EVOLUTION AND SPECIAL CREATION.

TAKING a retrospective view of the dark and unenlightened past, when the mighty forces of nature were almost entirely hidden from the human gaze; contemplating the sad spectacle of our forefathers being sunken in gross superstition, ere the light of to-day had arisen above the horizon of mental ignorance, and contrasting the then limitation of knowledge with the extensive educational acquirements now existing, what a pleasing contrast the intellectual advancement presents to the modern observer! Recognising the glories of nature, and finding ourselves possessed of an amazing amount of information respecting the laws of nature and the phenomena with which these laws are connected—such information being for ages unknown to the great masses of the people—we are prompted to inquire what has produced this marvellous transformation, and to what agency we are indebted for this grand and stupendous revolution of the nineteenth century. Whatever may be the reply of the theologian, whose intellect is too often clouded with dreamy imaginations, the answer of the patient and unfettered student of nature will be that it is to science we owe the magic power which has substituted for the dense darkness of the past the brilliant light of the present. The marvels of astronomy, the revelations of geology, the splendours of botany, the varieties of zoology, the wonders of anatomy, the useful discoveries of physiology, and the rapid strides which have been made in the development of the mental sciences, all combine to unravel the once mysterious operations of mind and matter. While each of the modern sciences has corrected long-cherished errors and

opened new paths of investigation, one or two of them have especially tended to unfold to our view the nature, affinity, and development of man, and the wonderful universe to which he belongs. For instance, without the science of geology we should, in all probability, forever have remained in ignorance of the various changes which had taken place on the earth previous to the appearance of man, and the different forms of animal and vegetable life that were then distributed over its surface. We now examine the various strata of the earth, and there discover the fossil remains of animals and plants which existed in the ages that rolled by when no historian lived to pen the mighty transactions of nature and hand them down to future generations. The science of electricity, too, still only in its infancy, promises to confer an amount of benefit upon mankind too vast to be conceived. We hear the thunder roar, and behold the vivid flash of lightning darting before our eyes like an arrow from the bow of the archer; but while we regard this phenomenon we have learned not to look upon it with dread as the vengeance of an angry God, but as a natural result of the operation of known forces. It was for Dr. Watts to sing:—

> "There all his stores of lightning lie
> Till vengeance darts them down."

But it remained for a Franklin and a Priestley to inform us that tempests were not to be beheld as indicating the wrath of an offended God, but as the effect of an unequal diffusion of the electric fluid. Thus science has been, and is, our benefactor, our enlightener, our improver, and our redeemer. Without its aid we should still have been in a state of mental darkness and physical degradation. Deprived of its discoveries, we should still have been bound down with the ties of superstition, ignorance, and fanaticism. As Pope observes:—

> "Lo! the poor Indian, whose untutored mind
> Sees God in clouds, or hears him in the wind;
> His soul proud Science never taught to stray
> Far as the solar walk or milky way."

Perhaps there is no domain of human thought where the advantages of scientific investigation are more clear and pronounced than in connection with what is termed "Evolution"—a word which, within the last few years, has

become very popular as representing a theory of man and the universe opposed to the old orthodox notion of special creation and supernatural government. There are, of course, some professedly religious people who avow their belief in Evolution, and who maintain that it is what they call God's mode of working; and there are those who even go so far as to say that the power and wisdom of God are seen more thoroughly displayed in the process of Evolution than in the method, so long believed in, of special and supernatural creation. But the number of these is comparatively small, and, consequently, the great mass of those who accept the word in its legitimate signification may be looked upon as of a sceptical turn of mind. It will not be difficult to demonstrate that the popular theological idea of creation finds no support in the theory of Evolution, which, if not a demonstrated thesis, has, at least, in its favour the "science of probabilities"—an advantage that cannot fairly be claimed for the Biblical account of the origin of phenomena.

The term "evolution" may be defined as an unfolding, opening out, or unwinding; a disclosure of something which was not previously known, but which existed before in a more condensed or hidden form. There is no new existence called into being, but a making conspicuous to our eyes that which was previously concealed. "Evolution teaches that the universe and man did not always exist in their present form; neither are they the product of a sudden creative act, but rather the result of innumerable changes from the lower to the higher, each step in advance being an evolution from a pre-existing condition." On the other hand, the special creation doctrine teaches that, during a limited period, God created the universe and man, and that the various phenomena are not the result simply of natural law, but the outcome of supernatural design. According to Mr. Herbert Spencer, the whole theory of Evolution is based upon three principles—namely, that matter is indestructible, motion continuous, and force persistent. Two contending processes will be seen everywhere in operation in the physical universe, the one antagonistic to the other, each one for a time triumphing over its opposite. These are termed "evolution" and "dissolution." Spencer remarks that "Evolution, under its simplest aspect, is the integration of matter and the dissipation of motion,

while dissolution is the absorption of motion and the concomitant disintegration of matter." Thus it will be seen that Herbert Spencer regards evolution as the concentration or transition of matter from a diffused to a more condensed and perceptible form. This change he traces in the systems of the stars; in the geological history of the earth; in the growth and development of plants and animals; in the history of language and the fine arts, and in the condition of civilised states. Briefly, the theory is that the matter of which the universe is composed has progressed from a vague, incoherent, and, perhaps, all but homogeneous nebula of tremendous extent, to complete systems of suns, worlds, comets, sea, and land, and countless varieties of living things, each composed of many very different parts, and of complex organisations.

Coming to the organic bodies, there may be included under the term "evolution" many different laws, some of which we may not even know as yet, and a great number of processes, acting sometimes in unison and often in antagonism, the one to the other. This, however, in no way weakens the theory of evolution, which, beyond doubt, is the process by which things have been brought to their present condition. It will tend, perhaps, to elucidate this truth the more readily and clearly if a brief exposition of the theory be given under the chief divisions of this extensive subject.

The Formation of Worlds.—According to Evolution, the present cosmos began its development at an immeasurably remote date, and any attempt to comprehend the periods that have rolled by since would paralyse our highest intellectual powers. When the matter which is now seen shaped into suns and stars of vast magnitude, and of incompresible number, was diffused over the whole of the space in which those bodies are now seen moving—of extreme variety, and, perhaps, of nearly homogeneous character—the human mind is unable to comprehend. This matter, by virtue of the very laws now seen in operation in the physical universe, would in time shape itself into bodies with which the heavens are strewed, shining with a glory that awes while it charms. What is called in these days the nebular cosmogony may be said to have arisen with Sir

William Herschel, who discovered with his telescope what seemed to be worlds and systems in course of formation—that is, they were in various states which appeared to mark different degrees of condensation.

M. Laplace, without any knowledge of Herschel's speculations, arrived at a similar idea upon a totally different ground—namely, the uniformity of the heavenly bodies. He showed that, if matter existed in such a different state as the nebular theory assumed, and if nuclei existed in it, they would become centres of aggregation in which a rotary motion would increase as the agglomeration proceeded. Further, Laplace urged that at certain intervals the centrifugal force acting in the rotating mass would overcome the force of agglomeration, and the result would be a series of rings existing apart from the mass to which they originally adhered, each of which would retain the motion which it possessed at the moment of separation. These rings would again break up into spherical bodies, and hence come what are termed primary bodies and their satellites. This Laplace showed to be at least possible, and the results, in the case of our solar system, are just what would have been expected from the operations of this law. For example, everyone knows that the rapidity of the motions in the planets is in the ratio of their nearness to the sun.

Many facts seem to support this theory, such as the existence of the hundred and more small bodies, called asteroids, observed between Mars and Jupiter, which doubtless indicate a zone of agglomeration at several points, and the rings of Saturn give an example of zones still preserved intact. This theory has been held by some of the most eminent astronomers, and is most ably advocated by the late Professor Nicol in his "Architecture of the Heavens." Some experiments have also been tried—as, for example, that of Plateau on a rotating globe of oil—which showed the operation of the law by which the suns, planets, and their moons were formed. Such is the evolution of worlds, and it is unnecessary to point out how diametrically it is opposed to the special creation described in Genesis, where the heavens and the earth are called suddenly into being by the fiat of God, and the sun stated to be created four days afterwards. Which theory should, in these days of thought, commend itself to a rational mind?

The Beginning of Life upon the Earth.—Evolution has been subjected to many severe attacks at this point. Those who contend for special creation have maintained, with a dogmatism which but ill accords with the knowledge they possess upon the subject, that nothing but the hypothesis of the supernatural origin of things is sufficient to account for the first appearance of life upon the earth, that evolution completely breaks down here, and that all the experiments which have been conducted with a view to lend it support have turned out positive failures. Such is the allegation of orthodox opponents. Let us see what grounds they have for these reckless and dogmatic statements. The two views of the origin of living beings have been called respectively *Biogenesis* and *Abiogenesis*, the first meaning that life can spring only from prior life, and the latter that life may sometimes have its origin in dead matter. Dr. Charlton Bastian, whose experiments will be hereafter referred to, substitutes for *Abiogenesis* another word, *Archebiosis*.

Now, it is well known and admitted on all hands that there was a time when no life existed on the earth. Not the most minute animal, or the most insignificant plant, found a place on the surface of what was probably at that time a globe heated up to a temperature at which no living thing could exist. The life, therefore, that did afterwards appear could not have sprung from germs of prior living bodies. True, the whimsical theory was put forward by an eminent scientific man, some years ago, that the first germs that found their way to the earth were probably thrown off with meteoric matter from some other planet. But on the face of it this is absurd, because such matter would be of too high a temperature to admit of the existence upon it of living bodies of any kind; and, besides, were it otherwise, it would explain nothing. It would only transfer the difficulty from this world to some other. For life must have had a beginning somewhere, and the question is as to that beginning somewhere. The supernaturalist seeks to get out of the difficulty rather by cutting the Gordian knot than by untying it, and falls back upon a special creation, thereby avoiding any further trouble about the matter. But the evolutionist thinks that he can see his way clearly in what must necessarily be to some extent a labyrinth, because no one lived at that time to observe and record what was taking

place. One thing is plain, which is, that living things were made or came into existence—whatever the mode may have been, or the power by which it occurred—out of non-living matter. Even the believers in special creation will not deny this. The only question is, therefore, whether the process occurred in accordance with natural law, and whether the forces by which it was brought about were those which exist, or, at all events, which did exist, in material nature. For it does not follow that, if such phenomena do not occur to-day, they could never have taken place in the past. The conditions of the earth were different then from what they are now, and forces may have been in operation that are now quiescent. Professor Huxley, who thinks that no instance has occurred in modern times of the evolution of a living organism from dead matter, and that the experiments which have been conducted on the subject are inconclusive—who, in fact, ranks himself on the side of the advocates of *Biogenesis*—yet says that, if we could go back millions of years to the dawn of life, we should, no doubt, behold living bodies springing from non-living matter.

But, of course, it will be argued that, if it happened then, it might take place now; and although, as I have said, this is not conclusive, yet to some it has much weight. What Nature has done once, it is insisted, she can do again. Quite so; but, then, all the conditions must be the same. Dr. Bastian himself asks the question: "If such synthetic processes took place then, why should they not take place now? Why should the inherent molecular properties of various kinds of matter have undergone so much alteration?" ("Beginnings of Life"). And the question is likely to be repeated, with, to say the least of it, some show of reason.

It must never be forgotten, as Tyndall has very ably pointed out, that the matter of which the organic body is built up "is that of inorganic nature. There is no substance in the animal tissues that is not primarily derived from the rocks, the water, and the air." And the forces operating in the one are those which we see working in the other, vitality only excepted, which is probably but another manifestation of the one great force of the universe. Indeed, Professor Huxley does not make an exception even in the case of vitality, which, he maintains, has no more actual existence

than the imaginary aqueosity of water. Mr. Herbert Spencer thinks that life, under all its forms, has arisen by an unbroken evolution, and through natural causes alone; and this view accords with the highest reason and philosophy.

Nor have the experiments performed with a view to solve the problem been so conclusive as would appear to some. At all events, the question is an open one as to whether the origin of living things in non-living matter has not been experimentally demonstrated. The old doctrine of "spontaneous generation" can, in its new form and under its recent name of *Abiogenesis*, or *Archebiosis*, claim the support of men of great eminence in the scientific world at the present time. Pouchet, a very illustrious Frenchman, performed a large number of experiments, and in all or most of them he succeeded, according to his own opinion, in producing living things. The objection that there were germs in the air, or water, or the materials that he employed, he met by manufacturing artificial water out of oxygen and hydrogen, and submitting the whole of the material employed to a temperature above boiling-water point, which would certainly destroy any living germ, either of an animal or vegetable character. Then, in England a series of experiments have been performed by Dr. Bastian, one of the leading scientists of our time; and the results have been given to the world in some voluminous and masterly books. "These volumes," says an opponent—Dr. Elam—"are full of the records of arduous, thoughtful, and conscientious work, and must ever retain a conspicuous place in the literature of biological science." Dr. Bastian maintains that he has succeeded, in innumerable instances, in producing living organisms from non-living matter. Hence the doctrine of Evolution, which is in accordance with true philosophy, finds its support in that physical science where we should expect to meet with it, and to which it really belongs.

The Origin of Man.—It has already been stated that the remains of man are met with only in the most recent geological deposits. On this point there will be no dispute. No doubt human beings have been in existence for a much longer period than is generally supposed; the short term of six thousand years, which our

fathers considered to cover man's entire history, pales into insignificance before the vast periods which we know to have rolled their course since human life began. But that fact in no way affects the question before us. Man was certainly the last animal that appeared, as he was the highest. If it be asked, Why highest as well as last? the answer is, Because, by the process of evolution, the highest must come last. This is the law that we have seen operating all through the physical universe, so far as that universe has disclosed to us its mighty secrets, hidden for ages, but now revealed to scientific observation and experiment. Man came, as other organic bodies came, by no special creation, but by the great forces of nature, which move always in the same direction, and work to the same end. As far as the physical powers are concerned, it will not be difficult to conceive the same laws operating in his production as originated the various other forms of organic beings. His body is built up of the same materials, upon precisely the same plan: during life he is subject to the same growth and decay, the same building up and pulling down of tissues; and it is but reasonable to suppose that the same forces originated his beginning, as we know they will some day terminate his existence.

Mr. Darwin made a bold stroke when he gave the world his "Descent of Man." In 1859 he had published the first edition of his work on "The Origin of Species," which fell like a thunderbolt into the religious camp. The commotion it caused was tremendous, and the effect can to-day hardly be imagined; so tolerant have we grown of late, and such a change has passed over the scene within the past quarter of a century. The most violent opposition raged against the new views; ridicule, denunciation, and abuse were hurled at the head of the man who had propounded so preposterous a theory as that all organic things had sprung from a few simple living forms very low down in the scale of being. Then came a larger work, entitled "Animals and Plants under Domestication," brimful of facts of a most startling character, supporting the theory advanced in the previous book, and challenging refutation on all hands. In the face of these facts, the public mind cooled down a little, opposition became milder, some adversaries were converted, and others manifested indifference.

The major part of those who still adhered to the supernatural and special creations held that, even if the theory of Evolution turned out to be true, it would not apply to man, who was a being possessed of an immortal soul, and, therefore, belonged to a different order of creatures from any other animals, and that Mr. Darwin never intended to include human beings in the organic structures thus originated.

In this state the controversy remained until 1872, when Mr. Darwin took the bull by the horns, and at one stroke swept away the last stronghold of special creation by showing that humanity was no exception to the great law of evolution; for man, like other animals, had originated in natural selection. The facts given in the book on "The Descent of Man" are both powerful and pertinent. This, however, is not the place to dwell upon natural selection, and it is only referred to so far as it supports evolution. The difficulties that have been placed in the way of the application of this principle to man have not had much reference to his bodily organs, but mainly to his mental and moral powers, his social faculties, and the emotional side of his nature. True, a controversy raged for a short time between Huxley and Owen as to whether there was a special structure in the human brain not to be found in the next animals lower in the scale of being; but this contention has long since died out, and to-day no anatomist of any note will be found contending for the existence of any such organ. That the human brain differs considerably from the brain of any lower animal no one who is at all acquainted with the subject will deny; but this is difference in degree, and not arising from the presence of any special structure in the one which is absent in the other. Man, therefore, must look for his origin just where he seeks for that of the inferior creatures.

The science of embryology, which is now much more carefully studied, and, consequently, much better known than at any period in the past, lends very powerful support to evolution, though, perhaps, little to natural selection. "The primordial germs," says Huxley, "of a man, a dog, a bird, a fish, a beetle, a snail, and a polyp are in no essential structural respects distinguishable" ("Lay Sermons"). Each organism, in fact, commences its individual career at the

same point—that is, in a single cell. These cells are of the same chemical composition, approximately of the same size, and appear to be in all respects identical. Yet the one developes into a fish, another into a reptile, a third into a bird, a fourth into a dog, and a fifth into a man. The process is the same in all up to a certain point. First, the cell divides into two, then into four, eight, sixteen, and so on, until a particular condition is reached, called by Haeckel *morula*, when a totally different set of changes occur. In the case of the higher animals the development of the embryo exhibits, up to a very late period, a remarkable resemblance to that of man.

The Diversity of Living Things.—A mere glance at the geological records will show at once that the order in which animals and plants have appeared on the earth is that which accords with evolution. The lowest came first, the highest last, and a regular gradation between the two extremes. In the early rocks in which life appears we meet with polyps, coral, sea-worms, etc., and no trace of land animals or plants. Then, passing upwards, we come upon fishes, then reptiles, afterwards birds, subsequently mammals, and, last of all, man. These are undisputed facts, as the most elementary works on geology, whether written by a professing Christian or an unbeliever, will clearly show.

The only objection, perhaps, of any weight that can be urged against the changes which evolution asserts to have taken place, is the fact that we do not see them occur. But this, in the first place, is hardly correct, since we see the tadpole—which is a fish breathing through gills, and living in the water—pass up into a reptile, the frog, which is a land animal breathing through lungs, and inhaling its oxygen from the atmosphere. Secondly, the fact that we do not see a change actually occur, which took millions of years to become effected, can surely amount to little. An ephemeral insect, whose life only lasts for a day, might object, if able to reason, that an a corn could not grow into an oak tree, because it had not seen it occur. But the evidence would be there still in the numerous gradations that might be seen between the acorn and the sturdy old tree that had weathered the storms of a century. And in

this case we see all the gradations between a monad and a man in the rocks which furnish us with the history of the past, although, as our lives are so short, we are not able to see the whole change effected. Plants were not all suddenly called into existence at one particular period, and then animals at another and later time. This we know, because the remains of plants and animals are found side by side throughout all the rocks. If there be an exception, it is an unfortunate one for the Christian supernaturalist, since it shows that animals were first; for certain it is that animal remains are met with in the oldest rocks.

The objection to evolution, that no transformation of one species into another has been seen within recorded history, is entirely groundless, and betrays utter carelessness on the part of the objectors. The truth is, such transformations have taken place, as mentioned above in reference to the tadpole. Professor Huxley and other scientists have proved this to be the case. It should, however, be remembered that in most instances these great changes are the work of time. As Dr. David Page observes: "It is true that, to whatever process we ascribe the introduction of new species, its operation is so slow and gradual that centuries may pass away before its results become discernible. But, no matter how slow, time is without limit; and, if we can trace a process of variation at work, it is sure to widen in the long run into what are regarded as specific distinctions. It is no invalidation of this argument that science cannot point to the introduction of any new species within the historic era; for till within a century or so science took no notice of either the introduction or extinction of species, nor was it sufficiently acquainted with the flora and fauna of the globe to determine the amount of variation that was taking place among their respective families. Indeed, influenced by the belief that the life of the globe was the result of one creative act, men were unwilling to look at the long past which the infant science of palæontology was beginning to reveal, and never deigned to doubt that the future would be otherwise than the present. Even still there are certain minds who ignore all that geology has taught concerning the extinction of old races and the introduction of newer ones, and who, shutting their eyes to the continuity of nature, cannot perceive that the same course

of extinction and creation must ever be in progress" ("Man: Where, Whence, and Whither?").

Let us now apply a test to the creative theory with a similar demand, and what will be the result? An utter failure on the part of the creationists to substantiate their dogmatic pretensions. Suppose we exclaimed, "Show us a single creative act of one species within recorded history." It would be impossible for them to do so, for there is not a shadow of evidence drawn from human experience in favour of what theologians call creation. "We perceive a certain order and certain method in nature; we see that under new conditions certain variations do take place in vegetable and animal structures, and by an irresistible law of our intellect we associate the variations with the conditions in the way of cause and effect. Of such a method we can form some notion, and bring it within the realm of reason; of any other plan, however it may be received, we can form no rational conception."

"The whole analogy of natural operations," says Professor Huxley, "furnishes so complete and crushing an argument against the intervention of any but what are called *secondary causes* in the production of all the phenomena of the universe that, in view of the intimate relations between man and the rest of the living world, and between the forces exerted by the latter and all other forces, I can see no excuse for doubting that all are co-ordinated terms of nature's great progression, from the formless to the formed, from the inorganic to the organic, from blind force to conscious intellect and will." The most that can be said of the creative theory is that it is a question of belief; but of knowledge never.

Dr. Page observes: "We may believe in a direct act of creation; but we cannot make it a subject of research. Faith may accept, but reason cannot grasp it. On the other hand, a process of derivation by descent is a thing we can trace as of a kind with other processes; and, though unable to explain, we can follow it as an indication, at least, of the method which Nature has adopted in conformity with her ordinary and normal course of procedure. We can admit possibilities, but must reason from probabilities, and the probable can only be judged of from what is already known. Than this there is clearly no other course for philosophy. Everywhere in nature it sees nothing but processes, means, and results, causes and effects, and it

cannot conceive, even if it wished, of anything being brought about unless through the instrumentality of means and processes."

To me it has always been a difficulty to understand how an infinite being could possibly have been the creator of all things. For this reason: if he is infinite, he is everywhere; if everywhere, he is in the universe; if in the universe now, he was always there. If he were always in the universe, there never was a time when the universe was not; therefore, it could never have been created.

If it be said that this being was not always in the universe, then there must have been a period when he occupied less space than he did subsequently. But "lesser" and "greater" cannot be applied to that which is eternally infinite. Further, before we can recognise the soundness of the position taken by the advocates of special creation, we have to think of a time when there was no time—of a place where there was no place. Is this possible? If it were, it would be interesting to learn where an infinite God was at that particular period, and how, in "no time," he could perform his creative act. Besides, if a being really exists who created all things, the obvious question at once is, "Where was this being before anything else existed?" "Was there a time when God over all was God over nothing? Can we believe that a God over nothing began to be out of nothing, and to create all things when there was nothing?" Moreover, if the universe was created, from what did it emanate? From nothing? But "from nothing, nothing can come." Was it created from something that already was? If so, it was no creation at all, but only a continuation of that which was in existence. Further, "creation needs action; to act is to use force; to use force implies the existence of something upon which that force can be used. But if that 'something' were there before creation, the act of creating was simply the re-forming of pre-existing materials." Here three questions may be put to the opponents of evolution who affirm the idea of special creation:—(1) Is it logical to affirm the existence of that of which nothing is known, either of itself or by analogy? Now, it cannot be alleged that anything is *known* of the supposed supernatural power of creation. On the other hand, sufficient is known of the facts of evolution to prevent the careful student of Nature from attempting to

rob her of that force and life-giving principle which undoubtedly belongs to her. (2) Is it logical to ascribe events to causes the existence of which is unknown, and more particularly when such events can be reasonably explained upon natural principles with the aid of "the science of probabilities"? Dr. Page forcibly remarks: "Man has his natural history relations—of that there can be no gainsaying—and we merely seek to apply to the determination of these the same methods of research which by common consent are applied to the determination of the relations of other creatures.....Scientific research must abide by scientific methods; scientific convictions must rest on scientific investigations." To assert that life is associated with something that is immaterial and immortal, and that this force could only have been brought into existence by a special act of "the one great creator," is to prostrate reason and experience before the assumptions of an over-satisfied theology. To once more use the words of Dr. Page: "Science knows nothing of life save through its manifestations. With the growth of physical organisation it comes; with the decay of organisation it disappears. While life endures, mind is its accompaniment; when life ceases, mental activity comes to a close. Thus far we can trace; beyond this science is utterly helpless. No observation from the external world; no analogy, however plausible; no analysis, however minute, can solve the problem of an immaterial and immortal existence." (3) Is it logical to urge the theory of special creation when science proclaims the stability of natural law, and its sufficiency for the production of all phenomena? Professor Tyndall, in his lecture on "Sound," remarks that, if there is one thing that science has demonstrated more clearly than another, it is the stability of the operations of the laws of nature. We feel assured from experience that this is so, and we act upon such assurance in our daily life. The same eminent scientist, in his Belfast address, says: "Now, as science demands the radical extirpation of caprice, and the absolute reliance upon law in nature, there grew with the growth of scientific notions a desire and determination to sweep from the field of theory this mob of gods and demons, and to place natural phenomena on a basis more congruent with themselves." Again: "Is there not a temptation to close to some extent with Lucretius when he

affirms that 'Nature is seen to do all things spontaneously of herself without the meddling of the gods,' or with Bruno when he declares that Matter is not 'that mere empty capacity which philosophers have pictured her to be, but the universal mother who brings forth all things as the fruit of her own womb.....By an intellectual necessity I cross the boundary of the experimental evidence, and discern in that matter which we, in our ignorance of its latent powers, and notwithstanding our professed reverence for its creator, have hitherto covered with opprobrium, the promise and potency of all terrestrial life."

Psychical Powers.—This is the great stronghold of the opponents of evolution. They maintain that, whatever may have taken place with regard to physical powers and bodily organs, it is clear that the higher intellectual faculties of man could not so have originated; that those, at least, must be the result of a special creation, and must have been called into existence by some supernatural power when human beings first appeared upon the stage of life. Such persons further urge that, even if it could be shown beyond doubt that the marvellously constructed body of man, with its beautifully adjusted parts of bone and muscle, nerve and brain, skin and mucous membrane, had its origin in evolution, yet no light whatever would be thrown upon the source of the wondrous powers of judgment and memory, understanding and will, perception and conception. This argument, no doubt, to some at first appears specious; but the question is, Is it sound? The assumption seems to be that we meet with these powers now for the first time, and that, therefore, it is here that a special creation must be called in to account for their origin, their character being so different from anything that has previously crossed our path in this investigation. But assuredly this is not correct. Some of these powers are certainly to be met with in the lower animals—a few of them low down in the scale—and for the rest the difference will be one of degree more than of quality.

It will not surely be maintained that perception is peculiar to man; it must exist wherever there are organs of sense, and these extend in some form or other to the lowest phase of animal life. Volition is also met with in all

the higher animals; and memory may be observed in the dog, horse, elephant, cat, camel, and numerous other mammals, with whose habits every-day life makes us familiar. Even judgment in the form of comparison is often displayed by the domestic animals, the dog in particular. Dr. H. Bischoff, in his "Essay on the Difference between Man and Brutes," says: "It is impossible to deny the animals, qualitatively and quantitatively, as many mental faculties as we find in man. They possess consciousness. They feel, think, and judge; they possess a will which determines their actions and motions. Animals possess attachment; they are grateful, obedient, good-natured; and, again, false treacherous, disobedient, revengeful, jealous, etc. Their actions frequently evince deliberation and memory. It is in vain to derive such actions from so-called instinct, which unconsciously compels them so to act." Max Müller also, in his "Science of Language," admits that brutes have five senses like ourselves; that they have sensations of pain and pleasure; that they have memory; that they are able to compare and distinguish; have a will of their own, show signs of shame and pride, and are guided by intellect as well as by instinct.

With such facts as these before us, what reason have we for supposing that these psychical powers are not as likely to have been evolved as the bodily organs? There is no break whatever to be seen in the chain at the point of their appearance in man. If the mental powers of the lower animals have come by evolution, there is not a shadow of reason for supposing that those of man arose in any other way, for they are all of the same quality, differing only in degree. No doubt, as Mr. Darwin says, "the difference between the mind of man and that of the highest ape is immense." And yet, as he also remarks, "great as it is, it is certainly one of degree, and not of kind." The highest powers of which man can boast—memory, judgment, love, attention, curiosity, imitation, emotion—may all be met with in an incipient form in lower animals. Let any man analyse his mental faculties one by one—not look at them in a state of combination, for that will be calculated to mislead—and then say which of them is peculiar to man as man, and not to be found in a smaller degree much lower in the scale of being. Even the capacity for improvement—in other words, for pro-

gress—is not peculiar to man, as Mr. Darwin has shown by innumerable examples of great force and beauty.

The emotions have often been spoken of as being peculiar to man, but evidently with no regard to accuracy. Terror exists in all the highest of the lower animals as surely as it does in man, and shows itself in the same way. It causes the heart to palpitate, a tremor to pass along the muscles, and even the hair to undergo that change which is called "standing on end," in the horse, the dog, and other animals, as in the human species. "Courage and timidity," observes Darwin, "are extremely variable qualities in the individuals of the same species, as is plainly seen in our dogs. Some dogs and horses are ill-tempered and easily turn sulky; others are good-tempered; and these qualities are certainly inherited. Everyone knows how liable animals are to furious rage, and how plainly they show it." The love of the dog for his master is proverbial; indeed, this noble animal has been known to lick the hand of the vivisector while undergoing at his hands the severest torture. And revenge is often manifested by the lowest animals—not simply the sudden impulse which revenges itself at the moment for pain inflicted or wrongs done, but long, brooding feeling, which may smoulder for months, waiting for the opportunity for manifesting itself, and, when that comes, bursting out into a flame violent and hateful. There are thousands of cases on record in which this has happened, especially in the case of monkeys which have been kept tame. And, perhaps, the personal experience of most persons can furnish an example of the truth of this allegation.

The social instincts are plainly seen in many of the lower animals; not, of course, in that perfect form in which they are met with in man; but the difference here again is one of degree only. Many animals experience pleasure in the company of their fellows, and are unhappy at a separation being effected. They will show sympathy one for another, and even perform services for each other's benefit. Some animals lie together in large numbers, and never separate except for a very short time, and then only for a purpose which they clearly understand. This is the case with sheep, rats, American monkeys, and also with rooks, jackdaws, and starlings. Darwin observes: "Everyone must have noticed how miserable horses, dogs, sheep, etc., are when separated

from their companions, and what affection the two former kind will show on their re-union. It is curious to speculate upon the feelings of a dog who will rest peacefully for hours in a room with his master or any of the family without the least notice being taken of him, but who, if left for a short time by himself, barks and howls dismally." Here we find the origin of the social faculty in man. It is very easy to imagine the course of development which this must have taken in order to have culminated in the highest form as we see it in the human species. The psychical powers appear first in an incipient form, and then gradually develop through a long course of ages, until they attain their height in humanity. Other influences, such as the power of language, further the development, these powers themselves being the result of the process of evolution. The question how far language is confined to man is one of great interest to the student of evolution. In replying to the inquiry, "What is the difference between the brute and man?" Max Müller says: "Man speaks, and no brute has ever uttered a word. Language is our Rubicon, and no brute has ever crossed it." Referring to this statement, Dr. Page remarks: "Are not these powers of abstraction and language a matter of degree rather than of kind? Do not the actions of many of the lower animals sufficiently indicate that they reason from the particular to the general? And have they not the power of communicating their thoughts to one another by vocal sounds which cannot be otherwise regarded than as language? No one who has sufficiently studied the conduct of our domestic animals but must be convinced of this power of generalisation; no one who has listened attentively to the various calls of mammals and birds can doubt they have the power of expressing their mental emotions in language. Their powers of abstraction may be limited, and the range of their language restricted; but what shall we say of the mental capacity of the now extinct Tasmanian, which could not carry him beyond individual conceptions, or of the monosyllabic click-cluck of the Bushman, as compared with the intellectual grasp and the inflectional languages of modern Europe? If it shall be said that these are matters merely of degree, then are the mental processes and languages of the lower animals, as compared with those of man, also matters of degree—things that manifest

themselves in the same way and by the same organs, but differing in power according to the perfection of the organs through which they are manifested."

The Doctor's view of this matter receives a striking corroboration from the following excerpt from the introduction to Agassiz's "Contributions to the Natural History of the United States": "The intelligibility of the voice of animals to one another, and all their actions connected with such calls, are also a strong argument of their perceptive power, and of their ability to act spontaneously and with logical sequence in accordance with these perceptions. There is a vast field open for investigation in the relations between the voice and the actions of animals, and a still more interesting subject of inquiry in the relationship between the cycle of intonations which different species of animals of the same family are capable of uttering, and which, so far as I have yet been able to trace them, stand to one another in the same relations as the different, so-called, families of languages."

The moral powers of man have been evolved in a manner similar to that in which the other forces belonging to the human race were evolved. All that we see in the evolution of human conduct is the result of the great and potent law of evolution. "It is said," writes M. J. Savage in his suggestive book, "The Morals of Evolution," "that there can be no permanent and eternal law of morality unless we believe in a God and a future life. But I believe that this moral law stands by virtue of its own right, and would stand just the same without any regard to the question of immortality or the discussion between Theism and Atheism. If there be no God at all, am I not living? Are there not laws according to which my body is constructed—laws of health, laws of life, laws that I must keep in order to live and in order to be well? If there be no God at all, are you not existing? Have I right to steal your property, to injure you, to render you unhappy, because, forsooth, I choose to doubt whether there is a God, or because you choose to doubt whether there is a God? Are not the laws of society existing in themselves, and by their own nature? Suppose all the world should suddenly lose its regard for truth and become false through and through, so that no man could depend upon his brother, would

not society become disintegrated, disorganised? Would not all commercial and social life suddenly become impossible? Would not humanity become a chaos and a wreck, and that without any sort of regard to the question as to whether men believed in a God or did not believe in one? These laws are essential in the nature of things; and they stand, and you live by keeping them, and die by breaking them, whether there is a God or not." These are the accurate and ennobling views of existence born of minds which evolution has raised from the ignorant depths of the past to the intellectual heights of the present.

On all sides the candid and impartial observer may behold undoubted evidence in favour of the doctrine of evolution. We see it in the various changes of the solar system. There are (1) fire mists; (2) globes of gas; (3) condensed oceans; (4) crust formation; (5) mountains and rivers, and (6) its present phenomena. What is this but evolution? Is it not a manifestation of changes from the lower to the higher, from the simple to the complex, and from the chaotic to the consolidated? The same principle is illustrated, as before indicated, by the science of embryology, with its clearly-marked stages of development—the fish, reptile, bird, quadruped, and, finally, the human form. The relationship of the species gives its proof in favour of the evolution theory. The different types of to-day had their one starting point, the variations now seen having been produced by altered conditions. Moreover, we find that in the process of evolution some organs in animals become useless, while others change their use, thus proving that the animal kingdom possess structural affinities, and that the subsequent differentiation depends upon the opportunity afforded for evolution. Then, again, man's ability to divert animal instincts and intelligence from their original sphere, as shown in the training of certain of the lower animals; of improving the eye as an optical instrument; of rendering less antagonistic the natures and instincts we discover in different species constantly at war with each other, all point to one process—that of evolution.

There is the old sentimental objection to this theory, that it is humiliating to think that we have evolved from forms lower down in the scale of animal life. But, as Dr. Page points out, there is nothing in this view necessarily degrading

"If, in virtue of some yet unexplained process, man has derived his descent *from* any of the lower orders, he is clearly not of them—his higher structural adaptations and improvable reason defining at once the specialty of his place, and the responsibility of his functions. It can be no degradation to have descended from some antecedent form of life, any more than it can be an exaltation to have been fashioned directly from the dust of the earth. There can be nothing degrading or disgusting in the connection which nature has obviously established between all that lives, and those who employ such phrases must have but a poor and by no means very reverent conception of the scheme of creation. The truth is, there is nothing degrading in nature save that which, forgetful of its own functions, debases and degrades itself. The jibing and jeering at the idea of an 'ape-ancestry,' so often resorted to by the ignorant, has in reality no significance to the mind of the philosophic naturalist. There is evidently one structural plan running throughout the whole of vitality, after which its myriad members have been ascensively developed, just as there is one great material plan pervading the planetary system; and science merely seeks to unfold that plan, and to determine the principles upon which it is constructed. If there be no generic connection between man and the order that stands next beneath him, there is at all events a marvellous similarity in structural organisation, and this similarity is surely suggestive of something more intimate than mere coincidence." Evolution, therefore, although unable to supply the solution to every problem presented to the student of nature, is, so far as can be discovered at the present day, the truest theory of man and the universe, and is sufficient for all practical purposes. Further, it satisfies the intellect as no other theory does, and is assuredly more reasonable than that of special creation.

One question of great importance will probably suggest itself to those who have given the theory of evolution much consideration. It is this: What is to be the position of things, and especially of man, in the future? Will there be evolved higher beings after him, as he is higher than those who preceded him? He stands now as the lord of creation; but so stood many mighty reptiles of the past in their day and generation. Could they have reasoned, would they

not have concluded that they were the final end of creation, and that all that had gone before was simply to prepare for their entrance into the world? In that they would have erred; and it may be asked, Shall we not equally err if we hastily decide that no higher being than man can ever come on earth—that he is, and will ever remain, the highest of organic existences? Now, the cases are not quite analogous, as a little reflection will show. The earlier animals were entirely the creatures of evolution; man is largely the director of the process. He can, by his intellect, control the law itself, just as he bends gravitation to his will, though, in a sense, he is as much subject to its power as the earth on which he treads. Before man arose, the animals and plants then existing were moulded by the great power operating upon them from within and without; hence the form they took and the functions they performed. When they had to contend with an unfortunate environment they became modified; or, failing that, they disappeared. Now man, by his mental resource, can supply natural deficiencies, and thus not defeat evolution, but direct its current into a new channel. He can bring his food from a distance, and thus avoid scarcity in the country where he dwells; he can successfully contend against climate, disease, and a thousand other destructive agencies which might otherwise sweep him away. It is, therefore, no longer a contest between physical powers, but between physical and mental. No higher physical development is likely to occur, because it would not meet the case, since, however perfect it might be, it could not hold its own in the struggle for existence against man with his intellect. The development in the future must be one of mind, not of body. We do not, consequently, look forward to the time when organised beings, higher and more perfect physically than man, shall take his place on the earth; but we do believe that a period will arrive when the intellectual powers shall be refined, expanded, and exalted beyond anything of which at present we can form a conception. The future of man is a topic of all-absorbing interest, and it needs no prophetic insight to enable us to form some dim and vague idea of what it will be. Mind will grapple with the great forces of nature, making them subservient to man's comfort and convenience. Virtue shall array herself more resolutely than ever against vice,

and rid the world of its malignant power. Brother shall cease slaying brother at the command of kingly despots, and thus the world shall be crowned with the laurels of peace. Priestcraft shall lose its power over humanity, and mental liberty shall have a new birth. The barriers of social caste shall be broken down, and the brotherhood of man thereby consolidated. Woman shall no longer be a slave, but free in her own right. Capital and labour shall cease to be antagonistic, and shall be harmoniously employed to enrich the comforts and to augment the happiness of the race. Education shall supplant ignorance, and justice take the place of oppression. Then the era shall have arrived of which the philosopher has written and the poet has sung. Freedom shall be the watchword of man, reason shall reign supreme, and happiness prevail throughout the earth.

"When from the lips of Truth one mighty breath
Shall, like a whirlwind, scatter in its breeze
The whole dark pile of human miseries,
Then shall the reign of mind commence on earth ;
And, starting forth as from a second birth,
Man, in the sunrise of the world's new spring,
Shall walk transparent like some holy thing."