A NEW THEORY

OF THE

ORIGIN OF SPECIES,

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STATEMENT OF THEORIES—LAMARK.

Ever since the time of Lamarck the scientific world has been interested, more or less, in regard to the origin of the various species of animals, which have existed upon the earth. Prior to that time the belief was universal, founded upon what may now be regarded as a too literal construction of the first chapter of Genesis, that the original progenitor of each species of animals (including man), was created full grown, within the limit of six solar days, by special and personal exercise of Divine power.

In 1809, Lamarck, a celebrated French naturalist, first promulgated the theory, that one species was developed from another by certain physiological changes, made necessary by surrounding circumstances, and producing new organs by sheer force of will. Thus the snail as it draws itself along, is supposed to feel the want of organs to examine the bodies it comes in contact with; and in making the effort to touch them, forces the fluids towards the head, causing two or more tentacula; and this is claimed to have happened to the whole gasteropod race.

So an herbiverous animal, pressed for forage, stretches its neck to reach the lower branches of trees, and be-

comes a giraffe. A shore bird desiring to swim in search of food spreads out its toes; and in time its feet become webbed. So too, in the language of Von Baer; "a fish swimming towards the shore desires to take a walk, but finds its fins useless. They diminish in breadth for want of use, and at the same time elongate. This goes on with children and grand children for a few millions of years, and at last who can be astonished that the fins become feet."

Under this law by slow gradations, Lamarck undertook to account for species from the monad to the mammal. Its total inadequacy, however, to produce such momentous results were so obvious, that the French philosopher gained few, if any adherents. It nevertheless contains the germ of the now justly celebrated "Darwinian Theory."

AUTHOR OF "THE VESTIGES OF CREATION."

Between the time of Lamarck, and that of the publication of the "Origin of Species," the most important work on the subject appeared anonymously in 1844, under the title of "The Vestiges of Creation." It is a work of extraordinary ability; and, the theory proposed is really more philosophical, and nearer the truth than that of Darwin, because with all its defects, the author continually recognizes the evidences of *creative design*. What it is in brief, may be gathered from the following extracts:—"the first step in the creation of life upon the planet was *a chemico-electric operation, by which simple germinal vesicles were produced.* This is so much, but what were the next steps? I suggest as an hypothesis countenanced by much that is ascertained, and likely to be further sanctioned by much that remains to be

known, that the first step was *an advance under peculiar conditions from the simplest forms of beings to the most complicated* and this through the medium of the ordinary, process of generation." (1st edition p. 155.)

"The idea then is *that the simplest and most primitive type under a law to which that of like production is subordinate gave birth to the type next above it, that this again produced the next higher, and so on to the very highest,* the stage of advance being in all cases very small—namely from one species to another?" (p. 170.)

How far the idea that the origin of species is due to "*the ordinary process of generation,*" falls below the truth, will be noticed hereafter.

The mind of the author however, seems not to have risen to the full comprehension of the *minute* as well as the *general* operation of creative power. He says: "It is the narrowest of all views of the Deity, and characteristic of an humble class of interests to suppose him constantly acting in particular ways for particular occasions." (p. 117.) Much more worthy of him it surely is to suppose that all things have been *commissioned by him from the first,* though neither is he absent from a particle of the current of natural affairs in one sense, seeing that the whole system is supported by his Providence." (p. 118.)

This is very little removed from the old idea that the Creator impressed upon the creation certain laws, like the winding up of a clock, leaving natural things in a measure to take care of themselves. It is to be regretted that the accomplished author could not have perceived a continual flow of creative energy from the Divine Being, acting at all times and places, and just as directly and potentially in the minutest, as the most gen-

eral operations. These narrow and cramped notions are still further urged:—"Is it conceivable, as a fitting mode of exercise for creative intelligence, that it should be constantly *moving from one sphere to another*, to form and plant the various species which may be required *in each situation* at particular times"—"yet such is the notion which we must form if we adhere to the doctrine of special exercise?" (p. 121.)

Well let us see. The heat and light of the sun is absolutely necessary for the growth of wheat; and the farmers over the whole earth, and it may be in Jupiter and Saturn as well, have prepared the ground and sown the seed in especial reference to the operation of these elements. Does the sun find it necessary to give its attention, first to one farm and then to another; or first to the earth, then to Jupiter and lastly to Saturn? Or does he pour forth his heat and light uniformly without reference to time or space?

In the eleventh edition of this remarkable work (1860) the author has somewhat varied the statement, though not essentially changing his ground. He supposes the series of animated beings from the lowest to the highest are results under the providence of God 1st, of "an impulse imparted to the forms of life, advancing them in definite times by generation," 2d, of another modifying impulse growing out of the environment, answering to the "adaptation of the natural theologian." (p. 139.) These impulses are regarded as possibilities of nature, as instanced in the manner in which bees so modify a larva, as to produce the queen bee." (p. 144.)

THE DARWINIAN THEORY.

In 1859, Dr. Charles Darwin published his first work on the subject, in which the origin of species is ascribed chiefly to "Natural Selection," or the survival of the fittest, in the struggle for life. He starts with four or five original progenitors, from which all animals have descended, branching out under the operation of this law, into the endless varieties which now exist.

He says: "Although much remains obscure, and will long remain obscure, I can entertain no doubt, after the most deliberate study and dispassionate judgment of which I am capable, that the view which most naturalists entertain, and which I formerly entertained—namely, that each species has been independently created,—is erroneous. I am fully convinced that species are not immutable; but that those belonging to what is called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, I am convinced that Natural Selection has been the main but not exclusive means of modification." (Origin of Species, p. 13.)

Again, "by my theory, these allied species have descended from a common parent; and during the process of modification, each has become adapted to the condition of life of its own region, and has supplanted and exterminated its original parent and all the transitorial varieties between its past and present state." (p. 156).

As one of his numerous illustrations of the mode in which this law produces the survival of the fittest, he instances the case of the wolf, during a period of scarcity of the animals on which they prey, in which "the swiftest

and slimmest wolves would have the best chance of surviving." (p. 85).

It will thus be seen that a fundamental point in the theory is, that the change in the organs, and production of new organs must be of *service* to the animal in the struggle for life.

The other agencies which co-operate with Natural Selection, are the environment, the local circumstances of climate,geographical situation,&c. The combined operation of these causes is by "slight successive variations;" —it "can never take a leap but must advance by short and slow steps." (p.174.) "If (he says), it could be demonstrated that any complete organ existed which could not possibly have been formed by numerous successive slight modifications, my theory would absolutely break down." (p. 169.)

He does not tell us how the four or five primordial types were created. Whether they were fashioned from crude earth by the Creator as he is, in popular estimation,.supposed to have formed Adam; or whether. after earthy materials came into existence the atoms having chemical affinities rushed together, and formed protoplastic bodies, productive or recipient of life are mysteries which he leaves unsolved.

In "Lay Sermons," p. 279, 280, we find Prof. Huxley saying: "with respect to the origin of this primitive stock or stocks, the doctrine of the origin of species is obviously not necessarily concerned. The transmutation hypothesis for example, is perfectly consistent with the conception of a special creation of the primitive germ or with the supposition of its having arisen as a modification of inorganic matter by natural causes."

We are not quite prepared to admit that the transmuta-

tion hypothesis is consistent with the "special creation" of Darwin's four or five primitive germs; because it breaks the uniform plan upon which we have a right to suppose creation proceeds. If there were special creations of five primitive stocks, why not five hundred or five thousand as well? Nay, why not of every distinct species? Nor is the alternative pleasant that we must believe these germs to have arisen as a modification of inorganic matter by "*natural causes.*"

Then again as to the doctrine of transmutation, to wit: that *life* as well as form is transmuted, there is a difficulty of no little magnitude to be surmounted. Is there anything in the vast array of facts collected and arranged by Darwin, that in the remotest degree accounts for the transmutation of the opposite principles of life into each other? Such as the sheep into the wolf or the reverse.

In support of his theory, the author has collected a great mass of facts, not only in his original work, but in the subsequent one of "The Variation of Animals and Plants under Domestication." His wide range of research and illustration, combined with logical skill in arranging and applying his facts, made a deep impression upon the scientific world, and gained some distinguished converts.

So far he had not undertaken to account for the origin of man, without which his theory manifestly lacked logical coherence, and the mass of scientific men were slow to believe that the wide gulf between the instinct of the highest ape and the lowest human mind, could be bridged over in that way.

In his last work "The Descent of Man," (1871), he makes the effort, with great logical ingenuity to supply

this lack, and now his theory, whether sound or unsound, presents an unbroken chain of development from the lowest organism up to and including man.

That the theory is true to a certain extent, there can be no doubt. "Natural Selection," as developed in these various works, belongs, unquestionably, to that class of intermediate causes, the operation of which results largely in "the survival of the fittest." Nor can there be any reasonable doubt, that it, to some extent produces varieties among individuals of the same species. But whether it has ever produced a *new* species—whether in fine it goes to the amazing extent, of accounting for all the structural and psychological distinctions between animals in the long chain from the Protozoa to man, is a very different question. It is certainly true that in the long series of experiments in the variation of animals under domestication, no instance has ever come to light of the production of a new species,or the slightest approach to it, in that way—the pigeons have obstinately remained pigeons—and the dogs, dogs—though the pouter differs much from the rock pigeon, and the terrier from the bull dog. But the space which separates the pigeon from the hawk; and that of the dog from the sheep has not been diminished to the extent of a single indubitable species.

In his "Descent of Man" the author, if he does not manifest a waning confidence in his own theory, has, to say the least, materially damaged it in the estimation of others, by the admission of serious mistakes; and the discovery of other and more important agents of change. On page 146 of vol. 1, he admits that after reading Nägeli on plants, he had in the earlier editions of the Origin of Species "probably attributed too much to the

action of natural selection, or the survival of the fittest." "I had" he says "not formerly sufficiently considered the existence of many structures, which appear to be, as far as we can judge, neither beneficial nor injurious; and this I believe to be one of the greatest oversights as yet detected in my works."

Again on page 148: "An unexplained residium of change, perhaps a large one, must be left to the assumed uniform action of those unknown agencies which occasionally induced strongly marked and abrupt deviations of structure in our domestic productions."

Here there are admissions of "*strongly marked and abrupt deviations of structure*"—and "structures which are neither beneficial or injurious," which according to his own statement in the Origin of Species, *absolutely breaks down his theory*. Nor is this all; there is it seems "a large *residuum* of change" brought about by "*unknown agencies*," and the statement that "In the greater number of cases," referring to occasional modications and monstrosities, "we can only say that the cause of each slight variation and of each monstrosity lies much more *in the nature and condition of the organism* than in the nature of the surrounding conditions."

Akin to these "unknown agencies, etc.," is the statement in a note to page 215 in regard to the sterility of hybrids in which he speaks of them as "the incidental results of certain *unknown differences* in the constitution of the reproductive system of the species which are crossed."

What may be the force and extent of these "unknown agencies," "constitution of the organism," and "unknown differences," he does not attempt to define. They stand as unknown quantities, which for aught that ap-

pears may be sufficient to produce all the results heretofore ascribed to natural selection. They appear to perform the convenient office of a residuary clause in a will, which not unfrequently gathers in a much larger amount of the estate of the decedent, than is before enumerated in the form of bequests and legacies.

In his "Descent of Man" Darwin has also introduced a new element of change to wit, "Sexual Selection," which occupies a large portion of the work; and it is made to play an important part in producing the gay plumage common to the male of some species of birds. The female is assumed to be pleased with the most beautiful male, and selects him on that account for her mate; and this in long processes of time operates to increase the gaiety of his apparel. This supposes a degree of æsthetic taste in the feathered race rivalling that possessed by mankind; and to make us believe it true the author must first convince us, that birds in mental endowments are much nearer the human race than the anthropoid ape.

If sexual selection works these wonders in the male, why not in the female as well? He indeed contends that the plain drapery of the female, is for sake of protection during the period of incubation. But this gives an effect to the exercise of a species of will on the part of the animal, which so far adopts the theory of Lamark pure and simple. It is much more philosophical to suppose, that from the original creative design, certain animals are furnished with means of offense, and certain others of defense and protection. Certain classes of animals are carnivorous and insectivorous; and they prey upon others, and are armed with the means of seizing and securing their victims. On the other hand those

preyed upon have to a certain extent the means of protection, such as the fleetness of the antelope, the changeable colors of the chameleon, and the dull feathers of incubating birds. If it were not for this arrangement the carnivora would perish for want of food on the one hand; and the animals on which they prey, would on the other hand be entirely destroyed. As it is, a fair equilibrium is kept up between destruction and over production.

As a proof that birds do possess the sense of the beautiful claimed for them, we are referred to the antic displays of the male in the presence of the female. He says: "If female birds had been incapable of appreciating the beautiful colors, the ornaments, and voices of their male partners, all the labor and anxiety exhibited by them in displaying their charms would have been thrown away, and this it is impossible to admit." (Descent of Man. p. 61.)

Yet the peacock will strut by the hour and display his brilliant feathers in the barn yard, with no other spectators than a few quiet cows. It is fair to conclude that the voice and the antic motions of the male, are the modes of mutual excitation inasmuch as they occur usually during the breeding season; but to ask us to believe in the appreciation of the beauty of color as a matter of taste is tasking human credulity too much. The truth probably is, that each bird and beast is affected instinctively by the exterior appearance, and the sounds uttered of its kind. The cawing of the crow is as sweet to its mate as the song in the case of the nightingale. Is the raven captivated by the liquid notes of the bobolink? We have no reason to think so. A herd of cows will become excited by the bawling of a

single calf. Did they ever pay the slightest attention to the pleasant notes of the thrush? The sounds uttered by animals are uniform, with slight variations, each according to its kind, and constitute their language. Animals are emotional, but not intellectual; and their language as it appears in the song of the bird, the mewing of the cat, or the whinny of the horse are their emotional expressions. It is far more rational to account for all these differences of exterior and sounds uttered, upon the theory (to be noticed hereafter) that each form of life puts on its own structure. Otherwise the egg of the sparrow might just as well hatch out a cat; or the seed of the maple ripen upon the oak. As each life puts on its own structure, so does the structure correspond to the life. The male life too, differs from the female, producing a corresponding difference of sex, voice and other external appearances.

Wallace in his work, "On Natural Selection," concludes, from the size of a man's brain, and his want of hairy covering, "that other power than natural selection has been engaged in his production" (p. 349) Dr. Darwin admits that such want of hair is not to be accounted for by his original theory, but claims that it is due to sexual selection. (Descent of Man, vol. 11, pp. 359, 360.)

This, with mankind operates as already explained in the case of birds, except that the female bird is supposed to have had a sense of the beautiful in an excess of gaudy feathers, whereas the woman just emerging from ape-hood, like Venus from the foam of the sea, becomes enamored of nudity. It assumes not only that primitive mankind were hairy; but that the Post Pliocene ladies becoming disgusted

with it, succeeded in changing the obnoxious fashion by persevering in a judicious choice of husbands. This assumption is wholly unsupported by evidence. Have we any reason to suppose that animals ever take a dislike to their external covering of hair, or feathers, or a thick pachydermic skin as the case may be? Suppose a chicken hatched without feathers, or an ape born without hair, or a child with a hair lip, or an albino, the fair inference is that such cases of *lusus naturæ* would be looked upon with dislike as deformities. If men had been hairy like the ape, that would have been regarded as their normal condition; and any considerable deviation from it a deformity. Darwin's logic is surely lame in the inference that any race of beings could, as matter of taste, have ever preferred to be divested of their natural clothing.

In support of his assumption, he mentions the fact that several species of monkeys have their faces naked, and certain others have large surfaces at the posterior end of their bodies denuded of hair. (p. 360.) If, however, the theory be true, there should be a gradual denudation from these inferior apes up to man, which is not only not the case, but the highest anthropoid ape is entirely covered with hair. The instances cited therefore furnish strong evidence against his theory.

He reasons further that as a woman is less hairy than man, she must at a very remote period have become first divested of hair, and have gradually transmitted her state of nudity to her young of both sexes. This reasoning is in conflict with that which he has applied to birds, in which sexual selection is made to clothe the male with gay plumage, while the female remains plainly dressed, involving the absurdity of like causes

producing unlike effects. The inference that, because woman is now slightly less hairy than man—less hairy in not having a beard—she must have commenced the work of denudation, does not seem to rest upon fact or probability.

WHAT IS LIFE?

Before proceeding further it may be well to explain what we mean by LIFE. Some understanding of what it is, and of its relation to matter, are quite essential, in any theory of the origin of species. We witness its phenomena all around us in the vegetable and animal kingdoms; and it is even claimed by some that there is life in what appears as inert matter.

What it is has much engaged the attention of philosophers, giving birth to a variety of definitions. Schelling said: "Life is the tendency to inviduation." According to Richerard: "Life is a collection of phenomena, which succeed each other during a limited time in an organized body!" According to DeBlainville: "Life is the two-fold internal movement of composition and decomposition at once general and continuous." As G. H. Lewes defined it: "Life is a series of definite and successive changes, both of structure and composition, which take place within an individual without destroying its identity."

Herbert Spencer disputes the correctness of all these definitions and undertakes one himself. Life he says is "co ordination of action." Standing by itself this conveys very little meaning; and needs an essay to make it understood even by the scientific reader—to the common mind it is as blind as the utterances of the Delphic oracle. Mr. Spencer devotes three chapters of interest-

ing reading to its elucidation, in which we learn that life consists of—"The continuous adjustment of internal relations to external relations." (Biology, p. 80, and see note to p. 74). In other words: The continual equilibrium between the inner actions of the organism, and surrounding circumstances. This formula is substantially adopted by Prof Fiske in the 9th lecture of his supplementary course at Harvard University. (New York *World*, June 30, 1871). He says: "Life, including also intelligence as the highest known manifestation of life—is the continuous establishment of relations existing or arising in the environment." That is to say: Life is the peculiar adjustment of certain material atoms within, in harmony with the adjustment of certain material atoms without,the organism. This kind of life may be said to lack "vitality," inasmuch as it begins and ends in the phenomena of matter. In fact, all these definitions, and the illustrations by which they are supported, seem to exhibit nothing beyond the combined action of life and its material organism; and we are really as much in the dark as ever, as to what it is, as distinguished from matter. Unless we go deeper than this we shall be as hopeless of success as in the expectation, that a chicken may be hatched from a porcelain egg. We know what matter is; and we can see and correctly describe the phenomena of matter containing life. But the question still returns—what is life? In may well be regarded a hopeless task to rationally define it, unless we have some idea of its origin. We have otherwise no grounds on which to distinguish between mind and matter.

It is much easier to think what it is from our own consciousness, than to put the thought into words. We

witness its phenomena only as it is clothed in a material form ; and when these cease to appear—when the form falls into dissolution, we are prone to the conclusion, that it is a mere quality or incident of matter.

Life though manifested in and through matter, is nevertheless to be distinguished from it. Look at it, at the germinal point of a structure—to the sight, a simple cell. Take two cells starting with vitality, at the same time, and watch their development. One very soon grows into a butterfly. The other has a longer journey before it, and travels more slowly ; and passing through various embryological transformations, puts on the form of an elephant. The one flutters through its existence in a month ; the other lives a century. It is quite certain that neither structure could have been developed without life. To say that these germinations and transformations are owing to some inherent force in matter, fails to satisfy the mind. We immediately seek to know how it came to be invested with such force—how it can so nicely discriminate, as to produce one form out of one set of atoms, and another and different form out of an exactly similar set.

Mr. Spencer starts the question : "does life produce organization, or does organization produce life ?" Though remaining in doubt on the point, he admits an implication in favor of life being antecedent to structure, because the lowest Rhizopods feed and grow, and move about, though shapeless masses, without distinction of parts. (Biology, p. 153).

This point is not without its importance. If life precedes organism, then it has a prior existence in its initiament at least ; and must stand in the relation of a cause to its effect.

Life, then, may be defined as the immaterial and active principle of being, derived from the Creator, which is vested with the power to put on a material organism. The life of the lowest Rhizopod is infused by the Creator into a material matrix or protoplasm ; and that point is the commencement of the creation of an animal ; and the same process is true of all vegetable and animal organisms. It is, so to speak, the psychological part of organic existence. Being precedent to form, it puts on and controls it. Every life which starts from the Creator, is initiated with a definite purpose. That of a dog, starts as such ; and must be developed as such or perish—it cannot be developed into anything else, by any system of natural or sexual selection.

It does not follow, that every case of initial life grows to a full development of the intended organism—it may perish at an intermediate stage—like the redundant fruit, prematurely falling from the tree. Thus a human embryo may never reach the full completion of a human structure.

DIFFERENCE BETWEEN ANIMAL AND HUMAN LIFE.

Having defined what we mean by life, the next important question relates to the difference between animal and human life ; and this it will be found has much to do in testing the correctness of the Darwinian theory.

When we look at animals divided into species, as we find them, we are struck with the manifest difference of one life from another—a difference in many cases completely antipodal. The life of a tiger prompts it to seize and devour other animals on which it lives—that of a sheep to avoid danger, and live upon herbage—that of a bee to form communities, build cells and gather

honey—that of a serpent to lie stealthily in wait for its victim.

When we regard the life of man, we find the curious fact that it is complex, and comprehends within itself the qualities of the life of all the lower animals—the ferocity of the tiger—the quiet inoffensiveness of the sheep—the thrifty saving habits of the bee—the cunning of the serpent etc. In this, human life differs from that of all below. Animals exhibit, a single characteristic. No one looks for mercy or mildness in the tiger, or ferocity in the hare; the one is carnivorous, and the other herbivorous without admixture with other qualifications and so they remain. A man however may be vindictive and cruel to-day, but at a future day become forgiving and benevolent.

It is a fundamental doctrine of Darwin that species are not immutable, but that forms and life as well, are transmutable. In view of the broad difference presented to us of life as well as form, it is difficult to see how such transmutation could be effected, how an inofensive animal like the deer can be transmuted into the savage nature of the wolf, or the reverse. Nor does there seem to be anything in the vast array of facts gathered and arrayed by him, which in the remotest degree accounts for a change so radical.

Man as to his body is an animal of the order Mammalia. He has similar organs; is composed in the same way of flesh, blood and bones; the elements forming these, carbon, oxygen, hydrogen, nitrogen, etc., are the same; and at death his body falls into dissolution, precisely as in the case of the ox or horse. So too as to the external or lower region of his mind, he has the same appetites; he eats, drinks and sleeps; and to

this extent he is psychologically to all intents and purposes an animal. That this is so is illustrated by the case of a person insane from such derangement of the brain as hinders or destroys the working of the intellectual faculties; and such, it is well understood, are held irresponsible for their acts before the law. So too in the case of microcephalous idiots, in which the cerebrum is so defectively organized, that the mind, either does not exist at all, or cannot act. In these we practically have animals with human bodies. Darwin calls these idiots cases of reversion to the ape; but they are really cases of non-development. If they were reversions they would at least have the instinct of the ape.

But there are some other distinctions between human and animal life, which it is quite essential to consider.

The author of "Vestiges," says: "The difference between mind in the lower animals and in man, is a difference in degree only, it is not a specific difference" (p. 282) —meaning by lower animals all below man. According to Darwin: "The difference in mind between man and the higher animals, great as it is, is certainly one of degree and not of kind." (Des. Man, vol. 1, p. 101).

This makes the mind of man to be nothing more than a developed instinct; and both these distinguished authors, (especially the latter), refer to a multitude of instances, in support of the idea in which sundry animals have manifested memory, attachments, dislikes, vengeful feelings, and in a few cases some glimmerings of judgment or reason; all of which, by the way, may be accounted for by the fact that man in the lower region of his mind is an animal.

This theory certainly leads to some curious results. The mind of a raccoon is the same as that of man, ex-

cept that the former has a thimble full, which prompts him to steal corn ; whereas the latter has a pail full, under the impulse of which he is able to measure the solar system, and perform other kindred feats. The quality is the same, but the quantity, it seems, makes all the difference in the world.

Nevertheless there are certain broad facts bearing upon this subject, which makes it very difficult for us to regard these differences in mind, as we look upon that between homeopathic and allopathic doses of medicine. Looking at animal and human life at their initial points we find some peculiarities that do not appear to have been sufficiently noted by these learned authors. At the commencement, the animal has a manifest advantage, because it is evidently born with the full knowledge or science of everything necessary for its existence or subsistence. This we call instinct; and it never advances or recedes from this to any approachable extent. The beaver without the slightest tuition or training knows how to construct its dam ; and as it built it in the time of Cheops, it builds it to-day. The bee collects in swarms, constructs its comb,gathers and stores its honey as it always has done. So through the whole range of animal creation ; and instances can be multiplied to any extent. The facts are beyond dispute ; and are highly suggestive of this idea, to wit : that any being brought into existence with full knowledge of all that is of necessity to it, presupposes an incapacity for improvement. It reaches its limit with one bound without effort, and has nothing more to learn. We may well suppose a tree, created at once mature, with spreading branches and full foliage to be incapable of further growth.

How is it with man? If he comes from the ape by

natural selection, the human infant ought to be born with all the knowledge of the infant gorilla, to say the least; but the very reverse is the fact. The man infant, presents almost a blank as to mind, and an utter helplessness as to body. About the only instinct he manifests is that of suction, and that is acquired by previous habit as a fœtus. There is a brain containing an incipient mind, to be thereafter slowly developed. Animals are emotional because they have no understanding; or in some exceptional cases, beyond the circumscribed knowledge which we call instinct, a mere trace of one. The infant man, on the contrary, has an understanding, which from a mere point as it were, gradually grows and matures; but before it becomes strong enough to exercise a controlling influence, he acts from emotion and impulse like an animal. In familiar phrase man may be called a two storied animal, all the other mammals having but one story; and this lower animal story is the base or mud-sill, on which the upper—and properly human story —rests. The result is, the animal stops about where it begins; the man starts from next to nothing, and keeps on growing; and this is substantially admitted by Darwin when he says: "He (man) has to learn his work by practice; a beaver on the other hand, can make its dam or canal, as well or nearly as well, the first time it tries, as when old and experienced." (Des. Man, p. 83, vol. 1.)

DIFFERENCE IN LANGUAGE.

Another marked distinction between man and animals, is that the former has speech; whereas the latter, being destitute of an understanding, with the exception before noticed, has emotional cries and calls only.

These constitute their language; and they have it in perfection without tuition. The hen has a call for food, which her chickens at once understand; and they recognize too, her cry of alarm as completely when first hatched as ever after.

It may, I think, be assumed as a general rule, that every living organism can express by signs or vocally all its emotions and thoughts. And it is because man has emotions and thoughts infinitely beyond that of the highest mammal below him, that he possesses the necessary vocal organs to give them expression; and this accounts for the origin and growth of language. It is true a few animals like the parrot possess the power of imitating articulated sounds; but it mere imitation without the slightest understanding of what they mean. The power too is limited and cannot by any amount of training, be forced beyond a certain extent. If these articulations indicated an approach to language, on the transmutation hypothesis, "Natural Selection" committed a serious blunder in not selecting the larynx and lips of the Chimpanzee and Gorilla for the purpose instead of the throat of the parrot.

Whether primitive man was born, or created, already gifted with a regularly constructed language is one of the questions which has vexed philosophers not a little. I think the weight of evidence, and all analagous reasoning as well, are against it. It is inconsistent with the diversity of languages which now exist; and it is wholly irreconcilable with the fact, that every child has to be taught its mother tongue. The truth is, so far as we have any knowledge on the subject, language universally grows from mere rudimentary beginnings like everything else; and changes with the changing currents of thought. An

Englishman of the age of Chaucer would need an interpreter to be understood by his countrymen of to-day. It would indeed be as incongruous to look for a marble palace in the stone age, as to suppose the men of that day possessed of the polished diction of Milton or Everett.

The thoughts and emotions of the human mind will force themselves into vocal expression, with as much certainty as a tree will produce foliage and flowers. If a thousand children of both sexes could be isolated, and left to grow into a community, I apprehend a language would be formed suited to their wants, and grow with their mental development; and their language too, except in some emotional expressions, would differ from that of another community similarly situated in a different locality. How they would be able to communicate their ideas to each other by speech in the first instance, we can understand just as easily as we can understand how animals have cries and signs by which they can be understood by each other; or how each form of life puts on its own appropriate material organism.

Now to apply this to the Darwinian theory. It must be borne in mind, that the advance by natural selection is extremely slow. The distance between the instinctive cries and calls of the highest anthropoid ape, and human speech is immense; and to fill it up by slow increments would require a length of time ante-dating the existence of the most inferior ape. Not only so, there should be found in living apes from the lowest monkey to the gorilla, advancing approaches step by step to human language.

DIFFERENCE IN BRAIN.

In connection with the remarkable distinction between men and animals in respect to language, may be regarded the difference between the animal and human brain. Prof. Huxley says: (Man's Place in Nature, p. 93.) "So far as I am aware no human cranium belonging to an adult man has yet been observed with a less cubical capacity than 62 cubic inches, the smallest cranium observed in any race of men by Morton, measuring 63 cubic inches, while on the other hand, the most capacious gorilla skull yet measured has a content of not more than 34½ cubic inches.

The lowest man's skull therefore has about twice the capacity of the highest anthropoid ape. The anthropoid apes, so called, are the Gibbon, Orang, Chimpanzee and Gorilla; and they advance in cranial development in the order here named. The cranial capacity of man ranges from 63 up to 114 cubic inches,—Morton having found a skull of the latter size—showing a difference of 52 cubic inches, or a little more than double. Huxley says: "The difference in the volume of the cranial cavity of the different races of mankind is far greater, absolutely, than that between the lowest man and the highest ape, while relatively it is about the same." That the *relative* difference is about the same—that is, that the difference between one ape, and the other next above, is about the same as that between a man of one race, and the one next above—is a fact of much significance. It shows that there is no such immense gap between ape and ape, and between man and man, as between the highest ape and the lowest man. This fact too has the greater significance when we look at the long line of descent and great variety of the ape race.

The order Quadrumana, according to Prof. James Wilson (Ency. Britt., Art. Mammilia,) embraces two large families—the *Simiadæ*, generally known as apes,(containing the monkey tribe) and the *Lemuridæ*. The 1st he divides into two great sub-families—the 1st *Simiæ Catarrhini*, or apes of the Old World, containing eight generic groups; and the 2d, *Simiæ Platyrrhini*, or apes of the new world with six generic groups. The *Lemuridæ* comprises five generic groups.

The fossils of extinct species of monkeys have been found as far back as the Eocene; (Darwin, O. of Species p. 226) and it is not unlikely they existed at a much earlier period. Gratiolet, an eminent anatomist, (Darwin says:) "maintains that the anthropomorphous apes do not form a natural sub-group; but that the Orang is a highly developed Gibbon or Semnopithicus; the Chimpanzee a highly developed Macacus; and the Gorilla, a highly developed Mandrill." Mr. Darwin contends that man is descended from Catarrhine monkeys of the Old World; and that the "Semnopithicus," a generic of that group is connected with the "Macacus" by a fossil of the Miocene period found by M. Gandry. (Des. Man, vol. 1, pp. 188, 189) This under his theory (if Gratiolet be correct) would divide the honor of human paternity between the Gibbon and Chimpanzee. Be this as it may, the monkey race is proved to be of great antiquity. In living species we find a line of descent from one species to another presenting no remarkable gap between—nothing more than such increased enlargement of the brain, as harmonizes well enough with the transmutation theory. But how account for the immense gap between the Gorilla and the Bojesman, in which the brain

is double? This chasm is altogether too wide to be bridged over by the imperfection of the geologic and zoölogic record, so often appealed to by Darwin. There should be found, if not fossil remains of man, at least fossil apes in the Miocene or Pliocene periods, or living species between the Gorilla and man.

Again, look at the immense cranial distance between the lowest and highest man—88 cubic inches—and consider the time it must have taken to reach the highest by the exceedingly slow increments which lie at the very foundation of the theory. It would seem to require a period reaching back to the Eocene. Look again at the Engis skull dating as far back as the Post Pliocene. It was of the average European capacity, and covered a brain which, according to Huxley, might have been that of a philosopher. If this brain were indeed the result of the slow Darwinian gradations, it would require its primeval monkey progenitor to have lived long before there was an inch of land on which the foot of an animal could rest.

When we regard the comparative weight of the brain we arrive quite as emphatically at the same result. The brain of the full grown Gorilla is found to weigh 15 oz., avoirdupois by Prof. Owen, whereas man ranges from 35 to 65 ounces; that of the lowest weighing more than double that of the Gorilla.

There is another mode of stating the same fact in the language of Hugh Miller. He says: "It is of itself an extraordinary fact, without reference to any other consideration, that the order adopted by Cuvier in his 'Animal Kingdom,' as that in which the four great classes of vertebrate animals, when marshalled according to their rank and standing, naturally range, should be also that in

which they occur in the order of time. The brain which bears an average proportion to the spinal cord of not more than two to one, comes first—it is the brain of the fish ; that which bears to the spinal cord an average of two and a half to one succeeded it—it is the brain of the reptile ; then came the brain averaging as three to one —it is that of the bird. Next in succession comes the brain that averages as four to one—it is that of the mammal ; and last of all appeared a brain that averages as twenty-three to one—reasoning,calculating man has come upon the scene." (Foot Prints of the Creator, p. 283.)

The lowest vertebrate is a fish, *Amphioxus Lanceolatus*, having a short spinal cord but no brain. The next above, *Lamprey*, *Myxine*, etc., has a brain. The average fish brain according to Miller is only two to one of the spinal cord ; and that of the mammal four to one ; whereas the average of man is twenty three to one. From this it would appear that the average distance in development from the mammal to man, is from four to five times greater than that of the average fish brain to the mammal ; and it would seem as if the slow steps required by the theory to connect the two ends of the series, would require a distance of time equal if not greater, than between the Silurian and Glacial periods. Well may the objector ask for the long series of anthropoids between the Gorilla and the Bojesman which should, if the theory be true, be found still living. There is a regular series from the lowest monkey to the " Gibbon, and from the latter to the Gorilla—why should it stop there ?

ANTIQUITY OF MAN—WAS HE CIVILIZED OR SAVAGE?

Other points of inquiry present themselves in this connection.

When was the first appearance of man upon the earth? What was his cranial capacity? Was he civilized or savage, or at least uncivilized?

The old idea still lingering in the minds of many, is that the first man, Adam, was created about 6,000 years ago, at the highest point of civilization; and that all the barbarism and savagery found to exist are but cases of degeneracy. The writer of the article "Adam" (Ency. Britt. p. 121.) says:

"It is evident upon a little reflection, and the closest investigation confirms the conclusion, that the first human pair must have been created equivalent to that to which all subsequent human beings have had to reach by slow degrees in growth, experience, observatian, imitation, and the instruction of others; that in a state of prime maturity, and with an infusion, concreation, or whatever we may call it, of knowledge and habit, both physical and intellectual, suitable to the place which man had to occupy in the system of creation, and adequate to his necessities in that place."

That is to say, the first man by the mere fact of his creation was profoundly versed in all the arts and sciences. He knew how to construct and put into operation railroads, steamboats and telegraphs—could rival Phidias in sculpture—Michael Angelo in painting —Milton in poetry—Webster in oratory, &c. But this does not seem to have been the extent of his intuitive qualifications. He was not only master of all the artistic and scientific results of modern times; but of all the improvements and discoveries that will be made in all coming time—such we may be permitted to suppose as examining the fauna and flora of the planets through improved telescopes—the navigation of the air

—the concoction of the veritable *elixir vitæ*—the manufacture of real diamonds—and so on *ad infinitum.* If such indeed were his qualifications, if he knew all, and more than all his posterity have grasped by slow processes, the student of modern science may well be amazed at the extent of the cataclysm, which could so completely obliterate every trace of his works. Science, however, is dealing sharply with old beliefs; and giving to the earth, and the human race dates so far in the ages of the past as to be beyond the reach of definite calculation.

The first trace of the existence of man is found in the Post Pliocene; and the evidence consists of the rude flint knives and stone hatchets, discovered mostly in the river drift gravel in France and England. These implements are found in connection with the bones of certain extinct mammalia of which the mammoth, wooly-haired rhinoceros and cave bear, are the most common. This was the "Earlier Stone Age," so called. From this there was an advance to the "Second Stone Age," exhibiting the same implements greatly improved in being ground to a smooth service and cutting edge, in place of the rough chipping of the former period, found in the lower level drifts of the valley of the Somme, and similar drifts in other localities.

There is also found a greater variety of manufactured articles, such as axes, wedges, chisels, poniards, hammers, etc.

The next advance was to the age of bronze in which that metal was used for arms and cutting instruments of all kinds. To this succeeded the age of iron, in which man became acquainted with that metal, forming the last pre-historic epoch. These ages, so called, are not

sharply defined but glide into each other, the use of the ruder instruments being gradually discontinued, after the invention of superior ones, as at the present day.

This brief statement embraces merely the results of the elaborate works on the subject of Prof. Lyell and Sir John Lubbock.

The finding of the rude flint implements in the Post Pliocene does not necessarily negative an earlier date to man,

Lyell says :—" Had some other rational being repre-representing man, then flourished, some signs of his existence could hardly have escaped unnoticed in the shape of implements of stone or metal, more frequent and more durable than the osseous remains of any of the mammalia.—(Ant. Man, P. 399.)

So far as it goes, this is unanswerable. But the learned professor makes no allowance for that period of time, necessarily great, which elapsed before man learned to manufacture the rudest stone instruments. Judging from the interval between stone and bronze, and from that to iron, the primal period must have been longer anterior, than that elapsing between the different ages ; and the first man, therefore, may date as far back as the Pliocene.

It lies at the foundation of the Darwinian theory that the brain of the first man was but a shade above the highest ape—a difference so small as to make it difficult to determine where the ape ended and the man began.

And irrespective of this theory, the idea extensively prevails that the cranial capacity of this man was no larger than that of the lowest savage ; and that with certain races, it has gradually increased with advancing civilization.

The weight of evidence, it appears to me, is entirely the other way.

Unfortunately, human bones are so much more subject to decay than those of other animals, that very few prehistoric skulls have been found; but these few furnish important evidence.

Two very ancient skulls the Neanderthal and Engis—so called from the Belgian caves in which they were found, have been subjected to close and critical examination by both Lyell and Huxley. The Neanderthal is of long elliptical form (*dolicephalic*); and from its depression, thickness and other peculiarities, is pronounced by Huxley to be "the most pithecoid human crania yet discovered." Yet its capacity is about 75 cubic inches; and therefore—"very nearly on a level with the mean of the two human extremes, and very far above the pithecoid maximum.—(Huxley Cited, Ant. Man p. 84.)

And it is admitted by both these learned professors, (though they have a leaning to the transmutation theory,) that it can in no sense be regarded—"as the remains of a human intermediate between man and apes." Darwin is compelled to say—"it must be admitted that some skulls of a very high antiquity, such as the famous one of Neanderthal are well developed and capacious. (Desc. Man, 1 Vol. p. 140.)

The Engis skull was found associated with the *Elephas primigenius* and *Rhinocerus tichorinus*; it is brachy-cephalic; and approaches near to the highest or Caucasian type.—(Ant. Man, p. 89.) After a close and critical examination Huxley says: "there is no mark of degredation about any part of its structure. It is in fact a fair average human skull, which might have belonged to a philosopher, and might have con-

tained the thoughtless brains of a savage."—(Man's Place in Nat. p. 181.)

Wallace speaks of a skull of the Stone Age, found in the lake dwellings of Meilon, corresponding exactly to that of a Swiss youth of the present day.—(On Nat. Sec. p. 336.)

In the first place, primeval man, of whatever race was wholly uncivilized. It does not follow, that because he was without civilization, he was therefore a savage or barbarous. The implements first found would seem to indicate that the first men did not make war on each other; war being more the results of organized states and governments. They were simply uncivilized, a condition not inconsistent with innocence of life. Traditions of this kind were current among the ancients. Virgil in his Æneid (Connington) says:

"This forest ground from time's first dawn
Was held by natives Nymph and Faun,
Men who from stocks their births had drawn
And oaks of hardest grain;
No arts were theirs: they knew not how
To couple oxen to the plough,
To store their treasured goods or spare;
The teeming boughs supplied their fare,
And beasts in hunting slain."*

Had the first man, as supposed by many, been completely master of all science, he must with the advantage of lives prolonged from the 930 years of Adam to the 969 of Methusalah, have left works of great magnitude

*It is curious to note in this connection the following in Swedenborg's Arcana Cœlestia No. 286: "This and the preceding chapters to the verses now under consideration, treat of the most ancient people and of their regeneration: *primarily of those who had lived like wild beasts*, but at length became spiritual men."

and durability; and such as could not have been utterly destroyed. In the second place the cranial capacity, and —as a sequence—the mental capacity of the first man of any race, (as for instance the Caucasian) was in no sense inferior to that of the same race of the present day. The Engis man is proved to have existed in the Post Pliocene with the brain of a philosopher.*

No one has the right to assume that his skull was the maximum of the men of his time—it is only one which has survived thousands if not millions.

It is quite evident that a long period must have elapsed prior to the commencement of the stone age, during which men probably lived upon the spontaneous productions of the earth, without regular habitations, and with only such protection from the weather, as may have been afforded by caves and sheltered nooks. The stone age appears to be the earliest period in which mankind have any history, dimly enough exhibited in flint knives and stone hatchets, but still a history. From that time there has been a steady advance through the bronze and iron ages to the time of written history.

The inventive genius of man then, as now, was stimulated by the necessities of his condition. It really required more brain work to invent and manufacture a stone hatchet, than it cost the man who invented and manufactured the modern axe. The advance from stone to bronze was very great because bronze is an alloy of nine parts copper and one of tin. The latter does not occur in a native state. To detect it therefore, separate it from its matrix, blend it with copper, and cast it in a

*I assume that the ancient brain would compare favorably in respect to convolutions and extent of surface of the gray matter as well as bulk.

mould show sagacity and skill. Bronze weapons and instruments, too, are more ornamented; and therefore show an advance in taste as well.

To bronze succeeded iron which was another great advance, inasmuch as this metal except as meteorites, is not found native; and requires close observation to discover the ore. And to separate it from the matrix by means of the requisite intense heat implies, the invention of some suitable machinery however rude. (Lyell Ant Man p. 10.)

There was no ink shed over these great strides in human civilization, but doubtless plenty of boastful talk about "the progress of the age," and the acme of perfection to which society had arrived. There were no patent laws either to protect or hamper genius; and the ancient inventor, had at least the advantage of not being exposed to various law suits growing out of supposed infringements.

We forget that in the marvelous inventions and discoveries of the present day we have the vantage ground of the accumulated wisdom of all past historic time, upon which to build. It is as if, between two runners of equal swiftness, one should have nine-tenths the start in the distance to be run. There are multitudes in civilized communities, who, if all implements and machinery now in use, and all the inventors, artisans, scientists, were suddenly destroyed, would be in about as poor condition as the men of the stone age, except from the knowledge of previous existence of such implements and machinery. They would know there was such a metal as iron; and that it could be smelted and made into axes. For the time they would be in a more helpless condition, for they would not even have a stone axe.

Science is relative. In the stone age it consisted in the knowledge of the manufacture and use of stone implements; a business too limited to need much division of labor. Who can say that in only one thousand years hence the men of 1872 may not be regarded quite as uncivilized, as those of the first prehistoric age seem to us.

In view of these facts and considerations it is safe to say, that it required quite as much close observation, skill and genius to invent a flint knife, compound tin and copper into bronze, produce iron from the ore and fashion it into implements of peace and war, and so on; as in modern times to discover and invent the art of printing, the mariner's compass, the uses of steam etc. Coming down to historic times, it may be pertinent to ask whether the skulls of the Homeric age were inferior to those of 1872? Is there any evidence that the best brain of that age would not compare favorably with the Darwins and Huxleys of to-day? If the mental calibre increases by advancing civilization, there ought to be some evidences of it, in a lapse of three or four thousand years.

These facts and deductions cannot of course be reconciled with the transmutation theory. According to that theory the man of the Post Pliocene instead of possessing "the brain of a philosopher," should have been accomodated with one just past the imaginary line between him and ape-hood—and from thence there should have been a gradual increase of cranial and mental capacity to the present time. And it would seem too that the matter could not stop here; but that the brain must go on enlarging under the increase of mental activities, and in obedience of the same law for an illimitable period.

It may well, too, be objected on general principles,

that there is no ending to the Darwinian theory, inasmuch as man according to it, cannot be considered as a finality. When it is a question of brute strength, the weakest goes to the wall as well in the one case as the other. It is true, mind in man's case comes in as a predominating element; but has mind ever been absent in working out the survival of the fittest among inferior animals? And in regard to human minds, the stronger have succeeded at the expense of the weaker, as witness the establishment, and at times overthrow of reigning families through all history.

The legitimate logic of the theory, therefore indicates the production of an animal mentally as much superior to man, as he is above the anthropoid ape and so on, *ad infinitum*. It is a never ending succession of results by a seeming train of accidents. There is no grand result—no cope stone to the work of Creation; because with one or two feeble exceptions, there is a persistent ignoring of an original design.

IS THERE AN INTELLIGENT FIRST CAUSE?

Much fault has been found with Darwin for not distinctly referring to the agency of an intelligent First Cause. The answer to this, on the part of the advocates of his theory, is that the question is one of science, to be investigated and discussed upon scientific methods, without reference to the existence, or non-existence, of God. The answer is certainly pertinent so far as scientific questions generally are concerned. It is sufficient for the chemist to test the point whether an alkali will neutralize an acid; or for the astronomer to resolve the milky way into stars; or for the naturalist to determine whether a newly discovered animal belongs to one

group or another,—without going into an inquiry of how all these subjects of study came to exist. And so far as the criticism relates to the interests of a theology of creeds, as distinguished from religion, I quite agree with the disciples of Darwin, that science must be permitted to pursue its course without let or hindrance.

But the subject of the origin of species belongs to a different category. It involves the distinct question of how species came to exist, or to be created. It puts in issue the very point whether species have been created by a train of natural causes alone, or whether those causes are intermediate only, and have been originated, and kept in continual and harmonious operation by a Creator.

Any theory of the origin of species without a distinct acknowledgement of a first and final cause, originating, and working by, intermediate causes, must lack a foundation on which to rest. The subject reaches beyond secondary causes. We might as well propose to lift the earth with a lever without a resting place—an effort which Archimides himself would not have essayed, had his lever extended to the planet Uranus.

It would really seem as if the profoundly scientific men of the day were so intensely learned in natural things, as not to be able to look beyond. God cannot be tested in a crucible, or examined through a microscope, or looked at through a telescope; and therefore he belongs to the "unthinkable and unknowable,"—he is to be profoundly ignored. But when the question is as to how those things which we see in the sphere of nature came to exist; and we trace back from man through a long series of causes down to the lowest zoöphyte, we get to the end of our tether—and are left either to sink

down into the theological idea that it is *unlawful*, or that of the scientist, that we are unable, to go any further. I am unwilling to submit, either to the fears of the one, or the *ex-cathedra* decisions of the other.

It is a question of evidence; and a great many things are proved to exist without being seen, by a process of reasoning on admitted facts. We are permitted to reason from the seen to the unseen. The flame of burning iron gives a peculiar color in the spectrum which never varies—that we see. The same color appears in the analysing of the solar rays, by which we gain a knowledge of the unseen vapor of iron in the sun. The earth was once a mass of heated nebulæ thrown from the sun; and the same has cooled and condensed, and gone through its multitude of changes to the present time. This we know though no one has ever seen the original fiery vapor.

Prof. John Fiske of Harvard, one of the, if not the ablest advocate of the transmutation theory in this country, in a lecture at Harvard, in 1869, (New York *World*) in reference to all attempts to account for the origin of the universe, concludes that "the human mind is incapable of obtaining satisfactory conclusions concerning the first cause, the ultimate nature of things, the infinite and the absolute."

This is not encouraging, but let us see. We go into a forest, and find a tree cut down, and a portion of it cut and split into forms convenient for making shingles. We did not see it done. Nevertheless, reasoning from previous knowledge, we form the following conclusions, which amount to absolute certainty to wit:—that the tree was cut down by a man; that it was done with an axe; that the axe was manufactured by a man; and that there was a definite and intelligent design, both in

the manufacture of the axe and the cutting down of the tree. We are able to see the cause and the design in the effect.

The same learned professor in a lecture delivered at Harvard in 1871, (New York *World*, Sept. 1. 1871,) regards the idea of a personal God as a decided failure, because "it obliges us to ascribe the evidence of evil comprising both wrong and pain, either to the unhindered volition of an all powerful but partially evil God, or else to the constraint exerted upon God's beneficent volition by the antagonist volition of a rival power that is wholly evil."

He undertakes, however, to construct "a science of Deity," and as a result gives this formula: "There exists a power, to which no limit in time or space is conceivable, of which all phenomena as presented in consciousness are manifestations, but which we can know only through these manifestations."

Again: "From the scientific point of view the Deity is the unknown and the unknowable power of which the universe of phenomena is the sensible manifestation."—We * * recognize the totality of manifestations as manifestations of an inscrutable reality, and there in all humanity, we are content to leave the case."

The substance of this seems to be that an "unknowable power" an "inscrutable reality"—manifested in the phenomena of matter, such as gravitation, light, heat, force, etc., constitutes in the aggregate an impersonal God, who or which is inscrutable, but nevertheless leaves the sentient and moral agents of the universe, to be subject to wrong and pain, and to inflict wrong and pain on each other.

With all due deference, it seems to me, the distin-

guished lecturer has overlooked some facts and conclusions, which in this connection, it will be well to consider.

1st. There can be no such thing as enjoyment or happiness in beings who are not sentient; and to be sentient involves necessarily the liability to suffer pain. Pleasure would be merely negative without pain. In fact there is scarce anything of which the senses enable us to form any distinct idea without its opposite. We learn by contrast. What idea could we form of light without darkness, of a straight line without a crooked one, of heat without cold, of beauty without deformity? And I might add, of good without evil? but this involves other considerations, which here perhaps would be out of place. Why it should be so; why we cannot feel pleasure without the liability to suffer pain, may belong to the "unknowable." We cannot while in the sphere of nature solve all the mysteries of being, nor is it essential that we should. Having satisfied ourselves of the existence of God, it seems hardly wise, and surely borders on conceit, to think we could have made better work in the business of creation. An ox in a scant pasture, and separated by an enclosure from a rich meadow,may well be supposed to marvel why he should not be permitted to feast upon the luxuriant grass within his view, not knowing that such indulgence would ensure starvation in the coming winter.

2d. An impersonal God, made up of the aggregate phenomena manifested in nature is either no God at all; or it amounts only to an assertion that nature is God. It will, I think, puzzle the learned professor to think of anything except as connected with some form. Is it gravitation? We think of it as a quality of ponderable

bodies. Is it force? We think of it, as we see it manifested in machinery, animals, earthquakes, volcanoes, etc. Is it truth? We know it as the attribute of man or woman. Is it honor, benevolence, courage? The same. Disconnected from form whether ponderable or imponderable, they are abstractions of the mind. Power therefore however inscrutable must be connected with some distinct agent, by which it is exercised. I grant there is a "power" more or less "inscrutable," but reasoning from the seen to the unseen, I claim that it proves the existence of a personal God.

3d. We see creation going on all the time. The remark is often made, that preservation is perpetual creation; and it is true, because it requires precisely the same power, exerted in the same way to preserve, that it does to create. How our bodies are preserved we see. They waste and renew every day; and it takes not many days to give each of us an entirely new body. We renew our bodies by food; and what is food but dust, so to speak, in an organized form? We live therefore corporally on dust, in other words, we are continually created from the dust of the earth. But who gives this dust, organized as bread or meat, power to furnish sustaining elements to the body? Who gives the organs of the body power to appropriate and digest this dust when taken in as food? We see certain operations of matter upon matter, which we term cause and effect, so uniform, that the like cause invariably produces the like effect. Who organized and regulates the laws of cause and effect? We see immense siderial systems, in which worlds without number are kept in continual and harmonious motion, each preserving its relative position with the other. How came they to exist, and what power devised and pre-

serves the centrifugal and centripetal forces which hold them under control? In fine we see evidences of design everywhere, quite as certain as in a watch, or steamboat or other works of man; and on a scale so stupendous as to oppress the mind in their contemplation.

4th. Can there be *design* without *mind*—in other words, without life embodied in a personal identity?

Common observation shows, that every work of design which we can trace to its origin, exhibits a personal author. The bird builds its nest, and each kind its own peculiar nest, of which the design is obvious. So the spider weaves its web, and the bee fashions its honey cells. When we see the nest, the web, and the honey comb, we know them to be the work in each case, of an animal having a personal identity.

In like manner, the wonderful and varied works of man are at once traced to the agency of individual men. If, then, we see design in the machinery of the material universe, it is a fair logical deduction, that the power which put it in motion. had and has a personal identity.

We may, I think, go a step farther, and gain some idea of the grade of mind, or life, from the nature and extent of the work. Animal architecture, as we know, is confined and restricted within well defined limits. One kind of bird constructs one kind of nest, and no other; nor does it ever improve upon the original pattern. But in man's case, there is constant improvement; nor is there any apparent limit to his capacity to build on the former works of his race.

The manifest conclusion is:—The greater the work, the greater and more complicated the embodied life which produced it. Therefore, as the works of man are, in a certain sense, infinitely above those of animals; so is human, infinitely above animal life.

Apply the same rule to the created universe; and make the same relative comparison in respect to the author; and then we can have not only the idea of a personal God, but of a mind infinitely above the human.

5th. It may not be considered as a strong argument, nevertheless it is difficult to see, how the belief in the existence of a Deity could have obtained a lodgement in the mind except upon the hypothesis of its truth. This belief may be regarded as almost, if not entirely, universal (except with the men of science who reason themselves into atheism), the reports of travelers, founded on superficial observation to the contrary notwithstanding. If nothing exists above or beyond the sphere of nature, then it is reasonable to suppose, our ideas would be limited and bounded by it. Some have attempted to explain the common belief in a future state (a belief necessarily connected with that of Deity) by the fact that savages dream of seeing their departed friends. There might be some plausibility in this, provided they dream of nothing else outside of their normal experiences,such as flying, or seeing water run up hill, or any other impossible things; and there is no evidence that they do not as in civilized lands, on waking, regard it as "nothing but a dream."

MODUS OPERANDI OF CREATION.

All theories of the origin of species outside of the old, and now generally discarded idea of "Special Creation," are that they originated through the ordinary process of generation. It was that of Lamark, and of the "Vestiges of Creation"—it is, as we have seen, that of Darwin. There is much of minor detail, but none go back of this process. The Duke of Aygyll says, "If I

am asked whether I believe that every separate species has been a separate creation—not from but separately made—I must answer that I do not believe it." "There is one idea which has been common to all theories of development, and that is the idea that ordinary generation has somehow been producing from time to time, extraordinary effects and that a new species is in fact simply an unusual birth. (Reign of Law, pp. 214, 236.)

We see that creation as it goes on under our observation, is by the ordinary process. From this we are able to evolve, not merely the general, but the invariable rule, that every living organism, within historic times, has required a receptacle or matrix, for its conception, gradual development and final birth. Surely from what we thus see, we should be able to find a general law for the production of new species. If species are reproduced by this ordinary process, then it is fair to conclude that they must have originated not by an "unusual birth;" but by an *extraordinary generation*, and herein I apprehend, will be found the key to the whole mystery.

Starting with the fact of the existence of a Creator—God—by whom all things are and were created; let us see, if in the phenomena of matter, and the order in which things have appeared in succession, he does not permit us to form some rational idea of the *modus operandi* of creation.

The questions here suggested are of the gravest character. How does the Creator work, in the creating of those animals and plants of the time being? How is the power exerted, which gives efficiency to the intermediate causes falling under our observation? Is it spasmodic and fractionary, or uniform and incessant? Science teaches us, that the earth is an out birth of the

sun—having been thrown off in a nebulous mass, which gradually cooling and contracting, has been reduced to its present dimensions ; and we know too that it contains nothing, of which the original elements do not exist in its great central parent. We very well know that not a blade of grass, not a shrub or a tree, can grow, not a flower can blossom or a fruit ripen, not an animal organism can be formed or developed, without an influx of light and heat from the sun ; and that were it destroyed, not only would all vegetable and animal life cease, but the planets, losing their anchor of safety would drift wildly through space.

If we had no faculty of reasoning and speculating in reference to a power above nature, from which material things originated and are governed, our conclusion would doubtless be that the sun was the creator of all the forms of matter within the solar system. Starting with such a postulate, it would not be very difficult to explain the *modus operandi* of creation, in the incessant outflow of light and heat. Not only is this outflow unceasing, but in every direction ; and if it sometimes appears not to be uniform, it is because the earth's axis is not perpendicular to the plane of its orbit.

We find, however, this postulated creator to be within the range of human examination and analysis ; we find it within the domain of physics, however attenuated or sublimated it may be. It is a burning mass manifested by light and heat. Light and heat, however, are only intermediate causes, mere agents in the production of creative results, since it is not to be supposed they have original power in themselves to perform the work. We can see that the flow of heat and light is incessant and uniform, and we can easily under-

stand why it should be so. But, when in scientific investigation, we exhaust the agency of physical causes, we are then at the topmost round of the ladder of science, and neither the crucible nor the telescope, nor the spectrum will aid us farther.

We may, however, safely infer, that the sun is proximate to the Creator; in other words that it was the first proximate proceeding, a projection from him, in the creation of the material universe. The sun is everywhere present in the solar system, by its ceaseless flow of light and heat; and in the this respect affords a striking illustration of creative omnipresence.

We see how the sun works as an agent, and beyond this we do not see; but reasoning from the seen to the unseen, we are prepared to say that creative energy or power flows ceaselessly from the Creator; in creation, first of the material sun, next of the earth through the sun, and next of animals and plants through the sun and the earth, producing one after another the numberless detail of created things; and the farther we go, the longer the chain of intermediate causes. Unless this be so, we must fall into the absurd belief, that the principal has less power than his agent—that the sun exhibits greater omnipresence and activity, than the sun's Creator.

This creative energy is an *outflow* from the Creator, and an *influx* into space; and it must necessarily be incessant. Its interruption for a moment, would suspend all the operations of the laws of cause and effect. The sun would be extinguished, and all motion and vitality cease. It is difficult for the imagination to take in the full consequences that would follow. Perhaps *annihilation*, the sudden reduction of everything to nothing, would best express the situation.

As a question of design it can hardly be supposed that the creation of suns, and planets, and satellites was merely to exhibit the power of gravitation, and the harmonious working of siderial systems for the amazement or amusement of *empty space*, as Christmas toys are made to amuse children. On the contrary it is apparent that the ultimate purpose was to create life: first animal and finally human, as the crowning work of creation. All the preceding work is but the preparation for this grand result; and the same creative influx, which has, step by step, produced the physical universe, is adequate to infuse life into appropriate forms of matter, from the lowest to the highest; and this influx is unceasing as well in the one case as the other.

This omnipresent and ceaseless action of creative power, seems not to have been sufficiently considered, by those who have speculated on the origin of species.

ORDER OF CREATION.

The order of the creation of the material universe has been uniformly from that which is rudimentary and imperfect, in regular succession, to that which is more and more perfect. We do not precisely know what was the elementary appearance of the sun; but we know enough reasonably to infer that it was an immense nebula of fire, which by rapid motion has thrown off successively the planets. In what way the planets were thrown off, is of course matter of speculation; but we may suppose them to have been in the form of rings, which as a general rule being of irregular shape, broke up and run together into globes. That such was the case receives confirmation in the facts, that their axial and orbital motions are alike in direction. The earth gradually cooling and

condensing, became finally fit for the reception of life; and what is true of the earth, we have every reason to believe, is the case with all the planets of this, and of every other solar system.

We find that animal life commenced at the lowest initial point, among the *Protozoa*, and with an organism all but shapeless. These are found at the base of the "Silurian" a series of sand stones, limestones, slate, etc., forming the earliest stratified formation succeeding the igneous rocks. Some *fucoids*—the impressions of fuci—a class of low sea plants, are found in the Skiddaw slates as low, if not lower, than the first traces of, and as if to furnish food for, animal life. The "Silurian" formation, divided into upper and lower, is immense, having a supposed thickness in England of 30,000 feet, and exhibiting advancing grades of life. In the Lower Silurian appear the *Polypiaria*, whose swarming millions built up the vast coral reefs, which have excited so much wonder and admiration; *Cystidea*, a low crinoidal form, being without tentacula, and introductory in order of time to the true *Crinoidea*, a curious species of star fish on the top of a flexible stalk, with numerous tentacula; *Brachiopods*, an order of bivalve mollusks having its valves connected by a bundle of fibres instead of a hinge; *Trilobites*, a three lobed animal in general figure something like the wood louse; *Pteropods* a low univalve mollusk; *Gasteropods* or spiral shells, and *Cephalopods* a class now including some of the highest invertebrate animals, such as the nautilus and cuttle fish.

In the upper Silurian there is a continuation of the same groups with some changes of species; and additions, in which appear a number of crustaceans. There are also some traces of fishes in the Upper Ludlow rocks; and the

Onchus in the same formation gives the first evidence of vertebrate life.

Thus at the base of the Lower Silurian we find animal life commencing with an organism scarcely removed from the inorganic, a mere mass of shapeless jelly, without the slightest show of the distinction of sex, all invertebrate, and advancing from that to the first evidence of vertebrate life. Some of these advanced invertebrates *(Cephalopods,)* were armed with the means of preying on humbler organisms; and served to check the redundant population of the ancient seas.

The next is the *Devonian* formation about 10,000 feet thick in England. "There is here as in the Silurians, an abundance of Zoophytes, Corallines, Crinoids, Crustaceans, and Mollusks; but mostly presenting those inferior varieties which naturalists regard as constituting distinct species." (Vestiges of Creation p. 39.) Large numbers of the old species drop out giving place to new and superior ones. This formation shows a large development of fishes, among which the *Ganoids*, acted as the police in punishing the crime of over production; and no doubt grew fat on the spoils. One genus, the *Holoptychus*, appears near the close of the formation, and passing into the next, foreshadows the reptilian class. No remains of land plants are yet found, leaving the inference either that no land had appeared above the waste of waters; or that such portions as were elevated were unfit for vegetation; or that vegetable forms, if any, were too perishable to make their mark upon the rocks.

To the Devonian succeeded the Carboniferous, a remarkable era in the history of creation, in which are found stored away those vast collections of coal to serve the purposes, and advance the civilization of men

in after ages. In this era the fierce Saurians begin to make their appearance in the *Megalichthys Hibbertii.* The reptilian class becomes more fully developed in the *Archegosaurus Minor,* or primeval lizard, the remains of which are found in Bavaria, and the foot marks in the Pennsylvania coal beds ; and which probably was introductory to the *Labyrinthodonts.* It is deemed a transitional type between the fish-like Batrachia and lizards and crocodiles. Insects also appear in this era, and among then a few species of the curculio family, the descendents of which have occasioned so much annoyance to the modern horticulturist.

In the Wealden appear the *Deinosauria* of which the genus *Scelidosaurus* is described by Prof. Owen as posessing large and hollow limb bones, with a femur having a third inner trochanter, and with metacarpal and phalangeal bones, adapted for movement on land," (Ency. Britt. 17 vol., p. 150), evidently indicating an initial process in the creation of land animals. This is followed by the *Megalosaurus* of the Oolite. These were terrestrial crocodile-like animals of gigantic proportions, the latter being from 25 to 30 feet in length. Following these is the *Iguanodon,* a huge herbiverous reptile, posessing a tongue of prehensile character, like ruminant mammalia.

The Pterodactyl of the Muschelkalk—a winged Saurian, having wings similar to those of the bat, and resembling the *draco-volans* — is an advance bird-wise from the reptilia. The next step in the same direction is the *Archæopteryx,* the former (*Pterodactyl*), having the character of three parts reptile, and one part bird ; while the latter may be said to have three parts bird and one part reptile. In the same direction, too, is the *Rhyn-*

chosaurus of the Trias, having the body of a reptile, and the beak and feet of a bird; and this animal it is believed preceded certain species of the ostrich tribe (*Struthionidæ*), of which a living specimen, the *Apteryx* is found in Australia. It has imperfectly developed wings, a diaphragm and feathers somewhat resembling hair.

There are strong grounds for believing, that the diverging lines from the reptilia to birds and to mammalia, start in the *Monotremata*, composed of two genera-*Echidna* and *Ornithorhynchus*,—of which the common peculiarities are, a kind of clavicle common to both shoulders placed in front of the ordinary clavicle, and analogous to furcula among birds, five claws on each foot, the male having a spur on the hind legs resembling that of a cock, and a single external opening for the alimentary canal, and the genito-urinary organs. With these bird-like peculiarities, are united a quadrupedal form—lungs freely suspended—a diaphragm—rudiments of teeth—and a general agreement of the skeleton with that of other mammiferous animals. The *Ornithorhynchus* has a broad flat beak like that of a duck, with molar teeth in the gums on each side of both jaws; the posterior toes are united as far as the nails, and the body covered with hair. (Prof. John Wilson, 3 vol., Ency. Britt., Art Mammalia).

Darwin says: "The *Monotremata* have the proper milk-secreting glands with orifices, but no nipples, and as these animals stand at the very base of the mammalian series, it is probable that the progenitors of the class possessed in like manner the milk-secreting glands but no nipples. (Des. Man, vol. 1 p. 200.)

It is highly probable, therefore, that the early progenitors of these animals existed immediately prior to the

marsupials; and during that period in the earth's history, when the *Saurians*—a family of marine monsters allied to the modern crocodile—roamed the ancient seas at will; and like the Tamerlanes of human history, made relentless war on other animals. Of this Saurian family, the Icthyosaur of the Trias, is between the predaceous fishes and the crocodile. (Vest. Creation, pp. 67, 73.)

The remains of the mammalian in the Upper New Red Sandstone, give the first indubitable evidence of Marsupialian existence. The genus *Microlestes* is a small insectivorous quadruped resembling the *Myrmecobius* of Australia. In the Lias next above is the *Dromatherium*, approaching still nearer *Myrmecobius*. The *Phascolotherium*, found in the lower Oolite, resembles the Opossum. The lower jaw of the *Stereognathus* was found in the same formation; and Prof. Owen, after a very critical examination says: "We can only infer it to be more probable that the fossil was a herbivore, than an insectivore, or a mixed-feeding carnivore." Yet he concludes it certain that they were not hoofed. (Ency. Britt. vol. 17, p. 15)

If so it would appear to be an introduction to the herbiverous mammalia.

Further up in the Oolite series are the remains of extinct species of mole,—*Spalacotherium tricuspidens*. Also the genus *Plagiaulax* a carniverous marsupial.

These marsupials, now represented by the kangaroo and opossum, it thus appears, occupy an important and interesting position in the creation of animals. "The name marsupialia is derived from the presence of a large Marsupium, or pouch fixed on the abdomen, in which the fœtus is placed after a very short period

of uterine gestation and remains suspended by its mouth until sufficiently matured to come forth to the external air. The discovery of animals of this kind, both in the secondary and tertiary formations, shows that the marsupial order, so far from being of more recent introduction than other orders of mammalia is in reality the first and most ancient condition, under which animals of this class appeared upon our planet; as far as we know, it was their only form during the secondary period; it was coexistent with many other orders in the early part of the tertiary period." (Buckland's Bridgewater Treat., 1 vol. p. 64, 1837).

In respect to the maternal and fœtal peculiarities of these animals, Prof. Owen regards them as owing to the inferiority of the brain and nervous system in comparison with the fuller development of the higher order of mammalia: the more simple form and inferior conditions of the brain in the marsupial being attended with lower intelligence, and less perfect condition of the organ of voice.

"As this inferior condition of living Marsupialia shows this order to hold an intermediate place between viviparous and oviparous animals, forming as it were, a link between mammalia and reptiles; the analogies afforded by the occurrence of the more simple forms of other classesof animals to the earlier geological deposits, would lead us to expect also that the first form of mammalia would have been marsupial. (Buckland, Bridg. Treatise, 1 Vol. p. 65, note.)

Darwin says: "The marsupials stand in many important characters below the placental mammals. They appeared at an earlier geological period, and their range was formerly much more extensive than what it is now,

Hence the Placentata are generally supposed to have been derived from the Implacentata or marsupials; not however, from forms closely like the existing marsupials, but from their early progenitors." (Des. Man, Vol. 1, p. 194.)

No mammalian remains appear in the Chalk, but the plastic clay and Lignites of the Eocene—the commencement of the tertiary, exhibit apparently the point of divergance between the herbiverous (*Coryphodon* a tapiroid animal) and the carniverous (*Paleocyon*) mammalia. In this formation the *Mosasaurus* a huge reptile 25 feet long, seems to hold an intermediate place, between the *Monitor* and *Iguana*.

It has already been shown that remains of some species of the lower apes are found in the Pliocene. The *Lemuridæ* a sub-family of the ape tribe must have succeeded the marsupials. The "Aye-Aye" (*Chciromys Madagascarensis,*) a living species, has incisor teeth like the rodents; but in other respects, to wit, the heart, blood vessels, brain and limbs, it belongs to the *Quadrumana*. It has a long middle digit with the *Lemuridæ*, the lowest family of the *Quadrumana*, (Prof. Burt G. Wilder, Scribner's Monthly, May 1871, pp. 38, 39) to which its earliest progenitors must have been introductory.

When we look at the mammalia, without going into detail, we find many interesting cases of close relationship, a few of which may be mentioned. Thus the generic distinction between the Mastodon and the Elephant, has been almost entirely broken down by the discovery of between twenty and thirty intermediate species, some ranging as far back as the Miocene. (Lyell, Ant. Man 436.) The Ruminants and Pachyderms were once ranked as two distinct orders of mammals; but Prof. Owen subsequently discovered so many fossil links dissolving the

apparently wide difference between the pig and the camel, as to alter the entire classification by placing certain pachyderms in the same sub-order with ruminants. (Origin of Species, p.288.)

"The discovery of the remains of the *Hipparion* supplied one of the links, required by Cuvier, between the *Paleotherium* and the Horse of the present day, and it is still more significant of the fact of the filiation of species that the remains of such three toed horses are found only in deposits of that tertiary period which intervene between the older palæotherian one, and the newer strata in which the modern horse first appears to have lost its lateral hooflets. (Owen's Comp. Anat. of Vertebrates, Vol. 3, p. 791.)

These connections may be extended to almost any length, but nothing more than a general statement has been intended, and that is sufficient for the present purpose. The author of the Vestiges of Creation has very aptly given a general summary of the progression of life upon the globe, which he says was, "first an era of invertebrate animals; second, a period during which fish were the only vertebrate form of being; next a time when reptiles are seen in addition, but without birds or mammalia; then a period when these last were added, but without man; and finally the present era; in which the master species has existed in supremacy over all." (123.)

Life commenced at a point so low and minute, as to make it difficult to determine whether the new being was a vegetable or an animal. From this there has been a regular succession from inferior to superior in structure to the anthropoid ape; and the same holds as to intelligence. But when we pass on to man there occurs a great increase of brain as already stated, which

fails to be accounted for by the transmutation theory; and we find too a difference between the instinct of the highest ape and the human mind which appears almost infinite.

During these long ages, divided into Geologic periods, there appears a wonderful adaptation and interdependence between living organisms and inorganic matter. Before land appeared life was confined to the sea. Life did not appear until means were provided for its existence and propagation; and its forms have changed with changing circumstances. The geologic periods are thus dovetailed together by the extinction of such species as have ceased to be useful, or adaptive; and the creation of new and superior ones. When land arose from the seas, land animals were created, first amphibious, and next those living alone on land; and the same interlacing continues from period to period, as harmony with terrestial changes made necessary.

This is the evidence; and it would seem as if there could be no mistaking the conclusion, that creation, commencing in that of the material suns, is to be viewed as one whole united work, of which the original design was the creation of man as the crowning work.

Prof. Agassiz says:

"Seen as it were at a distance, so that the mind can take a general survey of the whole, and perceive the connection of the successive steps, without being bewildered by the details, such a series appears like the development of a great conception, expressed in proportions so harmonious that every link appears necessary to the full comprehension of its meaning, and yet so independent and perfect in itself that it might be mistaken for a complete whole, and again so intimately,

with the preceeding and following members of the series, that one might be viewed as *flowing out of the other*."—"Who can look back upon such a series, coinciding to such an extent, and not read in them the successive manifestations of a thought, expressed at different times in forms ever new, and yet tending to the same end, onwards to the coming of man, *whose advent is already prophesied in the first appearance of the earliest fishes*." (On Classification, p. 167.) (The italics are mine.)

It follows from this remarkable linking together of created things, and the order of succession from lowest to highest, that there is a necessary connection between them :—that the creation of the prior thing is necessary to that which is to follow. Nothing can exist without a cause ; and in a regular chain of intermediate causes, "nothing can exist but from a prior, and at length from the First."

The Earth could not exist without the Sun. The animal and vegetable kingdoms could not exist without the Earth. The Mollusk and Articulate divisions could not exist without the Radiate, nor the Vertebrate without the three prior types, as a house cannot be built without a foundation.

Birds could not have existed without the Pterodactyli —the Cetacea without the Ichthyosauri—the Horse without the Hipparion—Man without the Ape. It is true many of the prior links have become extinct ; but they have served their uses, like the scaffolding to a building, which is removed after the work is finished.

I have already stated that so far as all animal forms within the historic period are concerned, a receptacle or matrix has been used, and therefore found necessary in their creation. It may be added, that there is no fact

known to science, or any reason by analogy, by which the inference is warranted, that any different mode has been adopted in the prodution of the ancestral types of the several species which have existed and still exist.

It may indeed be stated as a general and invariable rule, that nothing can be created without a womb or matrix. The Sun was the matrix of the Earth. The Earth is the universal matrix of the vegetable kingdom;—it was that of the lowest of the animal kingdom; and after the lowest forms of the animal kingdom were created, they furnished the matrices for those higher, and so on to the highest.

No more striking proof of the order and laws of creation can be found than appears by certain known facts in Embryology.

"All organisms vegetable as well as animal, commence with a simple cell, of which it is impossible to tell in any case to what form it is destined to advance. A series of changes take place. First, of an animal embryo, we can distinguish whether it is destined for the radiate, molluscus, articulate, or vertebrate sub-kingdom. Take an embryo of the vertebrate sub-kingdom, we next trace in it the change which will determine whether it is to belong to the fish, reptile, bird or mammal class. Take an embryo of the mammal class, the characters of the particular order are next determined. Afterwards those of the family, genus, species, sex and individual are evolved in succession." (Vest. Creation, p. 130.)

"It is a truth of very wide, if not universal application, that every living creature commences its existence under a form different from, and simpler than, that which it eventully attains." (Huxley, Man's Place in Nature. p. 74.)

The human ovum is about $\frac{1}{125}$ of an inch in diameter, having the same essential structure as that of any other vertebrate animal; and in its development it resembles in a general way, in different stages in succession, a fish, reptile, dog, ape, and finally is born a man. Another remarkable fact is that every human fœtus before birth developes the female first; the male principle being subsequently produced, provided it be a male embryo. The same embryonic changes occur in the animals below man; but as water never rises above its fountain head, so the fœtus of a lower animal, as a dog, for instance develops only the resemblances to organisms below the dog.

Another embryological law is thus stated by Huxley: —"the more closely any animals resemble one another in adult structure, the longer and the more intimately do their embryos resemble one another; so that for example, the embryo of a snake and of a lizard remain like one another longer than do a snake and a bird; and the embryo of a dog and a cat remain like one another for a longer period, than do those of a dog and a bird." (Man's Place in Nature, p. 80.)

According to this rule the human embryo resembles that of an ape, a much longer period, than it does that of a fish, or a reptile, and it seems to indicate, that at this stage, there was an effort in the organism to produce an ape, which was finally overcome by the higher grade of life. It is known that the new born babe appears strikingly like the ape in its general outlines, having no waist, and turning the soles of its feet together.

Assuming the lowest *Rhizopod*, found in a bed of rocks lower than the silurian, to be the first appearance of animal life upon the globe, it must have been created

by direct influx into a protoplastic receptacle of earthly materials. It was nearly a shapeless mass ; yet it had life, and was the birth of a species from *dead matter;* the matrix and the offspring being separated, by whatever separates and divides the inorganic from the organic kingdoms of nature, and this must certainly be granted to have taken place, in at least this one case. Darwin, as we have seen, substantially asserts that it took place in four or five different instances.

In this lowest form of life, the mode of creation is easily comprehended. But the creation of an Elephant by influx into crude earth, would not much more readily fall into belief, than to suppose a house built without a foundation, and suspended in the air. The logic of creation has a more consistent and practical basis. The *Rhizopod*, low and useless as it seemed, could nevertheless serve as a matrix for the creation of an advance species ; and so on up. And the rule will be found to prevail throughout, that the higher and more complicated the life and structure, the higher and more complex the matrix needed for its original creation and protection.

Creative energy flows gestatively into every living organism, not only for original creation, but to reproduce. Life as we have already seen is always infused, and puts on and controls its appropriate form.

The life of a new species puts on its corresponding structure, varying radically, though by easy gradations, from the receptacle which gives it birth. Thus the first of the mammalia above the marsupial, we may suppose as an example, was infused into the latter not by sexual connection, but by direct creative influx ; and this conception and birth was a new creation, by *extraordinary generation*, and ordinary birth.

Reproduction on the contrary, is by ordinary generation and birth and follows the law of like producing like, with individual differences.

THE NEW THEORY.

My theory, in short is, that at each step in the creation of species, a prior living organism is used by the Creator as an ovum or matrix to produce a new species, without the aid of the ordinary *paternity* required in reproduction; and precisely in the same way, that the lowest animal was produced by creative influx into a matrix of crude earthy materials. Reproduction requires the coöperation of the animal sexes, while original creation does not.

There seems to me no middle ground between this theory and that of "Special Creation," so called. Either the ancestral type of each species was specially created, according to the old belief, or there was a prepared organization, (which you may call *protoplasm* if you please), adequate to the reception and protection of the infant being.

It is quite certain that nothing has ever been created, and as a sequence, nothing ever can or could be created, without the conjunction of two elementary principles, the *female* and the *male*. In physics, these two principles appear in the light and heat of the sun, heat alone, or light alone, affecting nothing; but in conjunction, they are efficient, intermediate causes in the work of creation. This dual principle exists potentially in the Creator, and flowing forth in conjunction, produces the distinction of sex, which runs through the animal and the vegetable kingdoms. Hence the fact substantially proved by statistics, of the near equality of the sexes in

point of numbers; that is to say, there are born into the world at any given period, about as many males as females. It would seem as though it could not well be otherwise in view of the evident design to people the earth with the various forms of animal and vegetable life.

Precisely at what point of time or organism, in the animal creation, this distinction first appeared, it is perhaps impossible to determine, the lowest organism not furnishing any well defined indications. Darwin does not undertake to account for its existence at all; though how he can originate his species without it, it is difficult to see. The author of the "Vestiges" says: "Sex is fully ascertained to be a matter of development. All beings are at one stage of embryotic progress female; a certain number of them are afterwards advanced to the male." (1st Ed., p. 161.) This he illustrates by the manner in which bees, by checking the development of a certain number of larva, produce first the queen bee in sixteen days, second the neuters in twenty days, and lastly, the males in twenty-four days." (11th Ed., p. 143.)

Granting this to be true, the question why it should be so, very naturally presents itself. If it prove anything, it proves that the first created organism having sex was female; and there is as much reason for believing this to be so, as that the fish was created before the reptile or the ape before man. The rocks tell us that this is true in regard to the fish and the ape and so does embryolgy, the evidences of the one corroborating that of the other; and if the rocks could speak in reference to the prior organic existence of the female principle, the evidence would doubtless be in equal harmony. That the first fish, first reptile etc., and the first of every newly created

species as well, was female, illustrates still further the law repeatedly alluded to, that the starting point of every form of life, is in a matrix prepared for the purpose.

In reproduction, or propagation, the law of heredity prevails, that is to say, individuals of species always produce their like with minor differences. Acorns have always produced oaks, and always will. The offspring of dogs, have always been dogs ; that of horses, horses, and so on through the whole animal and vegetable record. It is true there are minor differences without number, as there never have been, or can be, any two things exactly alike. The type of a species is well represented by a straight line, and the variations are departures from it, up or down, with a constant tendency to return to it, and keep in near proximity. This is the historic record ; and there have been no experiments by domestication or otherwise, by which it is substantially contradicted.

Man, the last creation, having physically the highest and most complex organization, according to this theory, could only be formed through the medium of the highest animal structure next below him—the ape—and his ape birth furnishes the strongest proof of the truth of the theory. The difference between the mind of man and that of the most intelligent animal is so great, that the idea of his propogation by the sexual connection of apes, is utterly absurd. Nothing short of direct divine Influx into the ape ovum could have produced the wonderful result.

The author of the "Vestiges of Creation," seems to have had some idea of this method. He says: "The production of the organic world is, we see mixed up with the production of its physical"—"Life as it were *pressed in* as soon as there were suitable conditions, and

once it had commenced, the two classes of phenomema, went hand in hand together." (P. p. 103-4.)

Again: "We contemplate in short a universal gestation of nature, analagous to that of the individual being; and attended as little by circumstances of a startling or miraculous kind, as the silent advances of an ordinary mother from one week to another of her pregnancy." (P. 158.)

The subject is too grave to be answered with ridicule or affected disgust; especially as there are multitudes of human beings in the world, including not a few, in civilixed lands, of whose paternity a great many baboons might well be ashamed. Those who are nervous on this point may find relief in regarding the difference in dignity, between being created directly from the crude *dust of the earth*, or by means of dust organized into a complete structure of flesh and blood. The world—the Christian world, at least—has witnessed, historically, the exhibition of that which is called the "miraculous conception" in the production of a Human so infinitely above common humanity, as to be capable of complete one-ness with Divinity. Even in that grandest display of divine benevolence, involving the salvation of mankind, God has seen fit, not to depart from His established laws of creation. And thus has been completed the mighty cycle of being, which begins and ends in Himself.

Another question intimately connected with the main subject is whether there was created a single pair only of each species—as a single pair of fish, dogs, apes, or man—from which they have since been propagated; or whether they were created in numbers more or less large. The popular belief has been, and to a great extent now is, in favor of a unity of races in original creation; and on this in a measure, rests the development theory.

"It is generally acknowledged that all organic beings have been formed on two great laws—Unity of type, and the conditions of existence. By unity of type is meant that fundamentel agreement in structure, which we see in organic beings of the same class, and which is quite independant of their habit of life. On my theory, unity of type is explained by unity of descent." Origin of Species, pp. 183–4.)

The entire weight of evidence appears to me to be the other way. Nothing probably in the vegetable or animal world ever made its appearance except for some neccessary use, though we may not always comprehend it, nor until the time when it was needed, and the conditions were in adaptation. This follows from the idea, that all creation has been from an original intelligent design to effect certain definite purposes. Life, as we have seen, in all its forms, flowed from the Creator into receptacles prepared for the purpose ; and these preparations must have been on a scale of magnitude corresponding to the design.

Take the case of the *Polypiaria*—does it not seem preposterous, that the swarming millions of that animal, were propagated slowly from a single pair? Is it likely that all the oak trees that have ever existed descended from one acorn? Or that all the clover has been propagated from a single parent seed? On the other hand it is much more in accordance with all that we are capable of seeing and comprehending of creative force to suppose that at the proper time, and in the suitable localities, millions of clover plants started into growth, as we see fireweed in a burnt district. Creative power is exuberant, and not sparse or stingy, or poured out in small measure.

We know very well that land emerged from the seas at different periods, and at widely different regions. Suppose Africa to have been first elevated, and made fit for the growth of plants, and for the existence of vertebrate land animals. What necessity was there for waiting until land everywhere else emerged, before peopling it with a fauna and flora suited to its conditions? What probability is there, that any such delay took place? Suppose Australia, or some considerable portion of it, to have been next elevated. Is there any good reason why a fauna and flora, should not have been created there adapted to the environment, quite independently of that already existing in the African Continent? And so of America and Europe.

When the proper time came for the origin of a species, creative influx into the receptive forms already in existence, may just as well have produced numerous pairs as one. And this would easily account for all the allied species, as well as for many of the differences between individuals of the same species. Such variations would necessarily spring from the differences of the environment. The tiger of the Eastern jungle, for instance, is not so well suited to an American forest, as the panther; the dogs of the American Indian differ greatly from those of the Esquimaux, and these again from those of Europe; and we well know the Negro can live in miasmatic African localities, where a Caucasian would quickly perish. This view of the subject supersedes the necessity of speculating on the problem of the migration of animals, to account for the existence of allied species.

If this rule be true of plants and animals, it must be true of man. The same influx that could inpregnate a single ape ovum with human life could a thousand as

well, in contiguous areas, and about the same time. A single pair of human beings would be far less able to protect themselves from wild beasts, and whatever else there might be of adverse circumstances than a community. This idea of simultaneous creation of considerable numbers, explains many of the various and marked subtypes, which everywhere appear in communities of the same race. And especially does the creation of communities at different periods, and widely distant areas, account for the broad distinctions between the Negro, Indian, Mongolian, and Caucasian races. Ultimately, as we see, these different races, and subtypes, commingling, produce still further varieties.

It follows, that men created upon the lands first elevated, as Africa for instance, are the oldest; and the youngest are those of the lands which last became adapted to the needs of human life.

There are some moral considerations connected with this point which cannot be better expressed, than in the language of one of the most distinguished naturalists of modern times—Prof. Louis Agassiz: "To assume that sexual relations determine the species it should be further shown that absolute promiscuousness of sexes among individuals of the same species is the prevailing characteristic of the animal kingdom; while the fact is, that a large number even of animals, not to speak of men, select their mates for life, and rarely have any intercourse with others." * * * * *

"For my own part I cannot now conceive how moral philosophers, who urge the unity of the origin of man as one of the fundamental principles of their religion, can at the same time justify the necessity which it involves of a sexual intercourse between the nearest blood rela-

tions of that assumed first and unique human family, when such a connection is revolting even to the savage."

"The facts, with other facts which every day go more extensively to show the great probability of the independent origin of individuals of the same species in disconnected geographical areas, force us to remove from the philosophic definitions of species the idea of a community of origin and consequently, also, the idea of a necessary geological connection. The evidence that all animals have originated in large numbers is growing so strong, that the idea that every species existed in the beginning in single pairs may be said to be given up almost entirely by naturalists." (On Classification, pp. 253-5.)

It would be strange indeed, if the Supreme Being, whose laws of order lie at the foundation of all human prosperity and happiness, should have made their violation absolutely necessary in the first propagation of the race.