



THE PRESENT DAY
CONCEPTION OF



EVOLUTION



—
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THE PRESENT DAY CONCEPTION OF EVOLUTION.

I.

There seems to be an impression abroad that the adherents of the doctrine of evolution have hopelessly fallen out among themselves, and threaten to destroy by internecine conflict the hold which this doctrine has obtained upon scientific thought. This impression is an erroneous one. Evolutionists do differ gravely from one another on such subordinate matters as the causes of variation, the classes of variation which may be preserved by heredity, and the selective factors at work in the gradual moulding of organic forms. In particular two strongly marked parties have emerged among them, differing radically upon these subordinate matters. One of these, led by Prof. Weismann, holds that all hereditary variations are congenital and purely fortuitous; and that "natural selection," acting upon these fortuitous congenital differences, gradually moulds the successive organisms into better and better harmony with their environment. The other party, to which probably the majority of evolutionists give in their adhesion, holds that variation is strongly stimulated by use and disuse of organs; that such acquired qualities are hereditary; and that thus "natural selection" has not merely a body of purely fortuitous variations, but a series of definitely adaptive changes to work upon. The difference between these two forms of the theory of evolution is not a small one. But it is obviously not a difference fundamental to the conception of evolution itself, but one which has reference only to the modes of its working. Evolutionists appear to be entirely and even increasingly at one in their fundamental conception of the doctrine.

We have lately been led to observe this, in an interesting way, by the circumstance of the appearance, in a single issue of a quarterly journal, of two general papers on evolutionary philosophy by such representative evolutionists as Prof. Joseph Le Conte, of the University of California, and Prof. E. D. Cope, of Philadelphia. Possibly no two American workers could be brought together who would more fairly represent the conceptions which really rule among evolutionary thinkers. Both have been decidedly committed to this scheme of thought from the beginning, and have

shown themselves leaders among their fellows. Yet they stand very far apart in many respects. Prof. Le Conte has devoted much consideration to the religious bearings of the new philosophy; while Prof. Cope has spent his strength in purely scientific investigations. In them, where they meet, so-called Christian evolution meets with so-called purely scientific evolution; so that their agreements will register for us what may be fairly looked upon as the common ground upon which evolutionary thinkers meet to-day.

The first thing that is apt to strike the reader of the two papers is the absolute unity of the two writers in their conception of what evolution is. Each gives a formal definition of evolution, and the two definitions read like the product of a single pen. Prof. Cope says: "The doctrine of evolution may be defined as the teaching which holds that creation has been and is accomplished by the agency of the energies which are intrinsic in the evolving matter, and without the interference of agencies which are external to it." Prof. Le Conte says: "Evolution may be defined as continuous progressive change, according to certain laws and by means of resident forces, *i. e.*, by natural forces residing in the thing evolving." In brief, each alike conceives evolution as a doctrine of *self-creation*. As over against all conceptions of creation by powers, forces or agents intruding into nature from without, evolution is conceived by them as a doctrine of creation by the energies and forces of nature itself. The emphasis in both cases is placed on the contention that the forces operative in the process are "intrinsic," or "resident," in the thing evolving. Prof. Le Conte still further accentuates this by the added definition, "*i. e.*, by *natural forces residing* in the thing evolving." Prof. Cope does the same by adding to the positive statement the negative clause, "and without the interference of agencies which are external to it." It is quite clear that with both, the fundamental point is that evolution is a doctrine of *self-creation*. If, and so far as, there is intrusion of force or interference of agency from without, evolution ceases.

The next thing that is apt to strike the reader is the thorough-going radicalism of both writers as to the sphere which they hand over to this process of self-creation. To both alike, the universe and all it contains is the sphere of this all-inclusive self-production. All that is, with the exclusion of nothing, is the product of the interaction of the forces, or energies, intrinsic or resident in the primal substance. Prof. Cope says simply that the energy by which all is accomplished, "is a property of the physical basis

of tridimensional matter, and is not outside of it." Prof. Le Conte is equally thorough-going. He enumerates several grades of evolution. He tells us that "matter by combination, re-combination, and therefore by purely *chemical* forces, rose to higher and more complex forms until it reached protoplasm;" and "in achieving protoplasm," it achieved "with its mobility and sensibility, *i. e.*, life." Under the guidance of this "higher form of resident force," matter went on until it achieved man, and, with man, self-conscious reason; under the guidance of this new resident force again it is to go on until it achieves society and finally the Divine man. Throughout the whole process nothing comes in from the outside, either in the way of energy or in the way of direction. "Matter" stands at the bottom with its resident forces; or, as Prof. Cope phrases it, "the physical basis of tridimensional matter," with its "intrinsic energies." And all that comes to be, comes into being only through the movements of this matter by means of its resident forces. It is not only a theory of *self-creation*, but it is a theory of the self-creation of *all that is*.

And this means, it will not fail to strike the reader further, that evolution is, in the hands of both these writers alike, a *philosophy of the universe*. It will not suffice to say that they, or either of them, look upon it merely as a theory of the method of creation, of the mode in which differentiations of form have come into being. It is presented by both of them alike as a theory of creation itself, accounting for all things that are. It is not merely that they omit to mention the higher directive power that may yet preside over the process of change, and lead it to a preconceived goal; it is not even merely that they render the assumption of such a power superfluous; they directly and emphatically exclude it. Prof. Cope tells us plainly that, in his mind, there is an active exclusion of interfering agencies from without. And Prof. Le Conte, with scarcely less emphasis, gives us to understand that it is "nature," which in his mind is, through this process, "struggling upwards" towards "the divine plane from which it originated," and not God who is moulding nature through the ages to his will. To both writers alike, evolution is a philosophy—a philosophy which accounts for the universe as it is, and for all that is in it, without calling in any interference from without.

Naturally, both must have something to start with, in this process of self-creation. And for both alike this "something to start with" is phenomenally *nothing other than matter* with its primary qualities. Prof. Cope calls it, indeed, "the physical basis of tridimensional matter." But by this he only means that he con-

ceives that, behind matter as we know it, there lies yet a simpler form of substance, so that matter as we have it—"tridimensional matter"—is itself a product of evolutionary process. But this simplest primordial substance is still physical; and it is by its intrinsic energies alone that it has lifted itself first into "tridimensional matter," then into organized matter, and then into reasoning matter. Prof. Le Conte's ontology is no less really materialistic. He gives us to understand, to be sure, that "the plane from which all evolution sprang" was "divine," even as the goal to which it tends is "divine;" so that "nature by evolution through infinite time has struggled upward to reach again the divine plane from which it originated." But "the thing evolving" in its primordial stage, he identifies with what we know as matter in its simplest form, endowed with or at least active only in "its purely chemical properties." The emergence of further and higher qualities comes later on, in the process of evolution itself. Thus to identify God with matter, or to call matter God, does not appear to us to improve things. The difference between a pantheistic and a materialistic ontology is insignificant in a connection of this kind; in both alike, it is from what we know as matter in its simplest form that all that is has come. Whence this primordial matter comes, neither writer tells us. Probably both would speak of it as eternal. The one may possibly take this in the materialistic sense, and, projecting his imagination backwards, might expect to find nothing but "the physical basis of tridimensional matter" behind. The other may take it in a pantheistic sense, and conceive behind all changes what he calls "God"—but God in the form of simple undifferentiated matter. To both alike, simple matter, with its own intrinsic or resident forces, is all that is, and all that has come to be is its evolution, *i. e.*, its changes of form under the action of its own intrinsic energies.

It assuredly will not escape the reader that this philosophical theory has no claim to be called "science." It is purely a *a priori* construction. Who has shown Prof. Cope his "physical basis of tridimensional matter"? What "scientific discovery" has revealed to Prof. Le Conte that "God" is identical with primal matter and can be attained by primal matter rising, through the operation of its resident forces, back to the plane from which it started? What discovery has shown him that protoplasm is a simple chemical compound?—that life is a product of chemical reaction?—that reason is modified life?—that God is advanced reason? Observed fact cuts no figure in these theories. Indeed, the reader will nowhere find himself more emancipated from the trammels of fact than

when reading such an imaginative construction as Prof. Le Conte's. He may feel himself in the hands of a poet whose feet scorn the earth, as he skims his opulent pages. But he can not discover the foundations of fact on which these great dreams are built.

Nor can it possibly escape the reader that evolution, conceived thus as an all-inclusive philosophy, leaves little room in the universe for what the Christian calls God. Even a materialistic scheme of evolution may, to be sure, comport with a Deistic conception of God. After all, Professor Cope is not entitled simply to assume "a physical basis of tridimensional matter," so endowed that by virtue of its intrinsic energies alone it may unfold itself into a universe of order and of mind. We need still to ask whence this physical basis of matter and whence its wonderful powers, unfolding within themselves the promise and potency of every form of life. At the least, we need a power outside and beyond the evolving stuff to make the stuff, to give its forces to it and to set it going—a *primum movens*, in this sense. And the most entire system of self-creation equally may comport with a pantheistic conception of God. Prof. Le Conte may teach all he teaches as to the involution of all that is in simple matter and its gradual evolution from it up to God himself,—if he understands by God only the All, whose varying manifestations the changing world is, who is not only entangled in matter, but is indistinguishable from matter, and who is only as matter is and what matter may at any moment chance to be. But it seems perfectly obvious that this evolutionary philosophy leaves no place for the Christian's God, who is not the God afar off of the Deist, and not the simple world-ground of the Pantheist, but the Living God of the Bible—at once above the world and in the world, the author of the world and its strong governor; who is not far from any one of us, but yet is a somewhat outside and above us; who is to the world and to man at least a power without them making for righteousness.

Theism has, of course, no quarrel with second-causes. It would not substitute the direct divine action for the operation of the natural forces which God has made, and which are real forces, really operative, just because "He who can" has made them such. But neither can it permit second-causes to be substituted for the Living God, who doeth his pleasure amid the armies of heaven and among the inhabitants of the earth. The universe was not self-created. It was God that made it, and without him was not any thing made that has been made. No philosophy the very principle of which is to account for all that is without God, can possibly take a really theistic view of the world. In this sense,

evolution as conceived by both of our present writers is, therefore, tantamount to atheism. It has no room in all its thought for a Living God—for a God who not only Is, but who Can and who Does.

II.

There are three general positions which may be taken up with reference to the doctrine of evolution, which has so deeply affected modern thought as to the origin of the universe and all that it contains.

1. We may look upon this doctrine as supplying an obviously true and adequate philosophy of being, and treat it as furnishing a complete account of the origin and present state of the universe. It is so looked upon by a large number of writers of light and leading. Thus Prof. Huxley affirms "that the whole world, living and not living, is the result of the natural interaction, according to definite laws, of the powers possessed by the molecules of which the primitive nebulousity of the universe was composed." This position is, of course, tantamount to atheism; and it is a matter of indifference to the theist whether it takes a materialistic or a pantheistic shape. When Mr. Darwin put forth his *Origin of Species*, he was confining his survey to the origin of the divergent forms of animated existence. He consequently postulated the existence of life and living forms. Moreover, he wrote that book at a stage in his ever-shifting opinion as to divine things, when he was feeling theistically; he, therefore, spoke throughout it in a theistic sense and theistic language. But that the theory, as held by him, was essentially atheistic, as Dr. Charles Hodge pointed out in a vigorous little volume, was fully exhibited by his drift away from theism, as recorded in his *Life and Letters*.

2. We may consider the doctrine of evolution as a discovery by science of the process through which this ordered world in which we live has, as a matter of fact, come into existence; and treat it merely as an account of the manner in which the universe, considered as a cosmos, has been produced, and all the forms of being which constitute it have been brought into being. In this form, evolution is not conceived as the ultimate account of any thing; it is made a second cause, and implies a first cause working by and through it. In this form, accordingly, it is not only not atheistic, but implies and pre-supposes theism. This is the form in which it is conceived by theistic thinkers; and a notable example of its presentation from this point of view may be found in the writings of the late Dr. James McCosh. Dr. McCosh speaks of evolution as "demonstrated" fact; and yet harnesses it to his own theistic conceptions, and makes it subservient to and indeed give

way before even his Christian supernaturalism. When so dealt with, the doctrine of evolution only supplies the Christian thinker with an account of the mode and method of creation.

3. We may look upon the doctrine of evolution as a more or less probable, or a more or less improbable, conjecture of scientific workers as to the method of creation; and thus treat it as, as yet, only a working hypothesis suggested to account for the manner in which the universe has come into being, and seeking now to try itself by the facts. This has always been the attitude of the more cautious thinkers, and in the progress of scientific investigation it is becoming now somewhat more common to find it adopted even by scientific workers themselves. An increasing caution is observable in assertion; perhaps we may even say, an increasing doubt as to the universality and sufficiency of evolution. In the new edition of his admirably restrained and sensible lectures on *The Bible Doctrine of Man*, Dr. John Laidlaw points out how much less frequently now than a few years ago the claim is made for the evolutionary hypothesis "as a universal solvent of the question of origins." And he points out with this the effect of the change of attitude on the duty of the Christian thinker. "In face of these recent confessions of the merely tentative character of the hypothesis," he remarks, "the lesson for the interpreter of Scripture is plain. For him to hasten to propound schemes of conciliation between the Mosaic account of creation and the Darwinian pedigree of the lower animals and man would be to repeat an old and, now, an unpardonable blunder."

In a word, the really pressing question with regard to the doctrine of evolution is not, on the one hand, whether it supplies in itself an adequate account of the origin of being and the differentiation of forms, nor, on the other, whether the old faith can live with this new doctrine. The first of these questions only raises in a new form the old problem of the atheistic philosophy which can not deserve a new discussion merely because it has put on a new dress. The second of them opens only a purely idle speculation, which is careless whether it deals with realities or shadows. We may be sure that the old faith will be able not merely to live with, but to assimilate to itself all facts. "The gold of fact," says Dr. Laidlaw finely, "will form at length the perfect ring of truth when the crust of suppositions which have helped in its formation shall be dissipated into dust and ashes." Meanwhile, having "a revealed account of the origin of the world and man, which coincides with the instinctive beliefs of the human mind, with the plan of human history, with the faith and hope that are in God," we

need not be over-anxious whether or not it can be shown to coincide also with every tentative supposition. The only living question with regard to the doctrine of evolution still is whether it is true. And the only reasonable reply which can be given to this question to-day is that it is *sub judice*. This is not equivalent, of course, to saying that it is not true. We may hold it to be probably true, and yet agree that it is still upon its trial and has not yet been shown to be true. But we think it must be admitted that it has not yet been shown to be true, and must still be ranked not as "demonstrated" fact but only as a more or less probable or a more or less improbable working hypothesis.

To be sure, it is to be borne in mind that it is scarcely legitimate to ask any thing of the nature of a strict "demonstration," or even any thing like direct proof, for a theory of this sort. Proof of a hypothesis of this kind can only be of a probable order, and can arise only out of inferences from observed effects to causes and processes. It is quite conceivable, however, that such proof might reach stringent validity and command assent. Its power to do so would depend on the ability of the suggested hypothesis to explain with ease and completeness all the observed facts. And by this we must mean something more than merely the possibility of wrenching some kind of explanation of the facts out of the hypothesis. Most of the phenomena of the universe could find some sort of explanation in the Ptolemaic theory. The probability of a theory thus increases not only in proportion to the number of the facts of which it supplies an explanation, but also in proportion to the cleanness, so to speak, with which it explains them, and its power to illuminate the connection between the facts and thus supply a basis for deduction, by which we may (1) deduce from the terms of the theory all the known facts, and thus, as it were, prove its truth; and (2) deduce also new facts, not hitherto known, by which it becomes predictive and the instrument of the discovery of new facts, which are sought for and observed only on the expectation roused by the theory. It is quite possible, by a combination of such results, so fully and powerfully to commend a suggested hypothesis that the mind cannot resist the evidence in its favor. It may with such cleanness and perfection explain all the observed facts, with such power of illumination uncover obscure points and reveal new and unexpected elements of fact, and with such certainty determine the facts subsumed under it and lead on to the discovery of others, that we can not escape the conviction that in it we have exactly the key that belongs to this lock. And, of course, it follows that the more complicated the lock is, the greater is the certainty that we have found its true key when we

have a key which smoothly and cleanly fits every ward. But it must fit the wards. The simplest bent wire will often serve as a pick to open a lock. And as it is not every key that will open a lock which is its own proper key, so it is not every theory that will open a problem which is its own proper explanation. There is such a thing as picking the lock of a problem as well as of a safe, and science needs protection against burglary just as truly as banks.

But if it is true that not every theory which will provide some sort of explanation for the facts is the true theory to assume for their explanation, it is, of course, *a fortiori* true that no theory which will not explain the facts can possibly be the true theory. Every theory proposed to account for a body of facts must run two gauntlets. It must first of all be shown to be capable of accounting for the facts. It is sometimes assumed that this is all that can be asked of it. But all that has been so far shown is that, should there be reason to believe that this hypothesis is the true one, it may be accepted as such—no facts stand in the way. We must now ask what reason exists for supposing it to be the true account of the facts. In other words, we must now range it alongside of whatever other theories exist also capable of accounting for the facts, and seek grounds for choice between them. Every thing is not true that is shown to be possibly true. The race is to be run between the various theories which have been shown to be able to account for the facts. The preliminary exhibition of ability to account for the facts is only conforming to the condition of entry for the race. Assuredly the prize cannot be claimed before the race is run, merely on presentation of clean entry papers. Much more assuredly the prize can not be claimed before the entry is itself approved.

If now it be asked what is the exact *status* of the doctrine of evolution, it will be scarcely possible to affirm that it has as yet been shown that it is capable of accounting for all the facts. Precisely what is now under investigation is whether the facts as known can be accounted for on this hypothesis. There is a wide-spread feeling abroad that, if it can be shown that it is capable of accounting for all the facts, this is the proper theory to assume in order to account for them. And there is a wide-spread expectation that sooner or later, in one form or another, the evolutionary hypothesis will be shown to be able to account for all the facts. But it is surely premature to say of it that it has already been shown to be able to account for all the facts. And we can only think that enthusiasm has run away with good judgment when we hear it said, as we sometimes do hear it said, that we have the same

proof for the doctrine of evolution which we have for Newton's theory of gravitation. There is an essential difference between these two cases in kind, as readers of Dr. Flint's paper on *Theology* in the ninth edition of the *Encyclopædia Britannica* will have lucidly expounded to them. But apart from this, it would seem to be too evident to require statement that the proof that evolution will account for all the facts observed in the sphere for which it has to account, as yet lags. It may be far from plain that it can not account for all these facts. It is as yet equally far from plain that it can account for them all. It is in the effort to show that it can account for them that a thousand scientific investigators are now engaged.

Possibly this over-enthusiastic assertion that evolution has been shown to be able to account for all observed facts in the sphere of its assumed operation, may find its explanation, in part, in a perhaps not unnatural extension of a happy experience in a narrower to an unwarrantedly broadened field. The doctrine of evolution has served us, we will say, in our endeavors to unravel some exceptionally hard problem. In the enthusiasm of this experience we declare it able to unravel all similar problems. This is the natural history of all panaceas. It is scarcely stringent logic, however, to infer from the fact that a theory can account for some facts, that it therefore can account for all facts. Yet this is a logic from which advocates of evolution have not kept their skirts free. A possible genealogy is made out, for example, for the Equidæ, which might possibly be accounted for on the doctrine of evolution. It is then assumed that this is the actual genealogy of the Equidæ and that evolution is the right account to give of it. And then it is forthwith assumed that because evolution may thus possibly account for the Equidæ it is also the true account to assume for the origin of species and genera for which we can not, as yet at least, make out any genealogy which is at all consistent with the doctrine of evolution,—of the Trilobites, say, or of the Devonian Fishes. Students of logic might obtain some very entertaining examples of fallacy by following the processes of reasoning by which evolutionists sometimes commend their findings to a docile world. The treatment of the apparition of the Fishes in the Devonian age in Prof. Le Conte's *Manual of Geology* may be commended to such as a shining instance, which, unfortunately, does not stand alone. But we scarcely need a better example than that in hand. Because a possible genealogy can be constructed for a number of forms, chiefly in the upper strata, for which evolution might possibly supply an account, it does not follow that evolution

is shown to be the true account of the whole series of forms presented to us in the crust of the earth. And it will hardly do to clench this somewhat violent inference by an appeal to the law of continuity and uniformity in nature, which is rather too sharp a two-edged sword for evolutionists safely to wield at this stage of the investigation.

It ought not to be necessary to add that none of this is said with a view to giving*the impression that the doctrine of evolution has been disproved. It is not even intended to suggest that it is improbable. We only wish to point out as clearly as we can that it is as yet unproved; that its present status is that of a suggested explanation of the facts of nature which is as yet on its trial, as to whether it can supply an account of these facts or not. We may deem it probable or we may deem it improbable that it will ever be shown to be able to account for these facts. It will certainly conduce to a clearer conception of the state of the case if he will recognize it according to our different judgments as, as yet, only a more or less probable or a more or less improbable conjecture of scientific workers as to the method and course of creation.