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I.

EVOLUTION IN RELATION TO SPECIES.

I PROPOSE, in this brief article, to submit some objections, of a strictly scientific or logical character, against the now fashionable hypothesis of evolution as an explanation of the origin and mystery of species in organic nature. I shall take occasion also to criticise the logic of its advocates. But I shall lay no stress upon its supposed sceptical tendencies for several reasons.

One of these reasons is, that, although infidels with their keen instinct everywhere welcome and defend extreme views on this subject as unanswerable arguments against the truth of the Holy Scriptures, yet all evolutionists are not sceptics. Some of them are firm believers in the Word of God, and declare that, as they understand it, they find nothing in it opposed to evolution. Some are clear and strong Theists, whether believers in revelation or not, strenuously maintaining that the forces of nature by which the processes of evolution are supposed to be carried on, are not in any sense the properties of matter, but the uniform action or energy of the Divine will. Others, whilst claiming that these forces are truly the properties of matter, escape the gulf of scepticism by holding also that God, by an original and personal act, endowed matter with these properties. Others still exclude the human soul entirely from the hypothesis, and claim that for its existence a creative act of God must be supposed. In

all these cases, doubtless, evolution doctrines may be held in consistency with faith in the personality and providence of God. There are others, however, and not a few, who affirm and maintain that the evolution forces are the properties of matter in such a sense that the question, how it came to be possessed of these properties, is excluded from scientific investigation and from the domain of human knowledge. These are the agnostics, for whom it would seem that materialism and atheism are unavoidable. But with such as these, of course, none but scientific objections can have any weight.

Another reason for confining myself here to such objections is, that science, as it seems to me, can be safely left to refute its own sceptical tendencies. For it is essentially progressive and ever advancing to new positions, or points of view, from which its previous hypotheses and theories are necessarily seen to be incomplete, or inadequate, and many of them entirely false. Consequently, scientists often advocate at one time what they strenuously oppose at another. In this way, the objections which they raise against the Scriptures, and which appear to many to be unanswerable, at one stage of their progress, they often, at another stage, overthrow and trample upon. Of this, evolution itself affords us a notable example. For only a few years ago, it was fashionable among a certain class of scientists to deny the truth of the Mosaic account of the deluge on the ground that the different species of living creatures were so numerous that they could not possibly have found room in Noah's ark. But now the evolutionists are moving heaven and earth to convince us that there never were any such things as permanent species, and that all organized beings have been evolved out of a very few primordial forms, perhaps from a single one, and ultimately from inorganic matter. Consequently, they have dropped this argument against the Scriptural account of the flood, as a live coal; for at the time this great catastrophe occurred, which may be placed as far back as any one chooses, the several varieties of land animals may have been so few as to find ample accommodation in the ark. In this way, science is constantly dealing with its own errors, which, therefore, may be safely left to its own correction.

In the meantime, before we accept any hypothesis of the

scientists, it will be wise for us to wait until we see whether they themselves will not turn against it, as they have done in so many cases. Nor should we, to whom the faith of Christianity is everything, ever allow ourselves to admit that if this or that claim of science be made good we must give up our Bible. We should rather say to the scientists, with a certain wise and great man in his day :

“Go on, gentlemen, make all the discoveries you can. We are not afraid of the truth. But you will please to remember that whilst you are disputing about anything, we are not obliged to accept it. It is our place to wait until you have come to an agreement. And when you have established any new truth so that you yourselves no longer dispute about it, we will accept it in perfect assurance that it cannot possibly have any bad influence upon our faith. For since, as we hold, the Author of nature and of revelation is one and the same infinitely wise and good Being, true science and true religion can never have any quarrel with each other.”

Moreover, it is irrational for us to submit our minds blindly to the general theories, hypotheses, speculations, inferences and reasonings, which are so often put forth in the name of science. For scientists, like all other men, are fallible, and much given to speculative and discursive views. I venture to affirm that theology itself (which is saying a great deal) was never more prone to daring speculation than is physical science at the present time. We should bear in mind, also, now that it has become fashionable with scientists to submit to the public in popular lectures the evidences upon which they rely for the proof of their general and speculative conclusions, that their hearers are often quite as good judges of the nature, validity and force of their proofs, and of the soundness of their reasonings, as they themselves can possibly be. For logic is one and the same thing in all the departments of human thought and life. There is not one logic for physical science, another for moral science, another for political economy, and another for business affairs. There are no better practical logicians than our ablest men of business. Hence the statesman, the theologian, the lawyer, and the mind that has been well-trained in business, are abundantly competent to judge whether the proofs of such general speculations in science are conclusive or not. Otherwise, what good reason can be given for submitting them to the public in popular lectures? Consequently, when we detect in them the most palpable violations of the universal and immutable laws of logic,

as any intelligent person may often do, we need not hesitate to reject them. But, with respect to the facts of observation, or experiment, the case is all different. Here we may well accept in faith and with gratitude those vast and priceless treasures of information with which the discoveries of science are constantly enriching human life.

I come now to the scientific or logical objections which I propose to offer against this boasted hypothesis of evolution, which makes it necessary for me to enter here into some discussion of the essential nature and proper definition of species in the organic world.

The principle of classification, then, as is well known, lies at the foundation of science and of human knowledge. Consequently, it is everywhere represented in the languages of mankind, for every common term is the name of a class. Classes are formed by the mental processes of comparison and generalization. When we direct our attention to individual objects, we immediately begin, by an instinct of reason, to compare them with each other, and to note their points of resemblance and difference. Those that resemble each other in the greatest number of particulars we group together, and thus form our primary or lowest classes. Such a class of individuals is termed a species. These primary classes, again, we compare with each other, noting their points of resemblance and difference, and thus group them into classes of classes. Such a class is called a genus. Applying the same process to these higher classes, with similar results, when we have carried it as far as possible, we are finally arrested at one highest of all classes, which is that of undifferenced being. The word, being, as denoting barely that which exists, or the word, thing, which means whatever can be thought of, is the name of the highest class which it is possible to form. Among all these classes, and in every branch of science alike, that which bears the name of species, being a class of individual objects bearing the greatest resemblance to each other, is the most important. It is upon this that every system of classification rests.

But here a great difficulty is encountered in determining the limits of species from the fact, that a great number of objects, especially in the world of organized beings, are found, upon

inspection of their mutual resemblances, to shade off by almost or quite insensible gradations, and even to overlap, so to speak, upon each other. Thus the Virginia mocking-bird, one of the thrushes, and the most richly endowed of all singing birds, partakes of the nature of the hawk—it is, to a certain extent, a bird of prey—for in its wild state it will kill and eat a sparrow as naturally as does the sparrowhawk. In addition to this, creatures which bear the closest outward resemblance to each other are often found to be very different in their inward structure; whilst those which are most alike both in appearance and in structure often differ greatly in their physiological characters, especially in life and life's powers, faculties, and manifestations. The Saint Bernard and terrier dogs, for example, have little outward resemblance, but their life is so nearly or quite identical that it can be freely propagated between them, and their offspring are also fertile one with another. On the other hand, the Muscovy and common duck bear a much stronger resemblance to each other, yet they are so diverse in life that, although it can be propagated between them, their offspring is a hybrid or mule, in which, consequently, the development of life and variation on that line comes to an end. Also, it has been often asserted that the Caucasian man of the highest type and the negro of the lowest differ from each other in appearance and structure more than the negro and orang or chimpanzee; but the former are so completely identical in life that it is not only propagated between them with the utmost freedom, but their offspring are as fertile one with another as themselves; whilst the negro and the orang are so diverse in life that it cannot be propagated between them at all. Thus it appears that the veiled mystery of life is most salient, and its distinctions most capable of being apprehended by the mind, in the phenomena of its reproduction.

For these and other reasons, our elder naturalists, and all until very lately, were agreed in regarding as subordinate all other points of agreement and diversity, for the purpose of determining the limits of species in the organic world, and in attaching a paramount importance to those of life and life's organs, functions, operations, and manifestations. Thus Linnæus, the founder of the modern science of natural history,

selected those organs in plants by which their life is propagated, and, neglecting all other points of agreement and diversity, erected upon them alone his all-comprehending system of classification. Thus also the naturalists of succeeding times have grouped in species all known organized beings which they regarded as possessed of such a unity of life as that it could be propagated among the individuals of the same species in a permanently fruitful form. I do not mean that experiments upon this point were actually made in one case out of a thousand, but simply that hybridity was universally regarded as a final test of species in this sense, that all organized beings which might be found normally incapable of propagating among themselves a fertile offspring should be classed as of different species, and all which were capable of this, in the same. The divergencies by intermixture and other circumstances among the members of a species, rendering them liable to constant change in their peculiarities, were made the basis of certain fluctuating subdivisions, which, with the strictest regard to etymological propriety, were termed varieties.

Now these statements readily furnish us with a definition of species which is sharply determinative of the extent and limits of the idea. For, according to these views, species in natural history can be nothing else but that unity of life in a group of organized beings in virtue of which they resemble each other, and are normally capable of propagating among themselves a permanently fruitful offspring. This definition was substantially concurred in by all naturalists until the rise of evolution, and it is abundantly confirmed by the following passage in "the still classical work of Cuvier," in which he says :

"The birth of organized beings is the greatest mystery of the organic economy and of all nature. . . . All organized beings produce similar ones, otherwise, death being the necessary consequence of life, their species would not endure. . . . *There is no proof that all the differences which now distinguish organized beings, are such as might have been produced by circumstances. All that has been advanced upon this subject is hypothetical.* Experience seems to show, on the contrary, that, in the actual state of things, varieties are confined within rather narrow limits ; and, so far as we can retrace antiquity, we perceive that these limits were the same as at present. We are obliged, then, to admit of certain forms which, since the origin of things, have been perpetuated without exceeding these limits ; and all the beings appertaining to one of these forms constitute what is called a species. Varieties are accidental subdivisions of species. . . . Fixed forms which are perpetuated by generation distinguish their species. . . . Generation, being

the only means of ascertaining the limits to which varieties may extend, species should be defined the reunion," or grouping, "of individuals descended one from the other, or from common parents, or from such as resemble them as closely as they resemble each other."* To this it should be added, that "allied species produce between themselves an infertile offspring. Remote species of the same genus are those between which hybrids are never produced."

Now it is admitted on all hands, for it is undeniable, that this characterization of species, in which, as I have said, all the elder naturalists are substantially agreed, marks a real distinction in the actual state of things, and represents a vast range of facts in the organic world. An immense number of organized beings either cannot interbreed with each other at all, or their offspring is infertile. An immense number of others are capable of being grouped into classes such that the members of each class can and do freely interbreed with each other, and their offspring are no less fertile than themselves. And here I raise the question against evolution: Ought not the classifications of science to mark and signalize this great and broad physiological distinction and difference between organized beings? Is it true science utterly to ignore it in classification as if it did not exist? Yet this is just what all evolutionists are forced to do. The fact, indeed, is so undeniable and significant that they cannot help recognizing it from time to time, but the point which I make against them here is, that in their classifications, the primary object of which is to mark resemblances and differences, they utterly ignore it. Is this true science?

That I do not misrepresent them is evident from the fact, that their hypothesis itself is the assumption that there is no such distinction in permanence; that wherever it exists it is the result of circumstances; that all the differences between existing species have arisen through gradual divergencies, in the course of innumerable ages, among the descendants of common parents, which, therefore, were formerly capable of interbreeding, and may again become capable. It is still more evident, if possible, from their own characterizations of species. For although, for obvious reasons, they fight shy of precise definitions, yet they explain with sufficient clearness the meaning which they would if they could attach to the word. Thus Professor Huxley in his "Origin of Species":

* Animal Kingdom, edited by Dr. Carpenter. Introduction, pp. 18, 19.

"If in a state of nature you find any two groups of living beings which are separated from each other by some constantly recurring characteristic, I don't care how slight and trivial, so long as it is defined and constant, and does not depend upon sexual peculiarities, then all naturalists agree in calling them two species; that is what is meant by the word, species—that is to say, it is, for the practical naturalist, a mere question of structural differences." P. 104.

Now all this is very curious. For, in the first place, Huxley's assertion, that "all naturalists agree" in this characterization of species, is as far from the truth as possible. The truth is, that no naturalist, not even himself, as we shall presently see, practically distinguishes species from each other by any such tests as these. Secondly, by this expression, "a mere question of structural differences," he excludes all such as are physiological and biological, which include all the phenomena of life, among which, of course, are those of its propagation, and which, as we have seen, are the most significant of all the differences by which organized beings are distinguished from each other. This makes good what I have said, namely, that evolutionists ignore all such differences in their classifications, and again raises the question, is this true science? Thirdly, in making the distinction between species to depend upon any "constantly recurring characteristic," no matter "how slight and trivial," he lays down a principle which requires him to class the white man and the negro as of different species, for what can be a more "constantly recurring characteristic" than their opposite colors? But this neither he himself, nor any other evolutionist pretends to do; for it is not favorable to their hypothesis, and Huxley himself, in the work already referred to, explicitly says:

"I am one who believes that, at present, there is no evidence whatever for saying that mankind sprang originally from any more than a single pair; I must say, that I cannot see any good ground whatever, or even any tenable sort of evidence, for believing that there is more than one species of man." P. 113.

He has forgotten the constantly recurring, though trivial, characteristic of color, by which the black man and the white are distinguished. Thus, in fine, he finds it impossible consistently to abide by his own characterization of species. He loses sight of it on almost every page of the work in which it is given, and uses the word as including physiological traits, which he had expressly excluded. For example, in his discussion of hybridity, he says: "Hybrids are crosses between

distinct species. . . . Between species, in many cases, you cannot succeed in obtaining the first cross (remote species). . . . Here is a feature, then, great or small as it may be, which distinguishes natural species," p. 107. Here we have, on a single page, three examples, taken at random from innumerable others, in which he recognizes physiological distinctions between species, and uses the word precisely as defined by Cuvier and the elder naturalists. Especially in the last example, what does he mean by "natural species"? We see in these criticisms and quotations the sense which evolutionists desire, in the interest of their hypothesis, to attach to the word, species, and how utterly unable they themselves are to use it in this sense, by reason of the opposition which they everywhere encounter from the stubborn facts of nature.

I come now to discuss the arguments upon which they rely for the overthrow of the older definition, and for the establishment of their hypothesis, in which we shall see with what reason Cuvier could say, in the words which I have placed in italics: "There is no proof that all the differences which now distinguish organized beings are such as might have been produced by circumstances. All that has been advanced upon this subject is hypothetical." For these statements are as true now as when they were put on record by that great man. To this day, all that has been advanced in favor of evolution is "hypothetical."

There are only two such arguments, each of which, however, includes a multitude of particulars.

The first of these is the argument from analogy, which is thus stated by Professor Packard:

"Reasoning *a priori*, we assume that organisms, both plant and animal, have been created out of pre-existent forms because it agrees with the general course of nature. All agree that the solar system was evolved; that the earth was evolved . . . that . . . the nebular hypothesis is necessary to account for the origin of our earth. . . . Hence evolutionists assume that plants and animals share in this process of evolution."*

Thus far, then, the hypothesis can be no better characterized than as a mere assumption. But this argument includes also the many cases in which organic forms which had been hastily regarded as of different species have been discovered, upon more perfect knowledge of them, to be mere varieties

* *The New York Independent*, Feb. 5, 1880.

of the same, as the squirrels of tropical America, for example, have been reduced from fifty-nine to twelve species. Evolutionists lay much stress upon these discoveries and reductions, as if they indicated that the differences between all species might, conceivably at least, be thus reduced. But here, as in many other cases, their logic is manifestly false; for all that such reductions can prove is, that naturalists are liable to error, and have erred, through imperfect knowledge, as was unavoidable, in regarding as of different, what were in truth, varieties of the same species. Nor does it matter how many more such discoveries may be made, in so far as the evolution hypothesis is concerned, because, whatever definition of species be adopted, in ten thousand cases for every one of them, it must still and forever remain as impossible to reduce the differences among organized beings to a unity as it is that the lion should interbreed with the cow, or the mouse with the elephant.

But now this whole argument from analogy, however numerous the particulars it may include, can never, with its utmost logical force, prove that anything is so; the most that it can prove is that it may be so, and raise an antecedent probability in its favor. For thus Leverrier, for example, reasoned from many strong analogies to the probability that there was a certain undiscovered planet on the outskirts of our solar system; but he did not pretend that this was to be received as a truth of science until he had discovered, and could show, his planet, Neptune, through the telescope. Upon this evidence from analogy, therefore, whilst scientists may fairly accept evolution as antecedently probable, and as a good working hypothesis, which is full of suggestion, and which may lead, as it has led them, to many valuable discoveries; yet they cannot logically claim for it the character of a scientific truth, which others are obliged to accept, and with which other known truths must be harmonized, until it shall have been demonstrated by proofs of an entirely different character.

The only other argument for the hypothesis is, that it will account for, explain, or render intelligible, a vast number of facts in nature, especially the resemblances and differences among organized beings. These facts are such as the following: The existence of rudimentary organs—the rudimentary

hand in the whale's flipper; the male mammæ, which are supposed to have been dwarfed by ages of disuse, together with all the female organs in the male in a rudimentary or *atrophied* condition; and, in like manner, all the male organs in the female, in a similar condition—the changes which are observed to take place in organized beings under the influence of circumstances, such as those by which, it is admitted, the various types or races of mankind have been formed; the progress in organization from the lower and more simple to the higher and more complex types, which is everywhere conspicuous; the manner in which the differences in organisms shade off into, and overlap upon each other by almost insensible gradations, especially as this has been disclosed by late discoveries of fossil remains; the origination of new forms successively in the lapse of past ages; together with the perishing of such as were ill-adapted to, and the preservation of those which were in harmony with, their changing physical conditions and surroundings. These are only examples of a great multitude of facts in organic nature which it is claimed that this hypothesis will account for and render intelligible.

Now this argument, which is strictly inductive in its character, if it were without flaw and perfect, would, I frankly concede, be demonstrative; that is to say, if the hypothesis were in itself conceivable, and if it would fairly account for all the facts to which it properly applies, and if these facts could be accounted for in no other way, then we should be obliged to accept it as a scientific truth, resting upon evidence precisely similar and equal to that upon which we receive the Newtonian theory of gravitation. But, unfortunately for its advocates, all of these three necessary conditions are wanting, as I now proceed to show.

In the first place, then, it is not claimed that it will account for all the facts to which it properly applies. It is admitted on all hands that it includes as yet unsolved difficulties, some of which will be referred to in the sequel. Now, in this state of the case, the fact that it will account for a great number of phenomena is not sufficient evidence to establish it as a truth of science. For other hypotheses, as is well known, have been maintained on similar grounds, and yet have subsequently been found untenable. Thus in astronomy the Ptole-

maic or geocentric construction of the solar system was for a long time universally accepted on the ground that it accounted for a vast number of facts and celestial phenomena; whilst the vortices of Descartes accounted for almost as many of them as the theory of gravitation itself. Yet both of these celebrated hypotheses are now universally rejected, and few persons are now aware of what a place in science they formerly occupied. Such, therefore, notwithstanding the number of facts which it is claimed that it will explain, may hereafter be the fate of evolution. Professor Huxley is well aware of this, and in view of it he well says, though in palpable inconsistency with other deliverances of his to which I shall refer:

“You must understand that I accept it provisionally, in exactly the same way as I accept any other hypothesis. Men of science do not pledge themselves to creeds There is not a single belief that it is not a bounden duty with them to hold with a light hand, and to part with it (?) cheerfully, the moment it is really proved to be contrary to any fact, great or small.” “Origin of Species,” p. 145.

But how he can reconcile this with what immediately precedes it, and of which it is given in explanation, passes my comprehension. For there he says: “I think it is Mr. Darwin’s hypothesis (of evolution) or nothing; that either we must take his view, or look upon the whole of organic nature as an enigma the meaning of which is wholly hidden from us.” P. 144.

Moreover, it is very far from being true, that it is either evolution or nothing. For all these facts, especially the resemblances and differences among organized beings, can be equally well and better accounted for by another and totally different hypothesis, namely, that of the distinct and independent creation of species as defined by Cuvier and the elder naturalists. Evolutionists, indeed, contend that this is rendered improbable by many facts, and that it is utterly overthrown by the late discoveries among fossil remains of intermediate forms between existing species, which, as they claim, render the transition of one species into another an easy matter. Thus, Professor Huxley, in his New York lectures, ventured to assert that if but one more “missing link” should be discovered, namely, a horse with five toes, “evolution would be demonstrated.” But here again he sets all logic at defiance. For what if his five-toed horse were found? Nay,

what if any number of such approximations were discovered, and the structural differences between all species were reduced to a minimum? How would that "demonstrate" that any one species has been actually derived from, or evolved out of, another, whilst the bar of their inability to interbreed remains between them, and whilst their resemblances can be fully accounted for on a different hypothesis? How many things bear the closest resemblance which yet no one pretends to have sprung one from another? The planets of our solar system, for example, are very much alike, but this does not even suggest that the earth has been evolved out of Jupiter, or both out of the sun. Such is the logic of evolutionists by which they demonstrate their hypothesis, and overthrow that of the distinct and independent creation of species!

But now, if we concede that either of these two hypotheses will equally well account for the facts in question, there still remains a logical necessity for an *experimentum crucis*, a crucial test, that is, a fact verified and established which can be accounted for by one of them, but not by the other, in order to determine, on scientific evidence, which of them is to be preferred. Now such a crucial test we have in the universally acknowledged fact, that individuals of different species can produce between themselves no fruitful offspring, and, in most cases, no offspring at all. For this fact which, as we have seen, is one of vast range throughout organic nature, is fully and satisfactorily accounted for on the hypothesis of the distinct and independent creation of species, whilst it is utterly inexplicable on that of evolution. This, as we shall see directly, is admitted by Professor Huxley. For what conceivable reason can evolution give us, why the descendants of the same parents should ever come to be normally incapable of continuous propagation with each other? On the other hand, no such crucial test in favor of this latter hypothesis is conceivable except an actual, observed and verified transition or transformation of one species into another, such as that of a bison into a cow, a dog into a cat, a horse into an ass, a chestnut tree into an oak, or the development of a new species out of a pre-existing one so that their members should be incapable of crossing breed with each other. In order that this hypothesis should rise even to the character of a scien-

tific theory, at least one beast must be observed to have become a man, or one animal or one plant to have been transformed into another of a different or new species. But no such transformation has ever been observed. No evolutionist pretends to have discovered any such crucial test. In two or three cases, indeed, among the lowest forms of organic life, doubtful claims have been put forth to the evolution of new species out of pre-existing ones; but, in all these cases, the species have been distinguished by mere structural differences, and the question, whether they could interbreed with each other or not, upon which in this argument everything depends, has never been tested.

Professor Huxley, in the work already referred to, has given this subject an extended discussion, and we may safely accept his admissions.

"We have seen," he says, "that breeds known to have been derived from a common stock by selection may be as different in their structure from the original stock as species may be different from each other (?). But is the like true of the physiological characteristics of animals? Do the physiological differences of varieties amount in degree to those observed between forms which naturalists call distinct species? This is a most important point for us to consider. . . . For there is a most singular circumstance in respect to natural species," (Again, what does he mean by "natural species"? For true science knows no others) "at least about some of them—and it would be sufficient for the purposes of this argument, if it were true of only one of them, but there is, in fact, a great number of such cases—and that is, that similar as they may be to mere races or breeds (varieties) they present a marked peculiarity in the reproductive process. . . . If you take members of two distinct species, however similar they may be to each other, and make them breed together, you will find a check. . . . If you cross two such species with each other, then—although you may get offspring in the case of the first cross (allied species), yet, if you attempt to breed from the products of that crossing, which are called hybrids . . . then the result is that in ninety-nine cases out of a hundred you will get no offspring at all. . . . Between species, in many cases, you cannot succeed in obtaining even the first cross (remote species). . . . This is a very extraordinary circumstance." (He has just said that it is so ordinary as to be almost universal). "One does not see why it should be." (Here he admits that evolution cannot account for it). . . . "Here is a feature, then, great or small as it may be, which distinguishes natural species of animals. Can we find any approximation to this in the different races (varieties) known to be produced by selective breeding from a common stock? Up to the present time, the answer to that question is absolutely a negative one. As far as we know at present, there is nothing approximating to this check. . . . Here you see is a physiological contrast between races (varieties) produced by selective modification and natural species. . . . By selective breeding we can produce structural divergencies as great as those of species (?) but we cannot produce equal physiological divergencies." Pp. 104-111.

Subsequently he adds:

"Mr. Darwin, in order to place his views beyond the reach of all possible assault, ought to be able to demonstrate the possibility of developing from a particular stock by selective breeding two forms which should either be unable to cross one with another, or whose cross-breed offspring should be infertile one with another. . . . Now

it is admitted on all hands that, at present, so far as experiments have gone, it has not been found possible to produce this complete physiological divergence. . . . If you have not done that, you have not shown that you can produce, by the cause assumed (evolution) all the phenomena which you have in nature. . . . If it could be proved, not only that this *has* not been done, but that it *can not* be done." (So! by what law of logic does he require us to prove a negative?) . . . "If it could be demonstrated that this is impossible (*sic*). . . . I hold Mr. Darwin's hypothesis (evolution) would be utterly shattered." Pp. 140-141.

Now I have been compelled to leave out much of this long-winded discussion, which is loaded with verbiage, but I have given in the author's own words his exact meaning in every particular, as any one may see by reference to the pages quoted. Here, then, we see it fully and expressly admitted that the crucial test which the hypothesis of evolution requires has not been discovered, and we are gravely challenged to prove the negative, that its discovery is impossible! in which case, we are told that the "hypothesis would be utterly shattered," as if the burden of proof rested upon its opponents, and not, as it does wholly, upon its advocates. No, the evolutionists do not pretend that they have discovered their crucial test. They tell us that they have not yet had sufficient time; for one such transformation may require many thousands of years. Says Professor Jevons:

"The deeper differences between plants have been produced by the differentiating action of circumstances during millions of years, so that it would naturally require millions of years to undo this result, and prove experimentally that the forms can be approximated together again." "Principles of Science," p. 414.

Give us time enough, they say, and we will show you plenty of such transformations. Well, we may safely give them all the time they ask, and a million of years hence, when they shall claim to have discovered one such fact, we—will examine it.

But the inability of different species to produce a fertile offspring is not the only fact which cannot be explained on the hypothesis of evolution. In addition to this, there is a vast number of other facts, and these the most important of all, namely, the facts of human consciousness, of which it gives us no rational account. This is frankly admitted by some evolutionists, who, therefore, exclude the human soul, and all the phenomena of consciousness from their hypothesis, and claim that it is to be applied only to man's physical nature, together with the lower organic world. But the great majority

of its advocates, and all the ablest logicians among them, steadfastly refuse to make this exception, because they see plainly enough that, if it can be applied to the mental faculties of animals, no scientific interest requires them to exclude those of man. In fact, the exception is made by those only who are trying in this way to guard their religious faith. But inasmuch as this objection against the hypothesis, that it does not rationally account for the phenomena of consciousness, has been frequently and strongly pressed by others, I shall do little more than state it here.

Our mental faculties, then, and their operations—reason, sensibility and will; our conceptions of abstract, universal, and necessary truths; our ideas of the true, the beautiful and the good; our moral distinctions between right and wrong; our consciousness of freedom and immortality, of God, and of the whole invisible, supersensual and spiritual world—these great salient facts cannot be accounted for by the uniform forces of nature, nor by the properties of matter, whatever “potentialities” be ascribed to it, nor in any way consistently with the evolution hypothesis. Its advocates do, indeed, make spasmodic efforts to explain the phenomena of our moral nature. But the best they can do is to tell us that our distinctions between right and wrong are nothing but the summation or result of the experiences of good and evil through which our ancestors have passed transmitted to us their descendants by the principle or law of heredity: thus what was in them a distinction based upon experience becomes in us a distinction independent of, and prior to, our own individual experience. In the same way precisely they try to explain the operations of animal instinct. But even in this latter case they signally fail. For it is incredible that bees, for example, should have learned by manifold experiments through innumerable failures how to construct their perfect hexagonal cells, which combine the greatest possible mechanical strength and capacity of contents with the least possible expenditure of material and waste of room. Otherwise their intellectual faculties must be regarded as vastly superior, for such purposes at least, to those of human beings. The same is equally true of the operations of an ant-hill, of the flight of birds of passage, of the unerring return of the young fish

from their wanderings in the ocean to the river or stream where they were spawned and hatched, and of almost all the phenomena of instinct properly so called. Much more is this explanation inadequate to the phenomena of the conscience, of which the most fundamental and essential elements, namely, its authority and its moral character, are left unexplained. For it does not touch the fact of our consciousness of moral obligation, which obviously is not contained in, and consequently cannot be derived from, the mere experience of good and evil, howsoever prolonged through innumerable generations. Neither does it touch the authority with which the conscience delivers its sacred oracles—that “categorical imperative” the awful impression of which Kant, the philosopher, could compare to nothing but that of the starry firmament. In fact, this explanation reduces this great mystery of “the voice of God in man” to a faculty of mere prudential wisdom, to a selfish regard for our own welfare and happiness, to a complete level with animal instinct. This is not to account for facts, but to deny, or at least to ignore them. In like manner, our sensibility to the charms of moral sublimity and beauty, the admiration we feel for an act of noble self-sacrifice, the promptings of great and heroic souls, our indignation at injustice and iniquity—all these and other similar facts are inexplicable on the hypothesis of our derivation from ape-like creatures, in which no such susceptibility has ever appeared. Together with these, and above all, the phenomena of the human will can never be accounted for by the properties of matter, nor from the uniform operations of natural forces, nor in any way consistently with evolution. For if we know anything, it is that the will of man is not subject to the uniformity of natural laws, that it is a self-moving power (*autokinétos*). Human life, as proceeding from the will, does not run in fixed grooves, as the wheels of a steam-engine. We have the ability to choose for ourselves whether we will go in one direction or another, which is a freedom absolutely inconceivable as a property of matter, or as a quality of any of the natural forces.

In fine, the hypothesis of evolution necessarily involves and implies particulars, processes, details of transition or transformation which cannot be represented to the mind, of

which no conception can be formed, which are absolutely unthinkable. Among these are the origin of vegetable life from inorganic matter, that of animal life, with its mental faculties and operations, from the vegetable, the transition of sexless into sexual beings, the separation of the two sexes, previously combined in the same individual, into individuals of either sex alone, the transformation of insensible, irrational, involuntary, impersonal, unmoral things into sensible, rational, voluntary, personal, moral beings. Not one of these transformations is conceivable, or thinkable, in the several steps or details of the process which it necessarily implies. Nor is the difficulty lessened, though it is veiled and disguised, on the contrary, it is increased, by the immense length of time which is required and allowed for each of them. Especially, with respect to the evolution of sexual out of sexless forms, we have a logical right to ask, what was their condition at each step or stage of this transformation? In what conceivable way could their existence have been preserved, and their species propagated (if species they can be said to have had) during those hundreds of thousands of years whilst they were neither one thing nor the other, but partly sexual and partly sexless forms? Let any one undertake to represent to his imagination the procedure and details of what must be supposed to have taken place, and assuredly he will find that they are inconceivable. Again, in the separation of the two sexes, what were the several steps and details of the process? Whilst that which is now the male was ceasing to bear children; whilst his mammæ, now dwarfed and *atrophied* by ages of disuse, were ceasing to give suck; whilst all the female organs in the male were, from the same cause, falling into a state of atrophy; in like manner, whilst that which is now the female was beginning to bear separately, and her bosom was undergoing development; whilst all the male organs in her body were falling into a similar state of atrophy—together with all the prodigious changes in the internal structures and physiological traits of both which are necessarily implied—what then and through all the ages of this transformation, were the physical and mental conditions of the creature which is now the male and female man? How was its existence maintained, and how was its species (?) propagated, during

all these immense periods of time, whilst it was neither male nor female, but partly both? Is it not evident to all men that, before we can be even plausibly required to accept this hypothesis as a truth of science, we have a logical right to demand of its advocates, that they shall represent intelligibly all of the several steps, stages, processes, details, if not those which were actually followed, at least those by which the transformation might possibly, or conceivably, have taken place? But none of them, though they have been often challenged, indirectly at least, and though the necessity of it is palpable to all men, have ever dared or attempted to furnish us with any such scheme, and this, for the best of reasons, because it cannot be done. For these and all the transformations which have just been enumerated, together with innumerable others involved in the hypothesis, do necessarily include procedures, particulars, details, which no mind can, by any possibility, represent intelligibly to other minds, nor to itself—which are absolutely unthinkable. Now what other refutation does true science require of any hypothesis, or theory, than that, in its particulars, it is unthinkable?

The late lamented Professor Henry, secretary of the Smithsonian Institution, whilst he filled the chair of physics in Princeton College, was always very full and explicit on the nature and uses of physical hypotheses and theories. He took great pains to impress upon his classes that they were very useful in giving direction to experiment and research, and thus in leading to new discoveries. But he was accustomed to add: "Young gentlemen, your hypothesis is good for just so many new facts or truths to the discovery of which it can lead you. When it will yield you no more discoveries, you have no farther use for it—you may throw it away." Now, agreeably to this view, it is undeniable that evolution has opened the path of scientific research in many important directions, and has led to the discovery of many new facts and truths in the organic world. Neither have we any reason to think that it is yet exhausted. For scientists it may long continue to be a good and fruitful working hypothesis. But, for such reasons as these which I have here given, it has no claim to be regarded as an established truth of science, with which other known truths must be harmonized; and I

venture to predict that the time is not far distant when, as an explanation of the origin of species and of the mystery of life, it will be cast by scientists themselves "to the moles and to the bats," with the Ptolemaic system of astronomy, the vortices of Descartes, the notion that nature abhors a vacuum, and other Baconian "idols of the tribe and the theatre."

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