Indefinite Incoherent Homogeneity."

and successive amendments; and that is not final or complete after all, as we shall see. However this is it, solemnly printed in italics, as such a fundamental truth deserves:—"*Evolution is an integration of matter and concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity; and during which the retained motion undergoes a parallel transformation.*" This, then, is the true solution of the problem of cosmogony; or rather it would be, but for the troublesome circumstance that Evolution practically never is "simple," but always more or less "compound"; from which circumstance he admits that "complexity arises." But, complex or not, we must face the reality. It is no use dwelling on an imaginary and abstract *simplicity* such as this, delightful as it might be. Unfortunately the chapter on "Simple and Compound Evolution" goes no nearer to a definition of them than telling us that, "when it is integration of matter and dissipation of motion only, it remains simple, and when it is *something more* it becomes compound" (p. 304); and it always is something more. On the whole, we learn (p. 330) that compound Evolution involves both integration and its opposite, going on together; and so that "final formula," for practical use in cosmogony, has to be modified accordingly: only he never does modify it accordingly into any *perfect* form, beyond its "final" one. Therefore we must try to understand a little more about "indefinite incoherent homogeneity."

First we find, then, that the primeval homogeneous mass or nebula, which it suits Mr. Spencer to start with, must not be infinite; because then the self-existent gravity, which he is obliged to introduce (p. 224) instead of his indefinite persistent force, could never move a single atom, as it would act in all directions equally. Therefore the primitive, indefinite, homogeneous mass has to be finite; and an infinite one is summarily disposed of in his usual way, by being pronounced "unthinkable"; which word he invents as something stronger than "inconceivable" or "impossible." One would have thought infinity of space a good deal more conceivable than space bounded by nothing; nor is it easy to think why the primeval homogeneous matter should come to a sudden stop at some boundary, on the other side of which is nothing.

Moreover, a homogeneous anything is necessarily definite in substance too, whether we know what the substance is or not. Again, though he is pleased to call it incoherent, it was held together by gravity, without which, he says, matter is unthinkable, and it is his one actual initial force; and it is all

that holds fluids together now. Probably "the attraction of cohesion" of solids is some other force, which also Mr. Spencer has got to invent or account for by his universal solvent, the conservation of force, and the cohesion represents the heat that is requisite to dissolve it. But no one could possibly divine *à priori* how much more heat would be required to dissolve iron than lead, and lead than ice. Therefore these are laws of nature demonstrable only by experience, and requiring creation and maintenance, and not necessary truths independent of experience.

"Parallel Transformation of retained Motion."

Next for the "definite coherent heterogeneity." Coherence we have already seen to be merely a word of degree, depending upon the amount of "integration" or condensation that has taken place, up to date, as they say. There has been no such thing in nature, since gravity came in, as absolute incoherence,—though there may be a good deal of it in "synthetic philosophy." Again, if homogeneity must be a definite something, as it plainly must, heterogeneity can be no more definite, and unfortunately it can be much less. For heterogeneous things—even solid, and fluid ones still more, and gaseous above all—may be so intermixed and varied in density that the composition may be more properly called indefinite than definite. Therefore it turns out that all those fine adjectives mean just nothing, except that "definite and indefinite" ought to be reversed, if used at all. And, then, what is a "parallel transformation of retained motion" which is undissipated by integration? I look in vain through the Spencerian pages for an answer. It certainly never is parallel to its former direction after transformation. So there we must leave it, and "dissipation of motion" too, with the remarks I made on it just now as a necessary companion of integration, whereas it may just be the contrary.

What, then, remains of that portentous formula, the final and complete expression of the "Evolution of the Cosmos" out of self-existent matter by persistent force? Mr. Spencer, in his new Appendix, rebukes some great mathematicians for making fun of it without any serious argument, and says that they have not perceived, poor ignorant creatures as they are, that "language of the highest abstractness is necessary" to express such transcendental truths. I have not done that, tempting as it may be. But I have shown that every important word in it is either unmeaning or wrong, and ought to be reversed or combined with its opposite.

I am not reviewing Mr. Spencer's book generally: that has been done at greater length in the *Edinburgh Review* of

Other processes of Spencerian Evolution.

this month (January 1884). My only object here is to exhibit the impossibility and absurdity of his new alternative to the old theory of a Creator ordaining and maintaining laws of nature; which he calls "the carpenter theory of creation, (p. 120) maintained only in the pride of ignorance," of which I shall say a little more at the end. I might be content with this exposure of his final formula or definition of Evolution. But, if I stopped here, perhaps his disciples would say that it is a mere verbal question, and that they can afford to give up his definition of Evolution, unless we can also refute the processes by which he has satisfied them that the world was evolved by persistent force. I do not expect to convince them of anything. But perhaps I may some other people, who are only waiting to see if his other automatic processes are admitted to be possible results of the conservation of force, now that it is admitted to be true, not indeed as an axiom transcending demonstration and underlying experience, but as a law of nature proved by experience.

His various automatic processes, with their wonderful designations, are all proved to the satisfaction of his admirers by a peculiar kind of logic, which consists in giving some specimens of each of them, and then pronouncing them universal, and then "necessary corollaries of persistent force," sometimes adding that every body will (or ought to) *see it*. Whenever any "minor incident forces" are wanted, viz., such trifles as gravity, electricity, heat, crystallisation, and all the chemical and vital forces, they are instantaneously generated by Mr. Spencer's word, that matter is unthinkable without them. These processes of Spencerian Evolution are not only the integration and disintegration, differentiation and redistribution, dissipation and retention, which we have made acquaintance with already, but some more, viz., the Instability of the homogeneous, the Rhythm of all motion, Segregation, Multiplication of effects, Equilibration, and finally Dissolution (only that also is not final, any more than the "final formula" of Evolution), besides a few promiscuous phenomena, hardly to be called processes or causes. There is a chapter on "The Direction of Motion," which begins with the important admission that "the absolute cause of changes, no matter what may be their special nature, is . . . . incomprehensible." What are we to think of a philosopher who professes to "unify all knowledge," and to deduce everything from a single indestructible force in no known direction, and then tells us that the initial change in every direction is incomprehensible—without a Creator? for it is absurd to say they are in-

comprehensible with one, except as to his *modus operandi*, which we have nothing to do with here—only with his existence. Mr. Spencer's "Postulates."

It may be thought of little consequence whether he is right or wrong in saying that the conservation of force is not an experimental law of nature, but a necessary truth or axiom "transcending demonstration and underlying experience by being the basis of it"—and the only one; for he expressly denies that all the commonly received axioms are self-evident or necessary truths (179 n.). But it is of more consequence than it looks; for, if the conservation of force is really a self-evident truth, it is not a law of nature which required making by the only power that can make them. As a matter of fact, it has been established by a long series of experiments by real philosophers, who knew very well that it could only be an inductive truth, and not a deductive one, if true at all. Mr. Spencer has never discovered one single fact or law of nature, or a new cause or effect of any kind. He merely takes the correlation, or conservation, or indestructibility of force as he found it, gives it a new name, and dogmatically asserts that it is a necessary and self-evident truth prior to all experience, and that from it all the laws of nature come.

For some reason of his own too, or perhaps only from a determination to have a phraseology as well as a religion of his own, he is pleased to call necessary or self-evident truths *postulates*, instead of axioms, which have always hitherto meant quite different things. The reason he gives for himself and Professor Huxley inventing the term "persistence of force" instead of "conservation," as everybody else calls it (if not correlation), is that "conservation implies a conserver," which he therefore denies, although he over and over again assigns that as the only function of the power which it is the only business of religion to acknowledge. "Correlation," at any rate, does not imply a correlator; but that was old, and "Persistence" is new. And this is the way he sets to work to show that it is the one necessary truth:—"All reasoned-out conclusions must rest on some *postulate*. We cannot go on merging derivative truths in those wider and wider truths from which they are derived without reaching at last a widest truth which can be merged in no other, or derived from no other. And whoever contemplates the relation in which it stands to the truths of science in general *will see* that this truth transcending demonstration is the 'persistence of force'" (192 c.). Is it possible that Mr. Spencer does not himself see, but only expects unbelievers in a Creator but believers in him not to

The Meaning of "Axioms."

see, that any other proposition, not obviously false, might be substituted with equal logic for "persistence of force" in that sentence? What would he say if we substituted the "existence of a Creator" for it? Yet that is a vast deal more self-evident than the conservation of force.

Perhaps he or his followers may say that it is the very nature of axioms or self-evident truths not to be demonstrable by reasoning. And yet I see that one of them, the editor of *Knowledge*, in a depreciatory notice of the article on the Spencerian philosophy in the last *Edinburgh Review*, gives exactly the opposite definition of an axiom. He says that "in its proper sense it means a fact or law established by experience, and known to be worthy (ἄξιος) of acceptance": a truly fortunate pair of "proper meanings"! For (1) all truths are worthy to be received, and yet there are an infinity of truths for one axiom. And (2) so far from ἀξίωμα, or axiom (which are the same word in Greek and English writing), according to dictionaries and Aristotle, the great authority on such matters, always meant in philosophy "a self-evident truth, or basis of demonstration, or a truth which cannot be made plainer by demonstration"; in short, the very opposite of what requires experience to prove it. Euclid's axioms meant the same, and so did Newton's "Axioms or Laws of Motion," though he illustrated them by a few experiences and experiments, which alone were quite inadequate to prove them, if they had been at all doubtful in themselves. It is impossible to conceive action and reaction not being equal and opposite. And if bodies did not persist in the same direction and velocity, or rest, unless some new force disturbs them, to which side could they turn, and why should they either retard or accelerate themselves? The second law would require more discussion than this third and first; but I have no doubt Newton thought that also self-evident. If he did not, I have only to say that he was wrong, according to established use in Greek and English, to call his Laws of Motion "Axioms." Indeed they never are so called now, but always simply "The Laws of Motion," either for shortness or to avoid the ambiguity. But that is a mere verbal question.

I suppose that even Spencerian disciples will admit that something more than mere assertion is requisite to establish a new axiom; especially when a series of eminent philosophers had been for years trying to prove the thing in question by elaborate experiments, and have at last succeeded, so far as any law of nature can be said to be absolutely proved. Real axioms

are not proved by experiments, unless you choose to invent a new definition of them, like the editor of *Knowledge*, or Mr. Spencer, to which Mr. Romanes's remark would then apply. And let us see one or two specimens of this self-evident truth, which Herschel's "sufficiently clever man shut up by himself" ought to have been able to divine, if it is a real axiom, but not otherwise. When two equal lumps of clay hung close together as pendulums meet with equal velocity, they simply stop. All their motion appears to be lost; and the cleverest man in the world would have said that it is, and must be, until something more was known. No one could possibly have guessed that in those two dead, still, and cold-looking lumps a set of invisible vibrations would be set up, which we call heat, now that we have learnt by other experiments, and not by divination, what heat is; though to be sure Newton did divine that, but it had yet to be proved.

Conservation of Force is not an Axiom.

A synthetic philosopher sees somebody else turning a glass wheel under the friction of a piece of silk, evidently with more resistance than if the silk were cotton. The philosopher is asked to divine, without any information from experience, what becomes of all the force that the man has to exert beyond the ordinary friction. Does Mr. Spencer think he could have divined by any *à priori* process that a wire would carry that apparently lost force invisibly to the other side of the world, and there write sentences, illuminate a room (if the machine is big enough), perform chemical operations, melt steel, and grow peaches faster than the sun alone? If his philosophy is right, he ought to be able to divine all this, and every natural phenomenon in the world, without a single experiment. So far from that, he does not pretend to show how any single transformation could have been divined *à priori*, or deduced from his own assumed divination of the persistence of force. Yet his disciples are silly enough to believe that he has deduced and proved them all; which would indeed have "surpassed Newton in the vastness of the performance."

He thinks he gives a further proof of its axiomatic character by saying that Newton's "Axioms or Laws of Motion" involve it, which Newton certainly did not know—nor anybody else. Of course they are *consistent* with it, because both are true; but that is another thing. He forgets too that he denies all other "axioms" to be axiomatic except his own. Then, if Newton's depend on his (which they do not the least), they cannot prove it. If they are really axioms prior to his, and prove it (which also they do not), then his is not the one

Abstract Force in no Direction.

transcendental truth, "the ultimate of ultimates," but sinks into a mere consequence of Newton's laws; like the elliptic orbits of the planets, which are a necessary consequence of gravity and of whatever gave them their initial impulse; which also Mr. Spencer thinks he can dispense with, though he several times rightly says that a single uniform force of that kind could only produce uniform motion in one direction—*i.e.* towards the centre of gravity of the universe (287 and 481).

Therefore he has failed utterly on his very first proposition, and his whole case is gone. For, even if he could prove that everything may follow from the conservation of force, yet, until he proves that to be an *à priori* necessity, and not a law of nature which required a prime cause to make and to maintain it, his philosophy is nowhere, and can only be reconciled with truth and common sense in the same way as he "reconciles" religion with science.

Moreover, he seems to forget that force must act in some particular direction or directions before it can "persist" or be transformed into any other directions and kinds of force. Abstract force in no particular direction is nonsense. And indeed, as soon as he begins the real business of cosmogony, he does begin with the definite force of universal attraction commonly called gravity, and it is material to see how he generates and deals with it. Many philosophers, from Newton downwards, have tried in vain to discover a physical cause of gravity, acting equally through a vacuum and the densest matter, according to the well-known law of distance, and with the standard intensity, which could by no conceivable possibility be ascertained except from experience,—a fact which Mr. Spencer entirely ignores. They have all been wasting their time even more than the explorers of the conservation of force did in not waiting for Mr. Spencer, who does the whole job for them in three lines:—"Matter cannot be conceived except as manifesting forces of attraction and repulsion. . . . . By a higher abstraction results the conception of attractive and repulsive forces pervading space" (p. 224). And that is all: not the smallest scrap of a reason why there should be any attractive or repulsive forces, and what; or why the atoms of the universe should not have existed for any length of time in a state of perfect indifference as to approaching each other. Of course he allows atoms, ever so diffused, to be matter (224). He is continually saying that he has shown each force in succession to be a "corollary," or some other kind of offshoot, of his persistent force, which we now find to be gravity—or

nothing. But all that he really does tell us of their generation is this comprehensive dictum :—"The genesis of heat, which *must* accompany augmentation of density" (only in some cases it perversely does not, as he himself elsewhere mentions) "is a consequence of another order. . . . At a later stage light, as well as heat, *will be* generated. Thus, without dwelling on the *likelihood* of chemical combinations and electrical disturbances, it is sufficiently *manifest* that, supposing matter to have originally existed in a diffused state [the homogeneous definite nebulous mass before described], the once uniform force which [beginning how and when ?] caused its aggregation *must* have become gradually divided into different forces" (435); which is exactly what one force acting on homogeneous matter never could be, as he has himself several times indirectly admitted.

"Transformation of Forces a profound Mystery."

But suppose for a moment that it could, and even must: what reason is that for concluding that the one initial force must divide itself into just the attractions of various kinds, and a few repulsions, heat, electricity, and all the chemical and organic forces requisite to generate the world? Mr. Spencer has not a word of reason to give for any one of these "mysterious transformations," and indeed admits that he is entirely "in the dark" about them, as we shall see presently. And yet he coolly pronounces all these "wills" and "musts" and "likelihoods"—an entirely new agent in natural philosophy—"*deductions*" from his one axiom, and announces at the beginning of Chapter 14 that he is now going to "verify deduction by *induction*"; which means a natural selection of such specimens as suit his views of all his various processes of evolution, "abandoning" all that do not, and then pronouncing the induction sufficient and complete (379).

If anything could make all this more ludicrous, he has done it by solemnly pronouncing "the transformation of the physical forces into each other profound mysteries," which "it is impossible to fathom" (p. 217). We are saved all trouble of refuting his impossible proposition that any primeval uniform force (which turns out to be self-existent gravity) could ever transform a homogeneous mass into a number of heterogeneous ones, by his saying himself that "where the only forces at work are those directly tending to produce aggregation or diffusion [of which latter force he has yet told us nothing] the whole history of an aggregate will comprise no more than the approaches of its components towards their common centre, and their recessions from it" (p. 287). And again :—"Like units subject to a uniform force capable of producing

Mr. Spencer's Self-existing Flocculi.

motion in them will be moved to like degrees in the same direction" (p. 481); which of course is quite true; and consequently all the assumptions, that one initial force acting on homogeneous matter would or could divide itself and the matter into different kinds of forces and matter, are mere nonsense, and have been refuted by himself.

Yet, in the face of those two true statements of the only possible effects of a uniform force acting on homogeneous matter, either all in parallel lines or all towards one centre of gravity, he coolly says that "the first stage of nebular condensation would be the precipitation into *flocculi* of denser matter previously diffused through a rarer medium" (p. 225). But how did the denser matter get previously diffused through a rarer medium in a homogeneous mass? And previously to what? We begin with the homogeneous mass, which is also inconceivable (he says) without gravity. Then the first stage necessarily must be (as he rightly said in the other place) motion of all the atoms in like degrees towards the centre; that is, the density must have increased in uniform spherical shells. How, then, was the precipitation or diffusion of denser matter through the rarer medium to begin? In all this reasoning of his, every cart and its horse are made to change places just as they are wanted. Flocculi are the denser matter, and yet the denser matter could not possibly get into flocculi or clouds, which are (relatively to the rest) lumps, under the action of gravity or uniform compression. But flocculi are wanted, and therefore flocculi must come. The Spencerian philosophy can make greater things than these come when they are called.

The next thing to be conjured into automatic existence is the spirality of the contracting nebula of homogeneous matter, and that feat is performed thus: "The tractive forces which would of themselves carry the matter in a straight line to the centre of gravity are opposed by the resistent forces of the medium through which it is drawn. The direction of movement must be the resultant of these, which, in consequence of the unsymmetrical form of the flocculus, must be a curve, directed, not to the centre of gravity, but towards one side of it" (p. 228). But towards which side? And which of all the infinity of axes through the centre of gravity is to be the axis of rotation? And how are all the flocculi throughout the universe to conspire to send resultants of gravity from every direction all into one direction round one axis when it has been discovered? And how did any unsymmetrical flocculus begin by means of uniform attraction moving homogeneous

units to like degrees in a homogeneous mass? Mr. Spencer himself says (of course in another place—p. 223) that "the Absolute Cause of changes, no matter what may be their special natures, is incomprehensible." Here he means it to be comprehensible, and a necessary result of one initial force on one homogeneous mass. No doubt we might use the same words, only we should mean by them that the cause of all apparently automatic changes is the will of a Creator, who is incomprehensible beyond what he has told us of himself. But Mr. Spencer "abandons" him for a variety of incomprehensibles of his own, which can do nothing, and are nothing but mere words expressing that he knows nothing of any of those processes which he dogmatically calls corollaries of persistent force.

Hitherto he has been inventing processes, not one of which could take place spontaneously under the universal laws of motion. Next we have some maxims, of the kind which he is pleased to call postulates; not that it signifies much what they are called. The first that I will notice is what he calls "the Instability of the Homogeneous," and sets up as an automatic cause of other incomprehensible changes. Of course the homogeneous will be unstable whenever new heterogeneous forces act upon it; but he has got to generate them yet; which he here professes to do by stating their effect after they are generated: another transposition of horse and cart, or cause and effect, and another contradiction of his own true axiom, that "like (or homogeneous) units subject to a uniform force will be moved to like degrees in the same direction."

His assertion that "all motion is rhythmical," *i.e.*, periodic or vibratory, "if antagonistic forces act, a postulate which is necessitated by the form of our experience" (which, I suppose, means in English that they always do), is simply wrong both ways—*i.e.*, as a self-evident or *à priori* truth, and as an experimental law of nature. The vibrations of heat and sound and electricity are undoubtedly automatic in the sense that we know no cause for them but the will of whatever power made the laws of nature; but that has nothing upon earth to do with their being "necessary" or divinable *à priori;* and they are a very small fraction of all the motions of the universe. So far as we know, the universe could exist without electricity: at any rate no human being could have divined it. And what are the *antagonistic* forces in all these cases? Plenty of other motions, but not all, are in some sense periodic, when there are known causes for it in accordance with the laws of motion: that is, their rhythm is a

"Annual Trips a Corollary of Persistent Force."

consequence of them, and not an independent cause, which Mr. Spencer wants. And, as for any of those rhythmical motions being "inevitable corollaries from the persistence of force," just let him give us what he conceives to be a mathematical deduction of them from that alone; and I remind him again that their being *consistent* with it is worth nothing, because all truths are consistent with each other, but they do not therefore all prove each other.

It would be more tedious than useful to go through Mr. Spencer's descriptions of his other self-acting functionaries named above. In every case his mode of argument is the same as I have described already. The Multiplication of Effects is illustrated by the fact that "classes who before could not afford it now take annual trips to the sea; visit their distant relations; make tours," and so on (455); and then he says that "for symmetry's sake it is proper briefly to point out"—that is, to *say*—"that the Multiplication of Effects is also a corollary of the" correlation or conservation of forces. He might as well say the multiplication table is. It does not need twenty-eight pages to prove that effects accumulate by multiplication, which is all that these pages practically come to; nor are we much nearer the solution of the problem of the prime cause of all things by being told such things as that. Indeed in that very chapter we learn the disappointing news that, after all these wonderful phrases and new names for old processes, we are as far off as ever from any solution of that problem. For he says, at p. 444, that "we are still in the dark respecting those mysterious properties which make the germ, when subject to fit influences, undergo the special changes beginning (and continuing) these transformations." And also, at p. 217, that "they are not profounder mysteries than the transformation of physical forces into each other"; which actually is the one "self-evident truth or meaning" of persistence or conservation of force. Perhaps Mr. Spencer, or one of his admirers who think they understand his Philosophy, will condescend to explain some day how profound mysteries of experience can be necessary results and corollaries of a self-evident truth, which was itself only discovered by a long course of experimental investigation; and then how all knowledge is unified by telling us that all these things are unfathomable, and that the philosopher is hopelessly in the dark about them.

Tempting as it is to go on with the exposure of such mischievous and absurd *paradogmatism*, of which more may be seen in the *Edinburgh Review*, I will confine myself to

one more specimen, in quite a different direction. Thus far we have been learning the history of all things from the imperceptible. But our philosopher is a prophet too, and can even deduce other worlds of happiness and perfection from persistent force. He tells us how Evolution must proceed through "Equilibration" to final Dissolution and Omnipresent Death (514); and then suddenly cheers up, three pages further on, with the prophetic vision that "Evolution *can* only end in the establishment of the greatest perfection and universal happiness." And this is a piece of genuine inspiration, for he does not even profess to give a word of reason for it. The little that he does say about the scientific future points entirely the other way. For the only possible revival that he contemplates after omnipresent death is the chance of a future collision of some pair of wandering stars, which may generate another indefinite or definite nebula; and then all the same processes may start again. But why that future nebula is to reach any more perfection or happiness than this, or its inhabitants to make any greater "advance towards harmony between man's mental nature and the conditions of his existence," or even why there must be men at all there instead of some other kind of final products of Evolution—is all left in the region of the unfathomable, except to the prophet to whom it has been revealed. It certainly is hard upon his disciples to have to be content with his assurance that a future life of happiness and harmony and perfection is in store for somebody else, but only omnipresent and eternal death for them. That, however, is the common creed of evolutionary cosmogonists and disbelievers in the eternal life that we believe in.

Spencerian Future Happiness and Perfection.

## PART II.

The only Two Alternatives.

I think we have had enough of Mr. Spencer for the present, and we can reflect for ourselves on the phenomenon of the intellect of this scientific and conceited age accepting such attempts to find a substitute for the belief of all mankind (until lately), that nothing can have made itself or anything superior to itself; that manifest and admitted contrivances cannot have come without a contriver of them for the purpose which they serve, and of the means of producing them; and that it is little short of lunacy to talk of intelligence being generated out of self-existing matter with no properties by self-existing gravity—if such a force could be. We have now seen that nothing is too absurd, and no reasoning too ludicrous, to be swallowed by those who have abandoned that once universal creed among all people capable of thinking of more than their appetites. I now propose to add a few words on the inference of creative design backwards, from things manifestly being what they would have been if they were designed by an inventor and a power infinitely superior to ourselves.

Some anti-creationists deny that they are, and say that they could themselves have made some things better, though they prudently abstain from saying how, beyond repeating the general proposition that an omnipotent Creator ought, in their opinion, to have made a perfect world, with no evil in it. That proposition also I have discussed elsewhere, and of course do not pretend to explain why we have to wait for perfection in another world. All that has nothing to do with the alternatives of design or no design in this. For again it is necessary to remind people that they have to choose between two only possible alternatives, according to the balance of probabilities. There is no middle way, between the world and all that is in it having been either designed or not designed; and therefore we *ipso facto* believe, and cannot but believe, one just so far as we disbelieve the other. A man may not have made up his mind which to believe, but that man's opinion is worth nothing. In fact he has none; or an Agnostic must be wrong, whether theists or atheists are right.

Therefore, also, a man who denies design, but cannot state any other rational mode of generating the universe, condemns himself. For unquestionably a designing Creator could produce the universe, and therefore must have done it, if

nothing else did; and that something else must be capable of rational and intelligible description and proof of its capacity for doing the business before we need attend to it. We have seen that the "Apostle of Evolution" cannot make his scheme, or force, or whatever he likes to call his self-acting machinery, take a single step towards doing the business, without calling in other forces, of which every one required creating by some "immaterial Reality" or power strong enough to influence all the matter in the universe. And it would be absurd to talk of such a power doing all that without designing it, or making laws of nature in a hap-hazard, blundering sort of way.

Guessing what a Creator would do is useless.

Indeed it is one of the characteristics of the laws of nature that they have no mistakes, and never want amending, as all human laws do constantly. You may say that they sometimes produce failures—imperfect or defective creatures below their normal type, and some too bad too live. But that is only the old argument again in other words, that an omnipotent Creator would have made everything perfect. But, granting that opinion to be *à priori* probable, or worth something in the balancing of probabilities, it comes to very little when weighed against the innumerable facts which tend to prove design; for it is only one guess against the necessary inference from those facts. Moreover, occasional failures in individuals no more prove bad design than occasional failures in any machine or fabric prove it to have been ill-designed, though it may have been ill-made. Where is the contrivance in all nature which we could improve, consistently with the general laws of nature, which laws no one can be so absurd as to fancy that he could mend, or guess at the consequences of any attempt to do so?

Allowing as much gradual improvement as you like by biological Evolution, or the creation of small—or large—changes adapted to changing circumstances, each creature has somehow come to be as well contrived as possible for its own work. And I suppose we may say the same of every organ for the time, though they may have improved in time, owing to causes which are the very things that want explaining, either by a creative power or by whatever else unbelievers in one can invent, without merely calling them "unfathomable mysteries": which only means that they require a Creator.

Professor Clifford perhaps set the fashion of saying that the human eye is so far from being the wonderful and perfect instrument that Paley and others had made out, that it is full of defects. I never could find that he had invented a superior

Helmholtz on the Defects of the Eye.

eye himself, which a man who says all that ought to do. But I do find this in Helmholtz's *Scientific Lectures* (p. 227), part of which probably was Clifford's authority. After a detailed explanation of the ocular contrivances, he said:—"The eye has every possible defect that can be found in an optical instrument, and even some that are peculiar to itself; *but* they are all so counteracted that the inexactness of the images very little exceeds the limits which are set to the delicacy of sensation by the dimensions of the retinal cones [*i.e.*, no more would be any use]. The adaptation of the eye to its functions is therefore most complete, and is seen in the very limits set to its defects. The result, which *may* have been reached by innumerable generations under the Darwinian law of inheritance, coincides with what the wisest wisdom may have devised beforehand." I leave that to speak for itself.

I read a paper lately by Professor Attfield, trying to account for the rise of sap in trees far above the known limits of either atmospheric pressure of 32 ft. for water, or of capillary attraction. His explanation may be right or wrong. If wrong, we still know nothing of the matter; but, if right, it means that he has only now discovered the contrivance which has been doing its work perfectly as long as trees have lived upon the earth, and which the spontaneous Evolutionists expect us to believe made itself, without design anywhere. Whether it did so gradually or at once, it equally required inventing and preparing for and developing, like the steam-engine or the telephone. Philosophers have been trying to invent it, or rather to explain the invention with the puzzle itself open before them, and have not been able to do it with all their intelligence; and yet we are to believe that it invented itself with none; and that electric eels invented and made themselves ages before any electrical machine was invented by "the highest intelligence" of the anti-creationists; which also made itself out of dead atoms by persistent force.

In like manner there is every now and then a discussion carried on for months in the scientific papers about how birds fly; from which it is evident that nobody quite knows. Yet, either the birds have always known how to make themselves wings and feathers to fly away with, or some one else knew and invented feathers for them, one of the most wonderful natural contrivances. Has any Evolutionist ever pretended to guess how they came? They deny that feathers were ever designed for flying, or eyes for seeing: they both went on growing, with obstinate prophetic instinct that the time would come when they would give the *à priori* inconceivable

power of making solid bodies travel with immense velocity over the lightest known kind of matter; and that eyes would give a new sense altogether, and therefore quite inconceivable beforehand except by a Creator.

Useless Organs both wax and wane.

Yet one of the fundamental maxims of all the Evolutionists is, that organs do not grow and improve, but decay, when there is nothing for them to do. Mr. Romanes says, in *Mental Evolution*, p. 89, "blind fishes which live in the dark have lost their eyes from disuse"; yet other fishes, while blind, grew eyes spontaneously! If light makes eyes, how does it go to work? Organs only grow and improve by "natural" or "sexual selection"; which means preference for the useful over the useless, or the beautiful over the ugly, or the strong over the weak. But what was the use, or beauty, or strength, of a rudimentary feather—or a rudimentary anything? On this point their theory is suicidal; for if rudimentary organs could begin before they were of any use, or if rudimentary creatures could start them with a view to future use ages afterwards, that is *ipso facto* design of a very high order. Evolutionists constantly talk of animals and plants *doing* this and that, and growing all sorts of organs to produce such and such effects. If they are challenged to say what they mean, they answer that they only mean it figuratively. But their way is to use it without any explanation, and to get it carelessly accepted as common language of science, and so people are dexterously led to forget that, if it means anything, it means that all these things have been carefully designed. If that fallacy is pointed out, they say we ought to know, without continual repetition, that "natural selection" does it all. So you have only to make out that some contrivance will be wanted some day, either for the benefit of an animal or plant itself, or for some other, as horses are for men, and then they are sure to invent it and to develope it for themselves; and all this in the face of another part of the Evolution theory, that unused organs die out, and are *not* "naturally selected" to be continued and improved.

Another thing which the Evolutionists have been challenged to account for without creative design is the beauty of nature. All that they have ever been able to invent a plausible theory for is the improvement of the colours of some flowers by insects, and of animals by their own sense of beauty in sexual selection, which is assumed to agree with our sense of beauty. Considering what an enormous quantity of the face of nature these two hypotheses leave uncovered, it is

What made the Beauty of Nature?

hardly worth while to criticise them; for a theory that only explains a few phenomena out of an immense class is no theory at all, or cannot be the right one. It may be some subordinate branch of the true theory, but it is thereby proved not to be the fundamental one. Nevertheless, there is really very little evidence of animals being influenced by sexual selection of beauty, though there is some; and more as to strength where males have to fight for females. Even among men and women there is less than might have been expected. Nor is there much evidence, if any, that bees prefer what we think pretty flowers to plain ones in looking for honey. Of course they look for those which they know by instinct or experience to have the most or best honey. And it is singular that some of their most favourite flowers have very dull colours, notwithstanding the ages that they have been, according to this theory, improving them. I wrote this several years ago, and no Evolutionist has condescended to answer it, so far as I know; nor the remarks of the late Professor Mozley, and my further ones on the general beauty of nature in phenomena beyond the possibility of evolution, including a great deal that remains latent until we bring it to light, either by simple discovery or as the result of some such process as cutting or polishing, which does not make, but only reveals, already existing beauties. The automatic cosmogonists believe they made themselves, but they never tell us how; nor how the infinite variety of nature came, which is a striking contrast to the dead monotony and repetition that all human ornamentation soon runs into. At the same time the ugliness and offensiveness of internal animal organs which are not intended to be seen, and of all fæces, which are evidently intended to be got rid of, are instances of design by contrast with the beauty of most visible things, which again cannot be explained either by habit or by any process that can be called selection.

I only touch on all these points very briefly, and omit some others altogether, because I have treated of them elsewhere. It must be borne in mind throughout that the Evolutionists' argument about change of circumstances producing all necessary changes of structure, and advance of intellectual and other powers, from the lowest up to the highest, is no solution, but begs the whole question of the possibility of the smallest advance making itself, either to adapt itself to new circumstances, or to improve beauty, or to lay the foundation for future organs or powers which will be useless until they are complete. The very idea of power making or

developing itself is contrary to all modern science, and would not be listened to for a moment in any but the hazy regions of automatic cosmogony, for which any hypothesis seems good enough. Incomplete Machinery is useless.

There are other kinds of natural contrivances towards which surrounding circumstances could do nothing, if they ever could without some creative power moving to meet them—viz., those which must either be complete or nothing. There are cases, properly insisted on by Paley, and never answered, of holes being made in certain bones for arteries to pass through, and of sinews passed through loops in others like cords through a pulley to change their direction. It is plain that those must be all or nothing, and could not come gradually. And animals that live by gnawing and biting hard things, such as the rodents and elephants, have their teeth continually growing, which no others have. What conceivable automatic process could have caused that, and that the teeth should not only grow, but be in alternate hard and soft slices vertically, so as to keep the grinding teeth always rough, and the gnawing teeth sharp, and yet not too thin? There are innumerable other questions like these, to which the Evolutionists never attempt any answer.

If they ask how we account for some useless latent organs, or visible traces of them, we answer that, if they are waiting to be developed into useful ones, that is the clearest possible proof of design, and that accounts for them; and, if they are dying out because they are no longer wanted, we have no more to say than that it seems to be a law of nature that they should: so, at least, the Darwinians say, though traces of some useless organs have remained for as long as we know anything of the animals. But, assuming that law to be as true as they like, it is itself a very striking proof of design, that living organs should increase with use while dead machines only wear out. Wooden legs do not get larger or stronger by use, but the contrary, while live ones do, up to a certain point. That is no more accounted for by its commonness than all generation is, or the general likeness of offspring to parents, and occasional advance upon them. All these would appear miraculous or impossible to that imaginary philosopher of Herschel's shut up by himself to divine laws of nature, which is the position assumed by one who would logically deduce them from any real axiom that he chooses to start with. Mr. Spencer professes to have done it, and we see with what success; he cannot stir a step anywhere without assuming the result that he professes to deduce, and a

Seed-projecting Plants.

quantity of other things besides; nor does he even attempt an explanation of how any elements of oxygen, hydrogen, &c., got themselves made out of homogeneous atoms.

It would make this paper far too long if I began describing specimens of evident contrivance in nature, and therefore I will content myself with referring to the latest scientific notice of a particular group of them in a paper by Sir J. Lubbock, in the Royal Institution Proceedings of 1882, on the curious contrivances for projecting the seeds of various plants far enough, and sometimes for performing other feats, to make them grow, which he says he could not believe himself until he saw them. In my *Origin of Laws of Nature* I cited another of his observations, of the modes in which certain plants "protect themselves" from the ants who would steal their honey from the bees. What kind of natural selection or other automatic process can conceivably have had anything to do with such contrivances as those? Such outstanding problems ought to make us more suspicious of the very doubtful solutions of some others, such as the two famous mathematical problems of bee-cells, especially in the face of the difficulty that no working bee had working parents to transmit their experience to her: remembering also that a new instinct or genius sometimes appears suddenly, as in the "calculating boys" spoken of before. And, though we see that acquired experience can be transmitted through parents to a certain extent, that is itself quite as incomprehensible as Mr. Spencer admits all other natural processes to be. It would have been pronounced impossible *à priori* that a microscopic germ or seed should have the power of attracting and assimilating other particles of matter into a compound possessing some of the acquired knowledge and all the other powers of the parents of that seed. That is the primary problem to be solved, whether for bees or flowers, or anything else which is supposed to improve in successive generations; and the secondary one is the power of making variations ever so little better than before.

Until some theory can be invented to account for all those stages of evolution from a microscopic particle, including its own generation, up to a philosopher, by any conceivable self-existing forces out of homogeneous self-existing matter, and also for the production of all natural beauty—not merely a little of it—all the phrases that have been invented pretending to account for these things are nothing more than words. Natural selections, sexual selections, survivals of the fittest, atavisms, heredities, and I don't know how many more, may all be

true as facts or processes, and may do what they can. But the Evolutionists are at an immeasurable distance yet from showing that they can do everything. It is entirely bad logic to assume that they can do a bit more than we can prove. And, if we could prove them to be capable of doing even such inconceivable things as producing the general beauty of nature and starting generation, the theory of spontaneous cosmogony would still be nowhere, until we could prove for them that all the necessary forces started themselves and maintain themselves, and all their powers of transformation, according to the ascertained laws of conservation of force.

"The Carpenter Theory of Creation."

Therefore, whichever end we begin at in our reasoning, whether at Mr. Spencer's "Unknowable and Persistent Force," or the latest phenomena of the present world, we are equally landed in some confessedly "incomprehensible" process, or one for which no possible physical cause can be discovered or invented, or suggested in intelligible language with any rational probability. What does that mean, except that the final cause or agent must be above physical, or supernatural, or, at any rate, what Newton called "immaterial"? Indeed Mr. Spencer calls his Prime Cause an "immaterial Reality," which is practically the same thing, bearing in mind that he will never use other people's phrases. Only he denies that his immaterial agent does anything except maintain indestructible force and "work in us," whatever he means by that. Whether he means anything or nothing, both those phrases leave the problem of cosmogony as unexplained and as incomprehensible as if he had simply and dogmatically said, "The world made itself by persistent force, and that is all we know about it, and therefore there was, and is, and can be, no designing Creator."

I promised to say a word before I finished about his nickname of the "carpenter theory of creation" for ours, which is no doubt calculated to please those who do not want to see through its absurdity, or to remember that carpenters neither make nor alter the nature of their materials, and much less produce their results by making general laws for causing bits of wood to grow of themselves into chairs and tables, besides other very obvious differences below the notice of a synthetic unifier of all knowledge. And, if the nickname were as good as it is bad, it is only the Spencerian appropriation of the epithet "anthropomorphic," which had often been applied before by Materialists to the creative theory. To say nothing of its being wrong etymologically (for no theory imputes the *form* of man to God), it practically means this: Men

A Batrachomorphic Theory of Man.

have some intelligence, foresight, and inventive power, and some gradually increasing scientific and mathematical knowledge. Our Creator has infinitely more of all those things, and omnipotence besides. Therefore the creative theory assumes a God like men.

If such nonsense wants making more evident by illustration, here is one: Frogs have some intelligence, foresight, locomotive power, and will and knowledge how to maintain themselves and their species, to avoid certain dangers, and generally to gain the objects of their life. Therefore attributing those same powers in a much higher degree, with many others, to man, is a *batrachomorphic* theory of human nature. That is just as good logic as the other, and as the Spencerian philosophy of creation from beginning to end. It is no answer to say that there is no doubt about the existence of some human faculties of the same kind as those of many animals, and of others much higher, while the existence of a Creator with any faculties like ours, and superior ones, is doubted, and cannot be absolutely proved. Those who talk in this way ask us to accept their dictum as self-evident that a Creator cannot have such faculties, and pretend to help it by inventing an absurd nickname or two. Such arguing is not argument, but mere assumption. And if the old theory of a designed creation is only maintained "in the pride of ignorance," as Mr. Spencer says), I suppose the rejection of it for undesigned and "unfathomable mysteries" of self-transforming forces and self-generated properties of matter, and of effects without causes, is the modesty of omniscience.

I end by saying that I do not know, or know of, a single man of real scientific reputation or mathematical ability who has committed himself to any specific approval of Mr. Spencer's "natural philosophy," which he has himself explained his book of *First Principles of Synthetic Philosophy* to mean. General laudation of him as a great evolutionist by automatic cosmogony is good for nothing, and commits such admirers to nothing involving their own reputation. Too many of them have an evident reason for not choosing to expose his bad reasoning as I have done, though I dare say they could have done it better. Ignorant people naturally take for granted that his scientific reasoning is generally accepted by competent judges, whereas it is nothing of the kind.

The CHAIRMAN (the Right Hon. A. S. Ayrton)—I am sure we have all heard with the greatest pleasure the able paper just read. It is now left for the consideration of those present whose minds and studies have

been peculiarly directed to the subject-matter of which it treats, and I have no doubt you will be glad to hear such observations as they may be disposed to make. I trust that any one who may be induced to discuss this subject will confine his remarks within the four corners of the matter dealt with by the author, in order that we may not drift into a wide and unlimited debate on the very large and general questions which might be raised upon it. It would be well, also, to bear in mind that my friend Sir Edmund Beckett has merely taken up the gauntlet thrown down by a writer calling himself a veteran of natural science and a philosopher; and therefore it is desirable that the discussion should be carried on upon the footing of a controversy raised on the same basis; that is to say, we ought not to-night to meet what I may term the temporal view of the matter by theological propositions. What is required is that we should controvert what is asserted on the same platform as that which has been chosen by those who make the disputed assertions. If we can join issue on that ground, I think the result will be more instructive than it would otherwise prove, and will tend more to serve the purpose for which, doubtless, this paper has been written.

Capt. F. PETRIE (Hon. Secretary).—Before the discussion begins I have to mention that the Council invited Mr. Herbert Spencer to be present this evening; he has replied thanking the Council, and stating that the condition of his health had for some time deprived him of the opportunity of accepting such invitations.

Mr. E. CLARKE, Q.C., M.P.—I had not the smallest idea, when I accepted the very kind invitation of your honorary secretary to attend this evening and listen to the paper just read, that that would involve my being called upon to say anything on a subject which my studies have not given me so great an opportunity as those of Sir Edmund Beckett of dealing with deep questions of great importance such as that upon which he has read so admirable a paper. I may say, however, that I have listened with great delight to the reading of this paper, because, believing strongly, as I do, in the great truths which this Institute has been founded to maintain, I was very pleased to know that one of the keenest intellects amongst our living lawyers had been directed to the study of this subject, and that Sir Edmund Beckett had been induced to give you a paper thereon. For my part, it is impossible that I should make a speech on the subject opened up this evening. I might possibly do so were I at issue with Sir Edmund Beckett on any of the points upon which he has touched in his paper. In that case I should not be reluctant, however weakly and however feebly I might acquit myself, to enter into the conflict and fight the lecturer upon our points of variance; however, not only do I agree with him in all his conclusions, but, admiring as I do, the way in which he has put those conclusions before the meeting, I can only acknowledge the compliment paid me by inviting me here, and

await the opportunity, if I have it given me by-and-by, of following in his footsteps.

Mr. W. P. JAMES.—I do not rise for the purpose of criticising Sir Edmund Beckett's paper, which must have been an intellectual treat to everybody, not only on account of the ability it displays, and the polished irony which pervades it, but also because of the extreme ease with which the writer has demolished his opponent. There is one point upon which I should particularly like to say a few words, and that is with regard to the arrogance with which it is the custom for Haeckel and his school to speak of their views as an advance on the old philosophy. I merely wish to show, on the contrary, that if we consider the history of philosophy among the Greeks, the views of Haeckel and his followers, instead of being an advance on those of the ancients, evince a distinct retrogression. Those scientific journals which take their cue from this extreme section of Free Thought are very fond of speaking of the Argument from Design as if it were something quite obsolete, old-fashioned, grandmotherly, and antediluvian. In opposition to this doctrine, theories of material development or Monism are referred to as an immense advance, as the last expression of the culture of the nineteenth century. Now, if we take the course of Greek philosophy as a guide, we can see at once that this assertion is the exact opposite of the truth; and Greek philosophy is a very convenient guide for this reason, that it had no official connexion with religion; or, rather, the Greek religion was bound up with no theory of creation; so that the Greek mind enjoyed the utmost freedom in dealing with all these questions. This being so, when we go backwards and trace the whole development of Greek philosophy, we see that it began with a series of wild theories of evolution, and ended in a sober doctrine of design. The passage from a scheme which recognises Purpose in Nature, which contends for design, to a monistic or materialistic theory of evolution, is, in fact, a distinct retrogression—a going back from the position taken up by Aristotle, Plato, and Socrates—to the infantile guesses of Empedocles, Heraclitus, Anaximander, and Thales. Such was the historical development of thought in Greece where the human intellect could move with the utmost conceivable freedom, and where the popular religion had no official doctrine about creation. Greek philosophy began, as I have said, with theories of evolution or development of the wildest and crudest kind—theories setting forth that there was in the universe but one original substance, which substance was acted on by forces, and produced all the phenomena of Nature. Thales held that all had been evolved from water; Anaximander, that the world sprang from the infinite; Heraclitus, that everything had its origin in ethereal fire; Empedocles, that the universe was the product of the four elements, under the influence of two forces—love and hate, or, in other words, attraction and repulsion. The first person to bring in the notion of intelligence, or, as Aristotle put it, "to speak like a sober man among the drunken," was Anaxagoras. It is true that Pythagoras, also, had recognised that

the Universe showed Order, and had called it for that reason *Kosmos*. The first person again, to state the argument from design, as we know it, was Socrates, as he is reported by Xenophon—a more trustworthy authority for some purposes than Plato, because in Plato's eloquent and imaginative writings we never know whether we have the real Socrates or simply the mouth-piece of Platonic speculations. The opinions of Socrates on this point are to be found in the first book, fourth chapter, and again in the fourth book, third chapter, of the *Memorabilia*, a little treatise written in the purest Attic and full of practical wisdom. The argument was afterwards repeated by Plato, with a great deal of detail, in two works, in the *Timæus* and in the tenth book of the *Laws*. Besides Plato, Aristotle, the keenest, most searching, most all-embracing intellect of antiquity, distinctly rested in a teleological view of the universe. His statements of his views on this subject are only to be found in isolated passages, as they appear in his extant works; but it would seem, from a fragment translated by Cicero, that in one of his lost dialogues he had treated of design at great length and with much fulness and eloquence. Such is the history of Greek philosophy upon this subject—that is to say, from a crude origin, and from wild theories of evolution and development, it rose to the reasonable conclusion that the universe bears traces of intelligence and design; so that, when Haeckel and his imitators in England have the arrogance to speak of their monistic theory as an advance on all previous theories, they simply show their total ignorance of ancient philosophy. In doing this they evince not an advance, but distinct retrogression; they are going back from the sober conclusions of the splendid maturity of Greek speculation to the fanciful dreams of its childhood. (Applause.)

Mr. D. Howard (Vice-Pres. Chem. Inst.).—It is difficult to attempt to make a speech on a paper one so cordially agrees with, and of which one cannot speak too highly. It has been a very keen enjoyment to me to hear the theories dealt with by the author subjected to critical examination with all the dialectic skill of a trained and accomplished debater. I cannot help thinking that, with all their faults, the ancients had one wise method; they did submit their views to public discussion. It would be well if some of the moderns did the same. I was asked by a student the other day, "What is the use of teaching medical men logic?" I replied, that when he had seen more of scientific men he would not ask that question; but, rather, why did not they learn more? The paper read to-night has brought before us, in an admirable manner, the terrible confusion that exists among scientific men between deduction and induction—between what are spoken of as necessary truths and those truths that are proved by experiment. All I can say on the matter is, that to me nothing is more startling than to find that most difficult induction, which was the result of many years of patient labour—the correlation of physical forces—treated as a self-evident truth. This is one of the most amazing things we can possibly hear; and one can only lament the excessive density of one's own brain in never having seen the

necessity of that truth without experience, and wonder that any one could profess to have evolved such a truth from his own consciousness. The fact is, that so far from physical science, as we understand it, being the result of deductions from necessary truths, it is but the result of patient inductions from a life-long study of Nature; and this is, in itself, a strong argument for design. In the latter part of the paper, which deals more briefly than we might have wished, with the "argument from design," it is very pleasant to find this old argument made by skilful hands more strong than ever. It is gratifying to see that it is not to be regarded as worn out; that, although the old illustrations may be partially worn out, the argument itself is as forcible as ever. Nay, more, the very shifts its opponents are put to —the extraordinary logical, or rather, illogical manœuvres they perform in order to evade the crushing force of this "argument from design" is, in itself, a proof that it is as strong as ever. With regard to the question of evolution, I may express a hope that you will keep clearly in your minds the distinctions made in this paper between the many senses in which the word "evolution" is used. That some form of evolution may explain some of the phenomena of nature is a thing which many may grant; that it will explain all, it would require a bold mind to maintain; but we get into hopeless confusion between evolution in a logical and in a material sense—evolution of ideas and evolution by natural selection—evolution caused by an external power and that which is self-acting. In studying this hopeless confusion of thought I have often wondered whether any living lawyer could make sense of these dicta; and I am very glad to find that so able a representative of the law as Sir Edmund Beckett has, equally with myself, failed to make sense of them.

Rev. R. Thornton, D.D., V.P.—I rise, not to take part in the discussion, for I find we have not been able to discuss the able paper before us. Mr. Herbert Spencer is, unfortunately, absent, owing to indisposition, and consequently there has been practically no discussion of the questions raised by the paper in regard to Mr. Spencer's theory. I have risen for the purpose of asking those present to express their thanks to our Chairman for presiding on this occasion, and to the learned author of the paper for the very admirable specimen of his talents which he has put before us. I think the Victoria Institute has cause to be thankful to both these gentlemen, especially for the reason that there is a little bit of unfair suspicion in the minds of certain persons that there has been, perhaps, a little too much clericalism in this Society. We are not, as some have hinted, a mere assembly of divines, or of *quasi*-divines, whose object is to debate important scientific truths in purely theological fashion, and to decide them, as we clergymen are too apt to decide questions, in our "coward's castle." I am very glad to see one distinguished layman occupying the chair here to-night, and another distinguished layman defending the truths of Christianity—for they are truths of Christianity which the author of the paper has been defending, although he has defended them from the secular side. What we want is a scientific annihilation of *pseudo* science, in

the interests of religion; not a religious statement, such as anybody can make, that the discoveries of *pseudo* science are not in accord with our theology. We have heard with great gratification from the author of the paper that we are not, after all, to give up the old account that God made everything, one with another, and that He made nothing amiss. Mr. Herbert Spencer and his school come forward and say: "*Veteres avias tibi de pulmone revello.* I will teach you something better and grander. It is not true that in the beginning God created the heavens and the earth. There never was a beginning or a creation." When any one asks, "What was there, then?" Mr. Herbert Spencer tells us there was a "differentiation" and an "integration," and that these produced everything by "coherence" of the "homogeneous" or "heterogeneous," and by the "rhythmical motion" which he asserts has the power of production. Then, if you suggest any other mode of explaining the way in which things came into being, that is said to be entirely "unthinkable," and when you maintain anything which is "unthinkable" you know what to expect. That is the way in which we are treated by these philosophers. Having been accustomed, as a plain Englishman, to the use of words in their original and true sense, and having also been in the habit of cautioning my pupils against using words out of their right sense, I have been greatly puzzled by the diction of this Spencerian philosophy. But we have, fortunately, had the advantage of securing on our side on the present occasion an able lawyer, who has called the Spencerian witnesses up and cross-examined them. He has put it thus: "You say 'differentiation' and 'integration' have produced these results. What do you mean? What is signified by the words 'integration,' and 'coherence,' and 'evolution'?" And I think I may say, in point of fact, the witnesses he has interrogated have entirely broken down. I have now only to ask the meeting to return its cordial thanks to the Chairman for presiding, and to Sir Edmund Beckett for his admirable paper.

The CHAIRMAN.—As it is now so late, I do not propose to add more than a few words to what has already been said; but I may say that I think Mr. Herbert Spencer is to be credited with having distinguished himself immensely by an enormous evolution of words. In this he is pre-eminent; but I hope that both his philosophy and his words will die out, and that, at no distant day, the whole thing will be forgotten. At the same time, I am delighted to put the vote of thanks to our able lecturer, who has afforded us so much gratification this evening, and who has done so much to exhibit these Spencerian words in a fitting, proper, and true light, and to show that they really resolve themselves, in the end, into nothing but contradiction, and are but a sorry substitute for those substantial ideas which are to be found in plain English. It has struck me as astonishing, in reading these writings, how many words have been invented and employed to express the old idea of "growth." Everybody understands what that word means, but yet it has been mystified in all sorts of ways. If you put to yourselves this simple question, "How can there be growth, in the sense of reproduction, without

design before the reproduction commenced?" what is the obvious answer? If the thing itself can grow, how can the parent get the idea of making a new production, unless through a scheme of design commensurate with the beginning of species, and going on until it comes to an end? There is the evidence of design in the beginning—there is no break in it; and, if there be only that design governing the whole system of reproduction, it is manifest that new species could not be produced; that is to say, it could not in itself invent the growth of anything else; for, even if it had its own evolution, that evolution must come to an end with itself. It cannot regulate, after it is dead and buried, the evolution of something else; and, consequently, if anything else came without pre-ordained design, it would be an especially wonderful proceeding, because there would be no connecting link. The more you examine this, the more do you bring home to your mind the conviction that there must be design regulating continuity of life and species. It is very interesting, I think, when persons of great intellect and knowledge arrive at different ideas, to ask yourselves the question, "How does the difference begin? Where did it begin?" And the way in which it began is this: a certain class of philosophers took a very narrow view of what is called "species." They gave to species very definite limits, and these defined limits arose out of what is called the science of natural history, that is the classification of living creatures according to some selected feature, and from this a very narrow view of species was arrived at. Then, things are discovered which do not consist with the view that has been adopted, and hence there is contention through which some new fantasy arises. But the source of error appears to be, that the definition of species is much larger and more complicated than you will find in any book of natural history. It is not a thing that has a certain head or tail which makes it easy to grasp; on the contrary, it is a very complicated thing, and the definition of it consists in a great number of conditions peculiar to its own species. Moreover, every species is not exact in its reproduction and continuity. It is in the nature of species that it should be liable and subject to natural and external influences which will produce divergencies, both internal and external, and yet not destroy the characteristics which constitute the species itself. This may arise from climate and from a great many other things; but divergence is in the nature of every species, because we find no such thing as complete exactness in life. No two things are ever found exactly alike. If you examine a tree, you will see that no two of its leaves are exactly similar, and yet each has the characteristics of the parent plant on which it grows. The whole condition of nature is marked by variation, within certain limits and subordinated to certain rules applicable to species; but, nevertheless, there is continuity of the species itself; and, if you take a large and comprehensive view, you will find that the whole of Darwin's writings are confined to the development of the one principle raised in the book I first read—his *Origin of Species*. I remember saying to myself, "This man is really a very clever and skilful observer; but he does not seem to have a large

faculty of reason." It reminds me of what was written by a great philosopher of ancient times, "It is the business of specialists to collect all the facts; but it is that of true philosophy to arrive at just conclusions." Now, Darwin, as a specialist, collected an infinite number of facts, but he entirely failed to arrive at true, philosophical, and practical conclusions upon those facts. Curiously enough, the other day I asked a lawyer—because lawyers are very apt to look at facts with the eye of reason, by which facts are tried—"Did you ever read Darwin's book?" His reply was, "I read his *Origin of Species*, and when I had gone through it I wondered how a man could collect so many interesting facts and fall into so many fallacies." This tends to show that, if we get a clear insight into the character of the erroneous deduction that misled Darwin in composing his book, it would be easy to refute the conclusions he has expressed on the subject of evolution, in the sense in which I may venture to condemn it, namely atheistic evolution; because theistic evolution is a mere speculation as to how the Divine Creator proceeded in the work of creation. Any writer may create a theory of his own on this subject, because nobody knows anything for certain about it; but this is quite a different proposition. I think, therefore, that the more this subject is examined by the aid of the evidence presented to our senses in the light of nature, the less shall we be disposed to realise Darwin's views; the more surely shall we be brought to the conclusion that creation must have been by species, and that man, who is the highest type, was created in all his perfection, as far as that perfection has been exhibited; while, if there be variation, it is rather according to the law of species permitting a depreciation under certain circumstances, the man, whom we may call the worst made, being only a bad example of what the best originally was. I now ask you to give your thanks to the lecturer.

The vote was accorded amid applause.

Sir E. Beckett.—I have nothing to add to what I have already said, except to acknowledge the vote of thanks you have just accorded to me. I am sorry we have had no real discussion to-night; but, at any rate, I did my best to produce one by giving this paper to a very clever friend of mine—one of the most scientific men I know, whom I often consult on mathematical difficulties, and who, I am sorry to say, is not a believer in Revelation. He said to me, "I cannot say that I have a word to utter against your paper, except as to two sentences which assume a Revelation:" which I showed him that they do not. I thought this a great concession to be made by a man of that kind.

The meeting was then adjourned.