

Published the first day of every second month, price \$5 per year.

THE
AMERICAN JOURNAL
 OF
SCIENCE AND ARTS.

CONDUCTED BY

PROFESSORS B. SILLIMAN, B. SILLIMAN, JR.,

AND

JAMES D. DANA,

IN CONNECTION WITH

PROF. ASA GRAY, OF CAMBRIDGE,
 PROF. LOUIS AGASSIZ, OF CAMBRIDGE,
 DR. WOLCOTT GIBBS, OF NEW YORK.

VOL. XXX.—[WHOLE NUMBER, LXXX.]

SECOND SERIES.

No. 88.—JULY, 1860.

WITH A PLATE.

(PUBLISHED JULY 10th.)

NEW HAVEN: EDITORS.

1860.

PRINTED BY E. HAYES, 50 CHAPEL ST.

POSTAGE PREPAID AFTER THE PAYMENT OF THE YEAR IS RECEIVED.

Postage, if paid quarterly in advance, under 3000 miles 4 to 5 $\frac{1}{2}$ cts.—The Numbers will be sent to subscribers FREE OF POSTAGE after receiving the payment for the current year.

THE AMERICAN JOURNAL OF SCIENCE is published every two months, on the 1st of January, March, May, July, September and November, in Numbers of 152 pages each making Two Volumes a year. Subscription price \$5 a year, in advance.

1st Ser., 1818-1845, 50 vols., including a General Index. Edited to 1833 by Prof. B. SILLIMAN; after July, 1833, by Prof. B. SILLIMAN and B. SILLIMAN, Jr. Price for complete set, unbound, - - - - - \$100 00

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This long established Journal is sent by Post to American subscribers (when desired). The postage on each Number is 8d. (16c.) prepaid in London, and the same amount to be collected in the U. S.

The June Number of 1860 was No. 129, being of Vol. XIX, 4th Series. Address

TAYLOR & FRANCIS, Red Lion Court, Fleet St., London,
 And G. P. PUTNAM, 115 Nassau St., New York.
 July, 1860.—[t.]

THE
AMERICAN
JOURNAL OF SCIENCE AND ARTS.

[SECOND SERIES.]

ART. I.—*On the Origin of Species*; by THEOPHILUS PARSONS,
Dane Professor of Law in Harvard University, Cambridge,
Massachusetts.

It has frequently occurred in the history of science that some startling theory, which, when first announced, was regarded as the antagonist of received opinions, and became at once the subject of earnest hostility as well as unqualified approbation, has, after much discussion been importantly qualified and modified, and thus reconciled with views which it seemed to contradict; and when thus shorn of its excess and moderated in its demands, has been generally adopted as an important addition to knowledge. It may yet be so with Mr. Darwin's views.

His theory, stated very briefly, is, that all organisms tend to reproduce themselves in a geometrical ratio, and with such exuberance of life, that each one would speedily fill the earth, if not repressed by constant and powerful causes of destruction. Hence but a very small proportion of seeds or ova which are impregnated are able to mature and reproduce. Therefore there must be a competition, or as he phrases it, a "struggle for life," among all these impregnated germs of life; and if one in a hundred only lives there must be a reason why that one lives rather than the ninety and nine which perish. This reason must again be frequently, or at least sometimes, that it had some advantage in this "struggle for life," by a structural or functional difference. That is, it varied from its kindred, in such wise, that it was somewhat easier for it to live, to grow, to mature, and to reproduce, than for them. This difference or variation it must, as a general rule, impart to its offspring. When it be-

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came established, the same law of struggle, of advantage, of life, and of death, would operate upon this new and improved variety, and would cause another and a farther improvement. As this law is universal, and must always have operated upon all organisms from the beginning, not only are varieties established in this way, but so likewise varieties become species, species become genera, and so also orders, classes, families are formed, and thus finally we may suppose that all the organisms of the earth, living and extinct, animal and vegetable, have proceeded from the simplest original form of life.

While much interested in Darwin's work and in the discussions and controversies to which it has given rise, it occurred to me to consider whether one of the limitations which he seems to have imposed upon himself, was necessary. He assumes, and reasons exclusively upon the assumption, that the successive changes by which these great results have been brought about have always been minute and slow, and have only become sufficient to reach their consummation, by an indefinite accumulation of effects, through the indefinite periods of time which geology affords them. It seemed to me that this assumption was quite unnecessary, and therefore unphilosophical; and supposing that these changes may sometimes have been much greater, I then inquired what would be the effect of this supposition upon the general theory, that the succession of organized being has from the beginning been produced by generative development. This paper is intended to suggest—and only to suggest—some of the results to which I have come. Upon the question whether I have not departed so widely from the theory of Darwin, that I have no right to use his name, I have nothing to say. I wish only that these suggestions may pass for what they are worth whatever that may be.

To say that it is the tendency of all organisms to reproduce their like, but with some difference, would be merely to utter a truism, for there is almost or quite always some family resemblance between offspring of the same parents, and always so much of difference that no two of the offspring are ever undistinguishable from each other. We may say, however, that one certain law of this difference, or variation, is this; that while a slight difference is universal, great difference is less common, and the greater the difference the more rare it is, and therefore the less to be expected in any given instance. The question then arises, how far this difference may go; or to say the same thing in other words, what limit is there to the possible immediate variation of offspring from their parents and kindred?

The law of variation is itself variable; and while we have little knowledge of the causes of variation, we have none whatever of the limits to which it may be carried. Indeed, if we assume that there must be some limit to the possible extent of

variation, we may infer that it must be a very broad one, from the instances of extreme monstrosity which science has recorded. Let us say, then, that we will assume that there may be as much variation or aberration as these records prove that there has been, and no more.

Perhaps abnormality always seems to us a mischief, and by monstrosity we always understand aberration in a wrong direction; and facts would justify the inference that extreme aberration is usually a degradation. But we have no sufficient reason for saying that this is a *law*; or, in other words for asserting, that there can never be monstrosity in a right direction; or in yet other words, that the aberrance can never be an improvement and a help. As this seems to me an important principle I restate it. We know that it is the tendency of all organisms to reproduce their kind, but with some difference. We know, for all the improvement in our domestic animals proves it, that this difference may be improvement. We know that this difference may be carried to an enormous extent, as a mischief, because the records of monstrosity prove it; and we do not know that this difference may not be carried to an equal extent in the opposite direction of improvement.

My position therefore is precisely this. It is always possible that offspring may be born, differing as much from their parents and kindred in the way of gain, of advantage, and of improvement, as we know that offspring have differed in the way of loss, of hindrance and of degradation; and therefore when I speak of extreme aberration I shall mean by it variation carried to this extent.

Admitting this principle as possible, let us proceed with it to consider what may be called the system of Agassiz; using his name only because he has given to it great development and full illustration.

Take first his assertion that there must have been in each geological age many new creatures; say if you please an hundred or a thousand, and consider this as proved and admitted. Still it leaves wholly untouched the question how these new creatures were created. And be the answer what it may, that answer so far as it is only an answer to this question, leaves the assertion of Agassiz untouched. But if we bring to the question, how were these creatures created? the possibility of aberrant variation of offspring in the direction of improvement, we bring to it one answer. For example: suppose the time to have come when there is to be a new creation, and it is to be a dog, or rather two dogs, which will be the parents of all dogs. How shall they be created? We may say of this either of five things. One is, that we do not know, and never can know, and had better not inquire. This does not seem any answer. A second is, that they will be created "by chance." This also seems to me no answer, because chance is a word only and not a thing. A

third is, that they will be created at once and out of nothing, by the absolute will of a creator. This answer does not satisfy me much better. The fourth is, that they will be so created by absolute fiat, out of a proper quantity of earth and water, with the necessary chemical elements in due proportion, which had been summoned to meet together in a proper place by the will of the Creator for that purpose. But this answer does not recommend itself to my reason much more than the others. The fifth is, he will be created by some influence of variation acting upon the ovum (before or at conception or during its uterine nutriment) of some animal nearest akin—a wolf, a fox, a hyena, or a jackal; and the brood will come forth puppies and grow up dogs to produce dogs. Now the question is not whether this last answer offers a probability *per se*, but whether it is not after all less improbable than either of the other suppositions; less unphilosophical than either of the other answers, and therefore to be accepted on that ground: and I may say in passing, that if the present favorite theory for accounting for the diversities of our domestic dogs, by referring them to four different origins, be adopted, we may then conjecture that each of the four animals above named brought forth its own puppies, to be the progenitors of their respective families.

Let this doctrine of the new creation of new species, by generative development through variation be accepted, and we have Darwin's theory of the origin of species by successive generation; and instead of opposing the theory of Agassiz, it confirms it; because it adopts and reasserts the principle of new creations, and offers some explanation of the way in which they were made.

Let us glance—and only glance—at some facts in geology and zoology, to see what would be the effect of this principle; and I shall carefully limit myself to the most general suggestions, on a topic which would fill more than a volume.

At the beginning of the fossil records of life, in the Silurian formation, we find trilobites of various forms; and recently a *Limulus* or something akin to a *Limulus* has been found there. There are other Crustacea; but with these two only, is it not possible to account for all the Crustacea which have ever existed or now exist, without overstepping the rationally possible limits of extreme variation in offspring, simply by arranging those which we already know in a chain of affinity?

But how shall we get to the vertebrates? These same trilobites ran up through all the palæozoic rocks, through the Silurian, the Old Red-sandstone, the Carboniferous and the Devonian, and are lost at last in the Permian. Near their end, when they are already thinning out, we have, in the old red-sandstone formation, the "buckler head,"—or, to use the Greek name given by Agassiz, the *Cephalaspis*. And we have also the fossil flying fish, or using again the Greek name, *Pterichthys*. The first of these was long regarded as a trilobite of the genus *Asaphus*, until Agassiz

at length determined it to be a fish. Of the second, Murchison says in a letter to Miller, "if not fishes they approach more closely to crustaceans than to any other class. I conceive, however, that Agassiz will pronounce them to be fishes, which together with the curious genus *Cephalaspis* form the connecting links between crustaceans and fishes." Now, is it too much to infer from these facts, and always within the reasonable limits of generative aberration, that either of these animals, if a crustacean was so nearly a fish that some of its ova may have become fishes; or if itself a fish was so nearly a crustacean, that it may have been born from the ovum of a crustacean? We may add indeed, that the *Eurypterus*, now called a crustacean, was regarded at one time, by Agassiz, as a fish.

If fishes may thus have begun to be, and we may suppose that, having begun, they could be so arranged by their affinity and gradual difference as to account in this way for the successive new creation of their kinds, we may then pass to the question of reptiles.

Here also we have Lyell's *Dendrerpeton*, Owen's *Placodus*, and the *Archegosaurus* of von Meyer, all of which were held, and somewhat firmly held, by the highest living authority on this point—Agassiz again—as fishes; and all of them after further and final investigation, have been lifted out of the water by the same strong hand, and placed upon dry land, as reptiles. I know the explanation of this; but does not the fact itself suggest irresistibly that we have here what Murchison calls "connecting links." Links, that is to say, through which, by generative variation, the fish passed into the reptile, and so the family of reptiles began. So too, possibly, the *Pterichthys*, or fossil flying fish, the *Pterodactyle*, or huge winged fossil reptile, may suggest the possibility of a similar origin for birds.

As to that difference between vegetables and animals, which some have regarded as the greatest difficulty, I would say only what every one who owns or uses a microscope knows, that the line which separates the protophyta from the protozoa is constantly changing and always uncertain; and that if the organisms which lie along this line, should have offspring which are certainly vegetable, or those which are certainly animal, in neither case would the offspring differ much from the parent.

Nor let it be said that the geological records exhibit numerous instances where a race which succeeds another, does not come into existence until a certain period after the kindred race from whom they might have come has utterly perished. It is not quite so. On the contrary, in most cases, the great classes of animals lap over, as in the instances given, of crustaceous trilobites and the fish found with them, and again the fish and the earliest reptiles, in a way which has always suggested, of itself, this idea of succession by generative reproduction. There are eminent naturalists who read in the records of geology the plain declaration

that there have been some—perhaps many—cataclysmic destructions of whole orders of being, followed by periods characterized by the absence of organic life. If this were *proved*, there must have been not only many new *creations*, but many new *beginnings* of organic life. It must be remembered however, that the geologic record is assuredly not yet wholly unrolled; and that we are not sure that we read aright all that is seen. I have some doubts whether there be an instance in which such an interval of absolute nothingness unquestionably occurs; or one, even in the present state of our knowledge, in which among the races passing away there are not found, and far within the limits of extreme aberration, some who *may* have been their offspring, and the parents of succeeding races.

But I must forbear following these suggestions further. The difficulty of admitting the transformation is, I know, great; and still greater difficulties must be encountered in other parts of this supposed chain of reproduction. A very great one to my own mind arises from those beds below the Silurian, which, on the one hand, are wholly free from traces of life, and on the other, from evidence of destructive alteration by heat. They seem to me to lead strongly to the conclusion of Murchison and others, that the earth had only then become cool enough to make life possible, and consequently that life must have begun there; and there certainly we find it already very various. But, not to insist that with farther knowledge, wider discovery of “connecting links,” or transitional forms, and better examination, all these difficulties may be materially lessened, I say at once that I should accept them all unhesitatingly, rather than the notion that the first horse, or dog, or eagle, or whale, flashed into being out of nothingness, or out of a mass of inorganic elements which had been drawn together in due proportion for that purpose.

This last supposition is inevitable if we reject the first.

The one thing I would be understood to assert, is, that science must now *elect* between two hypotheses, which together fill the whole ground, and cannot *both* be rejected. One is, that the animals and vegetables of the world have been formed, by absolute fiat, out of a mass of inorganic materials. The other, that they have come into being successively, by generative production, of some kind and in some way. When Milton tells us that

* * * * The earth obeyed, and straight
Opening her fertile womb, teemed at a birth
Innumerable living creatures, perfect forms
Limbed and full grown. Out of the ground arose
As from his lair, the wild beast where he dwells
In forest wilds, in thicket, brake or den.
The grassy clods now calved; now half appeared
The tawny lion, pawing to set free
His hinder parts: * * * *

he adopts and adorns the first hypothesis; but while Milton was a great poet, he was not so great a zoologist.

I do not now assert that no creature *can* be made out of nothing, or out of the dust of the earth, nor do I speak of the first beginning of creation; nor of anything but the existing and extinct floræ and faunæ. In reference to the various species of these, I say only that this is the last conclusion which we should adopt, and only when driven to it. Perhaps I may illustrate my meaning thus. If a pair of undescribed mammals, about as large, we will say, as a fox, with young or preparing for them, were found to-day in some district in England which has been thoroughly explored, and of which the fauna and flora were perfectly well known, and these animals differed in some specific essentials from any known animal, there would be a vast amount of speculation about their origin. One writer would say that they had escaped from a menagerie or from some ship; another that they had always been overlooked and undescribed until now; another that they were hybrids, and there would be much discussion as to what animals could have produced them, like that which Gilbert White tells of about the bird which he thought a cross between a pheasant and a hen. There would be no limit to the extent or variety of the discussion,—excepting this. No naturalist would, I think, explain their appearance at that time and place, by supposing that they had been made out of nothing, or out of the dust, suddenly, where they were found. If any one ventured upon this hypothesis, I do not believe that it would be generally adopted. I do but apply the same way of thinking to past times. When the new species appears first in the geological strata, I say that its creation from nothing or from the dust should not be held, until all other possibilities of production are exhausted and rejected. For creation from nothing is just as possible now as it ever was; and we have no reason for saying that it would not be as natural *now*, as likely to occur, and as worthy of admission and belief.

What do we gain by the use, in this connection, of the word miracle in the sense of an exceptional interference by omnipotence? When one of the wheels of Babbage's calculating machine turns up its numbers in a certain unbroken series for a million of times, and then a new element is suddenly introduced, and an old one goes out, this apparently disturbing thing is just as much a part of the machine and its operation as all the rest. The illustration fails so far as this. Babbage calculates his machine and sets it going, and leaves its working to the natural laws which he finds in operation. God never leaves his machine, for if he did it would instantly perish, because it is always his present activity which gives force and efficacy to the laws by which He works.

But what shall we do with that other principle of Agassiz, that all this successive production or creation of new creatures has happened by the will of a creating God; or, to use his own

phrase, that each new creature has come into being by the fiat of the Almighty? What I do with it, is to accept it readily and entirely. For when the voice of God issues the fiat and says let this thing be, is it not as perfectly obeyed although that thing comes into being by generative development, as if it sprang forth from nothing or from the dust?

And again what shall we do with the principle of Agassiz, that in all these new creatures there is no chance and nothing arbitrary, but a coherence and coördination of parts, and a unity of purpose and of place, which prove the whole to be the work of one directing mind and one causative power. Again I answer, admit this also freely and gladly; thankful for every argument and illustration which enforce it. For what is there in the supposition that God has his own laws of divine order, and operates through these laws, and by the means which He has provided, (no matter how universal these laws or how far back the chain of influences or causes extends,) to prevent our recognition of Him and of his wisdom in his works.

But what shall we do on the other hand with Darwin's "struggle for life," and consequent "natural selection," which plays so great a part in his theory? Again I say, if farther investigation renders it probable, as I think it will, admit this also with perfect readiness to play whatever part sufficient evidence may assign to it, be that more or less. The fact *to some extent* is obvious and certain. And may not God act as well through this "struggle for life" as through any other of his laws? Must it be regarded as a blot, an imperfection, which he could not help, and bears with as he may? If we regard it as an instrument, by means of which he works out universal, inevitable, and never ending improvement, incorporating this law with the nature and essence of every thing that lives, or can live, may we not see in this also, at once his infinite love and his infinite wisdom?

Then as to hybridism. Darwin admits the vast preponderance of authority against the continued fertility of hybrids, but still thinks that there are some qualifications. Even since his book was published, Isidore St. Hilaire, who has made hybridism a special study, has published a work in which he asserts, and goes far to prove, that hybrids are sometimes at least just as fertile as their parents. Out of this uncertainty, let us draw one certainty; and it is that nothing is certainly known about it. And also one probability—that offspring may differ from their parents and brethren so very much that there can be no sexual intercourse between them. They may differ less and then there may be intercourse but it will not be productive. They may differ still less, and it may be productive, but the offspring will not reproduce. Still less and they will reproduce, but only for a few steps. Still less, and they will be as fertile as their parents or brethren. Scientific men may give to these degrees of differ-

ence the names of classes, of genera, or species, or what else they will. For here I will venture to remark that much of the criticism and discussion to which Darwin's work has given rise, both in England and in this country, seems to me verbal only. That is, it relates not to the origin and nature of certain existences, but to the language we should employ in speaking of them. What do we gain in real knowledge, when we insist that the word "species" *must* mean this or that, when it *may* mean anything, and very few persons use it in the same sense, or in any definite sense. And as to the question of difference or identity, do we know enough about it to be very positive on any point, except our ignorance? For how many years has the Tertiary formation been arranged into four classes—the Eocene with its one shell in twenty-five now living, the Miocene one in six, the Pleiocene one in two and a half, and the Pleistocene nine out every ten. DesHayes, a great man, has devoted himself to their examination, and has reasserted this with the most emphatic distinctness and the most abundant illustration: and Agassiz now comes and declares it to be all a great mistake. He doubts whether any one shell of the 4 per cent, the 17, the 40, or the 90, has ever been looked upon alive by man.

Far be it from me to undertake to decide between such men. But again let me draw one conclusion, which seems certain; and it is that there is no sure, unerring, and unmistakeable test of specific identity or difference.

If we admit with the qualification and in the way above stated the theory of the production of all things by generative development, and the active operation of this principle of the "struggle for life," and admit also Agassiz's requirement of new creations, and of the orderly succession and coördination of these, we have a theory composed of elements which certainly do not now oppose and destroy each other, but coëxist in harmony, and in mutual support and illustration.

How far shall we carry it? Not to the creation of all things from one beginning, unless farther investigations should remove the immense difficulties which this theory must now encounter, and sustain its probability. But let not the investigation be clouded, obstructed and defeated by the assertion that any theory which calls into being all existing and extinct organisms by some method of successive generative development, cannot be true, and must needs be false and dangerous.

The great difficulty to most minds would be, after all, that which relates to man himself. Man, from a monad! Yet let it not be forgotten, that this is the natural history of every man that has ever been born of woman. At first a nucleated cell, (call it a monad if you like,) not distinguishable from other nucleated cells, which, by segmentation, gives rise to that germinal membrane, from the outer portion of which are formed the or-

gans of animal life, and from the inner those of organic (or vegetative) life; and then, in its uterine development, exhibiting successively resemblances, more or less close, to the lower animals; the human embryo, for example, having, about the twenty-fifth day, the branchial openings and elongated body of a fish, at a later period the imperfect limbs of a seal, and still later the bent limbs of a quadruped. These, and many analogous particulars in the history of the human embryo, make this one of the most inexplicable and yet suggestive wonders of existence. One might well imagine that the "monad" retraces his footsteps along that immeasurable pathway from primeval being, and as it repeats, records them.

While all this is nothing like *proof* that man is also a product of this law of generative development through variation, it may have some tendency to lead the mind in that direction. And how much there is elsewhere in the metamorphoses of nature, to exert upon the mind a similar influence. Tell one who is eating a ripe peach, and after enjoying all the pulp, breaks his teeth against the stone, and being curiously inclined opens that, and finds the solid meat, and opens that again, and puts the in-folded plumule under a lens, and sees there the promise of a future tree,—tell him that skin, and stone, and seed and plumule, all are but *changed peach leaves*, will he not be at least as much surprised as if you carried him to a menagerie, and pointing to a hyena, said to him, there stands the father of the "yaller dog" of New England? *

But this notion of man being born from an animal stands in

* I allude, of course, to the January number of the Atlantic Monthly, wherein this strange animal is presented with that wonderful power of word-painting, which is a true daguerreotyping by the sunlight of genius.

But I write this note rather to refer to an article in the North American Review for July, 1857, in which Dr. Holmes, before the controversy about "Darwinism" began, treats many of the topics to which it has given rise, and exhibits his own views of an ever *immanent* God.

No one can admit more cordially than I do, the principle which has been recently so much considered, that God must have had at and from the very beginning of his action, laws, to which he and his universe have always, and, I am willing to say, necessarily conformed. So too, I admit, as cordially, that other principle, that all science, philosophy and reason, lead concurrently to the conclusion, that the "Causa causans" must be always and incessantly a present cause, as *present* at one period of duration as at another, and always directly and universally operative. But why regard these principles as antagonistic? To me they seem not only harmonious, but complementary, and necessary each to the other. If I believe that God is ever present, active and operative, it is because I believe that the laws of order which arise from his own divine nature, permit and require this. If I believe that these laws exist, that he has ever conformed to them and must ever do so, it is because I believe that they are the eternal instruments of his ever active love and wisdom. In the words in which Dr. Holmes sums up the whole matter at the close of his article in the N. A. Review, "whatever part may be assigned to the physical forces in the production and phenomena of life, all being is not the less one perpetual miracle, in which the Infinite Creator, acting through what we often call secondary causes, is himself the moving principle of the universe he first framed and never ceases to sustain."

the way of positive revelation! In my own mind it does not. I look upon the Bible as the word of God: but I do not believe that the first chapters of Genesis teach or were ever intended to teach natural scientific truth; nor does this denial lessen my reverence for what I consider as the moral, spiritual, and religious truth which I believe they do teach directly, or under the form of parable and symbol. And upon the question of the original and physical creation of man, I think that we know no more and no less, and are at equal liberty to think, to argue, and to conclude, as if these chapters had never been written. To me, they do not say one word about it.

But does not this notion stand in utter opposition to all religious belief? Again, I can only say that in my own mind it does not. I believe, most unreservedly and undoubtingly, that man is superior, not in kind only but in degree, to all animals, and is immortal, which they are not. But this belief would not be either shaken or troubled, if science should, upon evidence discovered hereafter, teach, that the Gorilla, which Owen says is most like to man, or the Chimpanzee, which Professor Wyman, with better reason, places higher,—if either or both had given birth, when the fit time had come, to a babe, whose brain and nervous system, with all the residue of its frame, were so organized that the breath of life, of spiritual and immortal life, could be breathed into him, and bear with it all the attributes of human nature,—all those attributes which divide, as by an unfathomable abyss, the man from the beasts that perish, and lift him infinitely above them. At present, science possesses not only no facts which would lead to this as a certain conclusion, but none which would declare it to be a probability. But neither has it sufficient reason for asserting it to be an impossibility. Nor, does it seem to me, that religion would receive a blow, if science should be led by additional discovery and more thorough investigation, to go not only thus far, but so much farther, as to account for the various kinds of men by asserting that the brown orang-outang that lives among the brown Malays was their progenitor; the black gorilla the father of the black races, among which he is still found; other simiæ the parents of other human families; and some one fairer than the rest, the remote ancestor of the Circassians, whose superiority over their progenitors was so great that they had rooted him out from the earth!

But let us consider the general relation of this hypothesis to religion. I am perfectly willing to confess that the theory propounded by Darwin, as it rests upon excessively minute changes, and those produced by what he calls "accident," (of which word, however, and of his use of it, he offers much explanation) seemed to me to have a tendency to obscure the thought of providential causation and government; and that I was first led to reason out, as well as I could, the probability and effect of more salient changes in the offspring, by its appearing to open the door

to this thought somewhat more widely. But aside from this, and indeed from any reference to this or any special question or theory, may it not be well to remember, that natural science belongs, mainly at least, to the intelligence of man, and to his outer life, while religion belongs, mainly again, to his affections, his motives and his inner life. Hence, entirely different faculties and functions of our common nature are brought into exercise in reference to science, from those which are invoked by religion. It is a good and wholesome thing for a man to become religious because he chooses to be so, and loves to be so; and it is good for him to compel himself to make this choice. He cannot indeed become religious on any other ground or in any other way. And therefore Divine Providence has mercifully guarded him, not only from the external compulsion, which, as all men see, cannot reach the heart, but from the compulsion of his own intelligence, which might be equally injurious.

In investigating the claims of science, he must call upon his intellect to look sharply at the facts, the logic, the arguments and the conclusions; and this is all, or nearly all. But he must choose and hold his faith, not by means which logic disdains and denies, but by asking of logic to do all that it can do and and the best that it can do, as the instrument of something higher than itself, which can take up and complete the work which mere logic must leave unfinished.

How easily could God have written his word and his truth in fire upon the sky, and in gold upon every leaf or stone, if all he had desired was the intellectual advancement of man. We may infer from his course of providence, that he desires this, only as a means to an end; and as an instrument of that moral and affectional improvement, which must be man's own coöperative work. Therefore it is, that religion never has been, and I think never will be fortified by the demonstrations which belong to ascertained science; and hence it is also that no science, and no mere truth has ever yet been suffered to arise on the world, and none I think ever will be, that does not leave man free to be irreligious if he will; although all true science offers him much to feed upon and to rejoice in, if he loves to look upon the truth he learns as aliment for his religion.

To every creature is given a tendency and a capacity to seek and find and appropriate that food which agrees with its own nature. When a willow tree sends a root far in one direction to a ditch where it may drink its fill, and a neighboring grape vine sends its root as far in an opposite direction and finds a heap of buried bones, we have but the operation of the same law, by virtue of which if ten men read a book, it may be to them ten books; for each will read the same words, and then translate them in his own way. It is an old saying, that what one brings home from foreign travel, depends upon what he car-

ries with him. So it is in the journeyings of the mind. Let that go where it will it carries itself, and uses itself as the organ for giving form and effect to all that it receives.

The poet may say that the undevout astronomer is mad; but astronomy, and every science cultivated among men, has those who are devoted to it with the most faithful assiduity, and who extend its borders and enlighten its dark places, and who are, nevertheless, utter unbelievers as to God and religion; and find in their science support for their unbelief. To minister to religion is the highest, the consummating work of science; but science cannot render this service where there is no religion to accept it. So will it be with the theory of the creation of all things by successive generative and variant production, if it be established in any form whatever.

This man will read it to whom the idea of God is an offense and a pain. His unbelief holds him in subjection; and when he reads any book, or studies any subject, he reads with clouded eye and mind all that favors religious truth, but brightens at once when he gets a fact or an argument for his unbelief, and dwells on that as a choice morsel. He will study this new theory, and find in it new evidence that God is a mere superfluity; and he will say exultingly, now we have proof that the laws of the world and their own necessity are all that a truly rational mind can ask. And he will deny, or forget, that there is no possible conception which so imperatively demands a lawgiver, as law; and none which so requires a cause to set it in action, as an active necessity.

Another man who loves to believe that God forms and fills and *is* the universe, and that there is no other God, will find here abundant support for his opinion, and will rejoice in the evidence this theory affords of the universality of law and the connection of all things by gradation into unity. And he will forget, or will not know, that all this implies design, and purpose, and will, and therefore personality.

And a third man will see in this theory new proof of the eternal working of the personal God in whom he believes. He will rejoice at the evidence it offers that God loves to bless every entity of his creation by using it as his own instrument and as the means for farther creation; that preservation is continual creation; and that he forever puts forth the same power, born of the same love and guided by the same wisdom, that in the beginning laid the foundation of the universe deep in that infinite which no plummet of human imagination ever can sound. To such a mind it will be a new proof, that from God's own nature, there came forth laws of order, in which, through which, and by which, he has ever worked, from a beginning, which when we try to think of it, recedes faster than thought can follow.

Cambridge, May, 1860.

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