

## THE ORIGIN OF SPECIES.\*

(MR. DARWIN AND HIS COMMENTATORS.)

**T**HE minds of men are so variously constituted that the observation of one and the same phenomenon often produces upon different individuals totally distinct and opposite impressions.

As in the tale of the travellers and the chameleon, one person examines an object from one position, and declares it to be white ; another views it from a different stand-point, and unhesitatingly affirms that it is black ; whilst a third, approaching it from the quarter where the two effects neutralize one another, pronounces it to be both, or neither, and at length discovers that it is grey ; and he at once proceeds to enlighten the disputants.

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\* Professor Huxley's Lectures to Working Men on "Our Knowledge of the Causes of the Phenomena of Organic Nature." R. Hardwicke.



Are we correct (we would inquire of the thoughtful reader), when we say that the debated controversy of the "Origin of Species" has assumed somewhat of this aspect to one who belongs to neither rank of controversialists?

Leaving out of consideration a host of writers, who have dealt with the subject without understanding anything of its merits, or who have formed hasty or prejudiced conclusions in regard to it, we still find many illustrious names rendered still more prominent by their association with that greatest of all nature's problems—the creation, modification, and continued existence of living forms; and where the leading naturalists of the age are found to hold diametrically opposite views, we can take but little credit to ourselves for having exercised caution in the expression of our own opinions.

But those who have followed us in our labours will be aware that we have done more than to exercise self-control; we have often (no doubt to the dissatisfaction of our correspondents) toned down, or entirely expunged statements which assumed as undeniable facts what many unprejudiced observers still regard as not proven, or even reject as error; and this we have done in order that a hasty expression of opinion on the one side might not call forth an acrimonious retort from the other.

The result has been that these pages are the neutral ground upon which men and women holding every phase of theological and political belief have met without restraint, and have learned to respect one another as searchers after truth. And it is chiefly with a view to maintain this prestige that we now venture to approach a question which will not allow itself to be cast aside; and upon which it is, therefore, right that each and all of us should bring our best judgment to bear.

During the brief period of the existence of this Periodical, we have had occasion to notice three works bearing upon the subject of the "Past and Present Conditions of Organic Nature;"\* all written by authors whose names are more or less intimately associated with the controversy; and now there lies before us a fourth treatise, an unpretending little volume, so far as outward appearance goes, and comprising only 157 small widely printed pages of matter. But this little work, diminutive though it be in its proportions, contains the deliberately expressed convictions of a naturalist who is invested with great authority by virtue of his official appointments in the educational departments of the State; and whose careful and untiring research gives weight to any opinions that he may think fit to express in public on those subjects which (to confine ourselves for the present to an expression of his own) tend to "the improvement of man's estate, and the widening of his knowledge."

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\* "The Past and Present Life of the Globe." By D. Page. Blackwood. (No. 1, "Popular Science Review.") "Unité de l'Espèce Humaine" (Unity of the Human Species). By De Quatrefages. Hachette, Paris. (No. 2, "Popular Science Review.") "On the Fertilisation of Orchids." By Charles Darwin, author of the "Origin of Species." Murray. (No. 5, "Popular Science Review.")



It deals with "the past and present condition of organic nature;" with the method by which the causes of these conditions of nature are to be discovered; the origin and perpetuation of living beings, and the phenomena that accompany these. It further enters into a critical examination of Mr. Darwin's book on the origin of species, suggesting to its readers how far they should be guided by the theories and hypotheses which it contains; and lastly, what is to us by far its most important feature, it is itself a verbatim report of a course of lectures delivered by the author (we believe in his public and official capacity) to the working classes of the great metropolis.

Our readers will therefore perceive that we are not called upon to deal with a mere scientific inquiry or criticism, of whose value every one may form a more or less accurate estimate, but that the doctrines and conclusions of the author will be taken for granted by, and serve as a guide to many who were previously unacquainted with the subject except by hearsay; whilst others more enlightened, perhaps, but still to a great extent strangers and new-comers in the world of science, will carefully scan its contents *as the popular exposition of the great scientific movement of the day*; and such persons will naturally form from its contents what appears to them to be the most accurate estimate of the efforts of modern science as applied to the laws of nature, as well as of the opinions held by scientific men.

The avowed purpose of the present work is, as already stated, to communicate to the partially educated masses what appears to the author to be a faithful account of Mr. Darwin's views concerning the origin of species, and to convey his (the author's) unbiassed opinion as to how far these views are entitled to their acceptance.

With this object, it may readily be supposed, that the author would find it necessary to impart to his readers some knowledge regarding the past and present condition of organic nature; and, considering the disparity which exists between him and his readers in extent of knowledge and modes of thought, it would have been impossible for him to have performed this portion of his task more efficiently than he has done. Indeed, there is no need for any qualification in our approval; and we are only doing him justice when we say that the combination of popular phraseology with accurate scientific information has never been surpassed, perhaps not equalled in any similar course of scientific lectures of a popular character that has come under our notice.

The mode in which the reader (or hearer) is enabled to carry away with him a simple, yet accurate ideal of the animal frame; and the familiar similes whereby the functions of the living creature are impressed upon the mind are above all praise. In fact, whenever the author attempts to convey to his imperfectly educated hearers (we speak, of course, of their scientific education only) a knowledge of those phenomena in nature which are recognized as *facts*, he does so with admirable tact, and in nearly every case with undeniable accuracy.

Had he confined his labours within these limits, and simply proposed to himself to make his readers and hearers acquainted with the phenomena of nature as they *are*, our criticism would have ended here;



that the window is open, he inspects it, and finds the mark of a dirty hand on the window-frame, and subsequently the impress of a hob-nailed boot outside on the gravel. Of course, he suspects that his plate has been stolen, and the *hypothesis* is that the owner of the dirty hand and hob-nailed boot is the thief. Undeterred by the counter-hypothesis of some kind friend, who suggests the possibility of the laws of nature having been "suspended during the night," and that there might have been "some supernatural interference in the case," he calls in the aid of the police, who track the burglar with the property on his person, and find that the marks correspond with his hands and boots. Under such circumstances, he thinks a jury would verify the hypothesis by convicting the prisoner.

After showing that it was by such hypotheses that Newton and Laplace made their discoveries, and telling his readers that the value of the result of the hypothesis depends upon the pains taken in its verification, he proceeds to say that it is on this inductive method of inquiry he means to consider the state of "our present knowledge of the nature of the processes which have resulted in the present condition of organic nature."

The precise bearing of this anecdote to the point at issue is not given with the story itself, and we shall inquire how far it is applicable to the natural problem before us; supplying what appear to us to be deficiencies, which might not occur to the "working classes."\*

*The Story* :—

1. A gentleman misses his plate, and asks himself what has become of it.
2. He finds evidence of a man having escaped from the window.
3. From this evidence he concludes, or rather forms the hypothesis, that a burglar had stolen his plate, and has escaped from the window; and determined to be guided by this hypothesis, he directs his investigations accordingly.
4. On proceeding in his investigations, he finds the burglar with the property on his person, and has him convicted.

*The Moral* :—

1. A naturalist observes that certain groups called species are related together by structural and functional peculiarities; and he asks himself how these species have originated.
2. He finds that by artificial breeding or selection, man is able to form varieties and races; and that similar influences to that exercised by man are all at work in nature.
3. He conceives the idea of natural selection; and assumes that "species" have thus originated.
4. *To be complete, the moral should conclude thus* :—He investigates the operations of nature; finds species formed by natural selection; and thus realizing his hypothesis, he arrives at a satisfactory solution of his problem.

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\* At p. 137, the author specially refers to this anecdote as constituting a case analogous to the one at issue, namely, the causes of origin of new species.



This we presume should be the *rationale* of the story ; but is it so ?

It is very easy to frame a suppositional argument, carry it to a satisfactory conclusion, and leave the reader to infer that it is precisely analogous to another that is hypothetical ; but the author cannot be surprised if his readers, finding that his analogy does not hold good, should throw away his whole *theory* as worthless ; and we fear that with many it will be so in the present instance. We have no objection to handle the inquiry after the author's own approved fashion ; but we trust he will not object to the introduction of a little fresh evidence and one or two additional witnesses. As it is a serious case, too, and affects the liberty of the subject (for he sentences his man), we hope he will allow us to employ counsel, on our granting him the same privilege. We, too, shall put an hypothesis.

His "objector," who happens to visit him in his trouble, endeavours to dissuade him from calling in the assistance of the police, and does so on the ground that as the spoons were taken away at night, the possibility is that the laws of nature might have been suspended at this season and that there may have been some supernatural interference in the case, into which it would be presumptuous in the owner of the spoons to inquire.

We presume that this means, that as species originated before man appeared on earth, or before the beginning of the historic record, therefore, it is possible that the laws of nature were different then to what they now are ; that species were supernaturally created ; and it would be presumptuous in us to inquire into their origin.

We will now introduce another witness and a fresh element into the inquiry, the nature of which will be fully comprehended from what follows.

Another friend who happens to enter the room just as the owner of the stolen spoons has pushed his first friend aside, and is about to depart in search of the police, and hears what has happened, stops his exit, and says, "Softly, my friend ; I don't put so much faith in the reversal of the order of nature as does your friend there ; but don't be hasty : you are very much agitated in consequence of your loss ; and, perhaps whilst you are running off in search of the police, the thief may be down stairs cleaning your boots, and he or she may take the opportunity to secrete the plate. Just let me see the marks on the window." And it is possible that when he comes to the window, his friend might say, "My good fellow, I always knew you to be an excellent leaper ; but you seem to think there are better than yourself in the world ; for this window is at least thirty feet from the ground, and if the thief did not fall into the area and break his neck, he would certainly be impaled upon the spiked railings beyond. Have you ever tried the experiment yourself?" Now we can imagine our friend of the stolen plate a little puzzled at first, but replying with great confidence : "Well, not exactly ; but it occurs to me that a friend of mine, a much more active man than I am, once tried to get down into the garden, and he succeeded after endless labour and risk in reaching that ledge which projects from the wall about half way down. He came up again and expressed his conviction that the remainder of the descent was feasible also,—and so with your permission I shall go for the police." Well, we may tell our readers frankly that we think this



person was very hasty, and would have done better if he had looked about in his own house, and had sent the most trusty of his servants to seek the police at the same time. We apprehend that if he found a burglar, or a man of notoriously bad character, with the plate upon him, there could be no doubt as to who was the thief, without either the evidence of the dirty hands or footmarks in the garden; but thieves do not generally carry stolen property about with them, especially when it is as heavy as silver plate is usually supposed to be; and we must beg our author to let us presume that the plate was discovered at a pawnbroker's, and that a man with dirty hands and hob-nailed boots was found, whom the pawnbroker believed to be the person that pawned the plate. Now we anticipate that the jury would like to be satisfied—

1st. As to whether this was the man who left his marks on the window.

2nd. Whether the pawnbroker was correct as to the identity of the thief.

For it is just possible that the actual thief may still have been in the house, and may have employed him of the dirty hands and hob-nailed boots to pawn the property for him.

Let us follow the owner of the property. We suppose that although he might think the evidence perfectly clear, he would entrust his case to counsel, and the professional gentleman, not being the victim of the theft, would naturally inquire into all the circumstances, and, amongst others, would hear of the height of the window from the ground; so, too, would the counsel for the defence. But, as our readers know, it is the duty of a barrister to make out his case, and upon his ability to do so under difficulties depends the success of his client. Well, we can imagine the prosecuting counsel being very much puzzled to connect the marks left by the man with the man himself, and endeavouring to get over the difficulty by some such pleading as this:—

“Every portion of the evidence, gentlemen, is quite clear, excepting one link; and this there is good reason to believe is much more tenable than it appears, for a friend of my client once succeeded, though with some difficulty, in getting upon the ledge half-way down, and he has been consulted, and repeats what he said at the time of his experiment, *viz.*, that he is satisfied the thing could be accomplished. My client, who is a clever gymnast himself, thinks the same. And I defy my learned friend, the counsel for the prisoner, to show that it was impossible for the prisoner to have effected his escape to the ledge, and from the ledge to the ground. *We* don't pretend to explain *how* it can be done, but we see every reason to believe that it is possible, and unless my learned friend can prove the contrary, I argue that the *jury* has no other alternative than *to commit the prisoner!*”

Now it appears to us that the best course for the defending counsel to adopt would be to leave the evidence precisely where it stands; and not even to avail himself of the arguments used by the objector on the ground of “supernatural interference,” in the hope that some of the jury might be “orthodox;” for we have little doubt that the prisoner would be



acquitted without much consultation on the part of the jury,—in fact, the verdict would be “Not proven.”

This, as it appears to us, is precisely how the question of the “Origin of Species” stands at present. The chief obstacle which now stands in the way of the acceptance of Mr. Darwin’s theory is, that he has not been able to create a new species by artificial selection. Although he has effected in a few years an approach to that end which, *in nature*, would probably have occupied ages; and although he and others have produced 150 varieties (of pigeons), differing widely from one another, yet in every case these varieties have been fertile with one another, and there has been no approach to sterility.\* Neither can it be shown that “*natural selection*” is anything more than a probability, nor that, in nature, species have been found to cross, excepting (as a general rule) with sterile results.

This is of course the chief interpretation of our supplementary evidence concerning the height of the window from the garden. And now as regards our author’s special pleading. If any one thinks that we have overstated or burlesqued this part of the subject, let him turn to the text,† and there he will find how ingeniously, nay, how plausibly, the author disposes of the difficulty in question, really the crucial test.

The author’s argument is practically as follows. We will test the validity of Mr. Darwin’s theory by a three-fold process:—

1st. We will ask: Do the supposed *causes* of the phenomena exist in nature?

The answer is decidedly affirmative. Atavism, variability, and conditions of existence analogous to those which are operative in artificial breeding, *do* exist in nature.

2nd. Are these causes competent to produce new *species*?

Answer, not quite so confident. *Races* may be thus produced, and it would be very difficult to explain many of the phenomena connected with species in any other manner.

(Is it possible to reach the ground from this window?

Yes; a friend of mine has succeeded in reaching the projecting ledge; besides, there are many circumstances connected with the theft—dirty hands, &c., which could not be otherwise explained.)

But I grant freely that, so far, it has been found impossible to produce infertile hybrids by artificial breeding, and being a *disinterested critic*, I feel bound to confess that it is a serious barrier to the acceptance of the views which I advocate. Still the phenomena of sterility are very capricious. The crucial test *may* be successfully applied, and unless *you* can prove it to be *impossible* you have no right to say it cannot be effected, and to deny the accuracy of my theory, which assumes that this is the normal method by which new species have been produced.

(There is no knowing whether some day or other a person may not manage the leap from the ledge to the ground; and unless *you* can prove that it is an absolute impossibility, you have no right to say that my

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\* This will be more fully explained hereafter. † P. 137.



plate was not stolen by a burglar, who, I believe, *did* effect his escape in this manner, and in justice you ought to transport the man.)

But we have not the space, nor is it needful, we think, to follow the author further in his reasoning. It may have appeared very clear to the "working classes," but it has not satisfied us that there is no alternative between "Darwinism" and "nothing."

Perhaps as we do not ask our readers to bring the "Baconian philosophy" to bear upon this inquiry, the author will allow us to draw their attention to a more modern method of treating this and all similar questions.

*Induction*, we have excellent authority for saying, "consists in stating the facts and the inference in such a manner that the evidence of the inference is *manifest*;" just as the logic of *deduction* "consists in stating the premisses and the conclusion in such a manner that the evidence of the conclusion is manifest." We suspect that if our authority for this definition\* had read these lectures, he would have added, by "*the facts*, I mean all the known facts of importance." In the first case (the story) our author has not stated *all* the facts as they exist, but has assumed some which do not exist; in the second (his logical inquiry) he has glossed over the *importance* of the fact previously omitted, and instead of proving the case has thrown the burden of *disproof* upon his opponents.

But now we come to another inquiry. Does the author accurately state Mr. Darwin's views and inferences concerning the causes of the phenomena of organic nature, and is the author's testimony sufficiently unbiassed to warrant persons who are uninformed on scientific matters in taking him as their guide on the subject? We do not for a moment doubt that he is perfectly sincere in his enunciation of Mr. Darwin's views; but our readers shall also have an opportunity of forming an opinion on the matter, and of judging for themselves as to whether it is best to seek their information at the main stream, or to judge of its proportions from those of its tributaries.

And perhaps it will be better that we should not confine ourselves to the exposition of Mr. Darwin's views coming from a warm advocate; but that, as the opportunity presents itself, we should also lay before them those of an opponent, and they will be somewhat astonished to find how the teachings of the great naturalist have been made the key-note to any melody.

In reviewing a work of a kindred nature to the one before us,† and written by one who also wishes to be regarded as an unprejudiced witness, we deprecated *very mildly* the introduction into such inquiries as these of the *odium theologicum*, in consequence of a charge of materialism brought against Mr. Darwin by the author. He passes sentence upon that eminent naturalist by saying that his theory is "a blind chance process," resembling that of Lamarck, or the author of "The Vestiges;" indeed, he

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\* Dr. Whewell.

† Page's "Past and Present Life of the Globe." Blackwood. Reviewed in "Popular Science Review," No. I.



(Mr. Darwin) merely phrases "in different terms the same materialistic hypothesis." He adduces his evidence in a foot-note, in which he says that in "the whole tenor of the 'Origin of Species' there seems to be a studied non-recognition of any higher influence than chance, external conditions, nature, law, and other kindred activities." In other words, he says that Mr. Darwin is a materialist, who ignores the existence of the Deity; and that the whole tenor of his work shows this to be the case. We will return presently to the statements of this gentleman, who is "*guided solely by a desire to arrive at Truth;*" and who wishes to "*deal charitably towards the opinions of others;*" and will pass on to those, not of an opponent, but a warm partisan—the author of the work under criticism.

Speaking of Mr. Darwin's theory:—"As I apprehend it," says our author, "for I have put it into a shape more convenient for common purposes than I could find *verbatim* in his book; as I apprehend it, I say, it is that *all the phenomena of organic nature, past and present,\** result from, or are caused by, the inter-action of these properties of organic matter which we have called Atavism and Variability, with the Conditions of Existence; or, in other words, given the existence of organic matter, its tendency to transmit its properties, and its tendency occasionally to vary; and lastly, given the conditions of existence by which organic matter is surrounded; that these put together *are the causes of the present and past conditions of organic nature.*"

Judging from the remarkable similarity between these two versions of Mr. Darwin's theory, our readers might be disposed to think that both writers must be correct—the opponent, who stigmatises him as an atheist, or something akin to it; and the advocate, who appears to endorse his views. But we will now let Mr. Darwin speak for himself:—

"I believe † that animals have descended from at most four or five progenitors, and plants from an equal or lesser number. Analogy would lead me one step further, namely, to the belief that all animals and plants have descended from some one prototype. *But analogy may be a deceitful guide.*"‡ . . . (After showing that all living things have certain properties in common) . . . "Therefore I should infer from analogy that *probably* all the organic beings which have ever lived on this earth have descended from some one primordial form, *into which life was breathed.*"

Again:—

"Authors of the highest eminence seem to be fully satisfied with the view that each species has been independently created. *To my mind it accords better with what we know of the laws impressed on matter* BY THE CREATOR *that the production and extinction of the past and present inhabitants of the world should have been due to secondary causes, like those determining the birth and death of the individual.*"||

\* These italics are our own.

† Here also the italics are ours.

‡ Origin of Species, p. 484.

|| Ibid. p. 488.



And thirdly :—

“There is a grandeur in this view of *life* with its several powers, *having been originally breathed into a few forms or into one*; and that whilst this planet has gone cycling on according to the fixed laws of gravity, from so simple a beginning, endless forms most beautiful and most wonderful have been and are being evolved.” \*

The author first referred to, who declares himself to be the seeker of “truth,” and who wishes to deal “*charitably* towards the opinions of others,” has in his work quoted the last extract, in which our readers will perceive that the Creator is *referred to*, but not named; but he sedulously avoids noticing the second paragraph, which he might have found (if he did not find it) on the preceding page; and although he condescendingly gives Mr. Darwin credit for *geniality*, as evinced in the paragraph last quoted, and the context; yet he condemns him for appealing to *chance* and *nature* (not to *prescience* and *Almighty Power*, mark!) for all subsequent development, “as if these blind deities † were aught without the direction of the same original life-breathing impulse!” *Ergo, Mr. Darwin is a materialist.* Now, without expressing our individual opinion (which may or may not, for causes other than those under consideration, be at variance with Mr. Darwin’s), we would ask our readers to say honestly, who has formed the highest conception of the Creator, he who believes that the Deity said, “Let it be,” and so it is for ever; or he who believes that the command is *of no avail* unless the Lawgiver watches for ever over the execution of His laws, lest they should vary or be broken?

As to the misrepresentation, we say nothing. Our readers well know how to value the testimony of such a witness for the future. One thing is quite certain. A proceeding of this kind is by no means calculated to enforce a recognition of the hand of the Creator in His works.

But if this writer has misconstrued Mr. Darwin, we think our readers will agree with us that Professor Huxley has been far from happy in *his* interpretation of the views of that eminent naturalist, and that neither commentator has conferred a benefit on the object of his criticisms.

Mr. Darwin does *not* say, “given the origin,” or “given the existence of organic matter, its tendency to transmit its properties, &c.” . . . . “these are the causes of the present and past conditions of organic nature.”

What he does say, we have given in his own words, and it is unnecessary to repeat them. He modestly expresses his conviction in a certain theory in regard to the production of all species, past and present, from a few forms, and draws attention to the fact that the same reasoning might lead to the belief that all are descended from one prototype. He shows that the phenomena which form the basis of his belief are due to secondary causes; but he has taken care to let his readers distinctly understand that he has never lost sight of the Great First Cause, speaking with

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\* P. 490.

† There is nothing in Mr. Darwin’s work to warrant this expression: “These obedient servants” would have been correct.



becoming modesty and caution of the laws which he sees operating in nature, and only approaching the Lawgiver with reverence at the conclusion of his labours to pay him his tribute of praise in what appears to him to be the most fitting manner. His interpreter, or critic, whichever our author claims to be, whilst he confounds the naturalist's inference as to what is *probable*, with his belief, founded upon actual observation, concerning secondary causes, totally ignores the author's reference to the First Cause.

Mr. Darwin addresses the world of science; and he does so, as we just observed, modestly, cautiously, and with due regard to the difficulties that militate against the acceptance of his own theory. *In fact, he is by far the fairest critic who has ever dealt with the views that he himself has propounded.*

His interpreter to the *working classes*, and to many very young students, harangues these with great ability, and with unbounded confidence in his own opinion concerning all that his author believes, and all that he supposes him to believe in regard to secondary causes; but in his address he completely ignores his reference to the Creator.

It is about seventy years since a remarkably able French naturalist, Lamarck, drew attention to what we may call the "theory of progressive development" in the animal races; but his method of explaining the visible phenomena has not been deemed satisfactory. He was unable to show "experimentally that even races could be produced" as *he* supposes species to have originated. Now another naturalist, of equal ability, has shown that, under certain conditions,\* races *can* be produced artificially; but he has not been able to evolve a new species from a variety, and his theory is admitted by himself to be imperfect. On this second attempt to solve the mystery of nature, our author steps forward and says to the masses (many of whom have never before heard the name of Lamarck mentioned), "Lamarck was a speculator (not quite such an objectionable one as some one else whom he names) and his theory has pretty well dropped into oblivion, as it deserved to do. Put him on the shelf, and if persons tell you that Mr. Darwin is groping towards truth as he did, I won't instruct you what to think of their judgment, but will leave you to think what you like, and *believe in Darwin*. 'Darwinism, or nothing,' is my motto—to-day—but, mind, I don't pledge myself to him, and should anything turn up to-morrow, that appears to serve our purpose better, I shall come and tell you so." We confess we cannot hold our beliefs with such a "light hand," and "part with them as cheerfully" as does the author, "the moment they are proved contrary to fact, great or small," and we repeat, that for the present, we prefer Nothingism to "Darwinism." Thus, at least, we shall retain our judgment for any emergency that may arise hereafter.

Whilst referring to "isms," we cannot refrain from mentioning that there

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\* To understand this question properly, and judge of the difference between the views of Lamarck and Darwin, the reader should carefully consider both, as there are similarities between them which do not appear on the surface.



are expressions in the work before us which are calculated to bring it into connection with an "ism" of a most unenviable kind, and the author and our readers shall judge for themselves whether or not we are right in saying that they are *ill-chosen*, in addressing the "working classes." In speaking of the limits of human inquiry,\* he says, that all our knowledge and all our investigation cannot take us beyond the limits set by the finite and restricted character of our faculties (a declaration, by the way, *hardly* in accordance with what he has said of man elsewhere†), "or destroy the endless unknown which accompanies, *like its shadow*, the endless procession of phenomena."

Let it be clearly understood that we do not, even by inference, desire to bring the grave charge against our author, which is so thoughtlessly bandied about by the ignorant or bigoted, a proceeding which we have ourselves deprecated in another; but we repeat, that this and similar expressions are *ill-chosen* in an address to the working classes.

And now, turning again to facts. Mr. Darwin has very properly said that there are "many and grave objections" which may be advanced against his theory; but we must add that there are also many striking facts which point to the special formation of new species from varieties—but not under the conditions and through the agencies attributed to Nature by Mr. Darwin.

In treating of the *origin* of varieties, Professor Huxley speaks of the birth of a six-fingered human being, and also of the production of a remarkable variety of sheep. These cases the author refers to "spontaneous variation," but he is so wedded to his adopted theory, that they do not suggest to him anything beyond chance. They are "accidental variations." This may be so, or it may not; but we will grant that it is so. Is there nothing to be learned from the *first appearance* of these "monstrosities?" If "Darwinism" be unable to account for these mysterious apparitions in nature, may they not serve as a clue to something higher than "Darwinism?"

Apparently the six-fingered man is really a monstrosity—and his appearance proves nothing more than that an unprecedented and apparently inexplicable change may take place in nature, and what the author would call an abnormal feature may appear to be perpetuated.

Of the long-bodied, bow-legged sheep, it can hardly be said that it was a *monstrosity*,—if so, it was a most convenient one to its owner, for it was just as useful to him as if he had *designedly* made such a sheep! Monstrosity or not, it was a very useful variation in the breed, with which (as far as evidence shows) neither atavism, variability (strictly speaking), nor the conditions of existence, had anything to do; yet it was remarkably adapted to the requirements of its owner and to the conditions in which he found it, and he therefore proceeded at once to perpetuate its peculiarities and form a new race. If we are to reason from art to nature,

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\* P. 135.

† "Natural History Review," No. I. (1861), p. 67, line 22, "The only earthly being of *practically unlimited* powers."



or, more correctly speaking, from the human to the Divine, then we have here a clue to the mode in which a new species *may* have been brought into existence when circumstances required it. The *type* is here created in complete adaptation to external circumstances, and is then, by external conditions (the hereditary transmission of peculiarities, &c.), perpetuated as a race.

We recommend to the earnest consideration of our author the question of "spontaneous variation."

Pasteur's experiments can hardly be said to have given the *coup de grace* to the theory of "*spontaneous generation*,"\* for some months before the author delivered these lectures, Professor Wyman, of Boston, had published his experiments (which were a repetition of those of Pasteur), with precisely the opposite result at which the French chemist had arrived. And, moreover, if *man* succeeds in making a living protozoon or protophyte out of inorganic substances,—a possibility which, according to the author's views, may be realised before fifty years have elapsed,—this "direct method" will be the strongest evidence that the Creator still continues to supply the earth's surface with the germs of these lowly forms through the operations of nature; for where are the necessary conditions the most likely to exist?—most certainly in nature, according to the author's view of the Darwinian hypothesis.†

Speaking of Professor Wyman, we do not exactly see the applicability of the author's reference to that gentleman's anecdote of the "Paint-root" and the "black pigs," with regard to natural selection.‡

The argument is that the most minute cause will sometimes save a species from extermination, and a case of "selection of colour" is here mentioned; namely, that in a locality where a certain root grows in Florida it has killed all the *white* pigs which have fed upon it (their hoofs cracking before death), whilst to the *black* pigs it is innocuous; consequently black pigs only are to be found there. Are we to understand that the black colour of the pigs is the "minute circumstance" which saved their lives? We cannot read it otherwise; yet it appears to us highly probable that the colour had nothing whatever to do with the phenomenon, but that it was only an unimportant concomitant of some very important difference between the two kinds of pigs, of which the narrators (the inhabitants) were ignorant. There are certain substances which act as poisons if taken by the lower animals, but are harmless to higher forms of life. This we presume is due to some very important physiological difference between them; and is it not merely an extension of the *actual* (not the alleged) cause that saved the black pigs?

*Geological and Palæontological Records.*§—The author tells us that in

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\* As stated at p. 82.

† It must not be understood that from this we advocate the theory of "spontaneous generation;" we are simply considering it from the author's point of view.

‡ Pages 130, 131. This is Mr. Darwin's argument.

§ Page 31, et seq.



these records there can be no cavilling, as in the histories of human origin "Nature's records," he says, "are laid clearly before us, and the facts state themselves; the question of the credibility of the natural record will require but little consideration.

We are at a loss to know why this statement was advanced by the author. It leads the reader to suppose that there can be no quibbling in regard to geological or palæontological evidence, but the sequel shows that not only is that evidence very scanty, but what there is of it is liable to extreme misinterpretation. He even goes so far as to say that if man had access "to every part of the earth (instead of only to 'about the 140,000th part of the accessible earth'), and had made sections of the whole, and put them all together, even then his record must of necessity be imperfect."

The fact is that the records of nature pretty much resemble those of man; and a comparison of the two records is calculated to impress even the most sceptical with the wonderful unity and all-pervading influence exercised by that Eternal Mind, which is gradually initiating us into the mysteries of nature, and instructing us in regard to the history of the universe.

In the world's physical history we have certain grand, well-defined eras; and so also in the history of our race. Strata, whose characters are unmistakeable stand side by side with dynasties and empires, regarding which we have an extensive fund of general knowledge. How long the strata were in arriving at their present state, or for what length of time they were uppermost, is at present very doubtful; what numbers of centuries the empires or dynasties were dominant, or the period which elapsed between their rise and fall, is in many cases equally debateable.

So, too, we have well-marked records of the animals which inhabited the globe during the depositions of the various strata; and their remains enable us to reconstruct and vivify and compare each group with its predecessors, or with those that succeeded them. The same obtains in human history, where sepulchres, mummies, hieroglyphics, arms, implements, and other antiquarian treasures are the indestructible traces which enable us once more to recall the different peoples to life, and to study their character and instincts. In both classes of facts our knowledge is daily increasing, and no one can with justice say that one record is more reliable than the other, nor predict with safety that "all human knowledge must stop somewhere."

When the author gives a "practical" definition of "species" (one, by the way, which is very convenient for his argument), and falls back completely upon structural differences; and when he states that "whether a physiological test between species exist or not, it is hardly ever applicable by the practical naturalist;"\* he should remember that as his definition was derived from animals "in a state of nature," it is only right to ascertain whether or not Nature herself applies a test of species. Or, to speak more plainly, whilst he was careful not to omit the mention of any

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\* P. 109.



evidence which he could find in artificial breeding, or in nature, to show that animals might be and have been produced by his process of selection, which differ from another so widely in their *structure* as to constitute *apparent* species, would it not have been fair to such of his readers and hearers as are uninformed on the subject, to lay stress upon those *obstacles* presented by Nature herself to the amalgamation of *acknowledged* species? Is it not a fact that the higher animals are endowed with instincts (*functional* attributes so to speak) which act as a repelling influence between species and prevent them from breeding *at all*,\* and are not the lower forms of existence (such as insects) actually furnished with appendages, *structural* peculiarities, which render a fusion of species *absolutely impossible*?

Indeed, leaving the domestic animals out of the question, and putting that stock-example the Rock pigeon aside for a moment, we would ask our author whether there is any property of "species" in nature, any one of its numerous designations so prominent and immutable as the physiological bar to cross-breeding. This may or may not affect the question at issue, but when the author dwells upon the "capricious character of sterility," and rakes up all the evidence he can find in favour of a theory which he is subjecting to a "critical examination," it appears but just to his hearers to tell them not only what is abnormal, but also what is almost the undeviating rule in nature. For after all it must be remembered that Mr. Darwin seeks to prove that new species have been found in *nature* and by *natural* selection; and even if he produces a new species by artificial breeding, "analogy may be a deceitful guide."

And now, finally, we come to the question of Man; a subject which we approach with "humility and hesitation" akin to that which the author experienced when he dealt with the "great art and mystery" of pigeon breeding, and one upon which in all earnestness "a man must not speak lightly."

The author believes that man is an improvement from some lower animal; but in this he tells us that he is expressing not Mr. Darwin's, but his own view; and he proceeds, popularly and very briefly, to communicate to the masses his well-known opinions on this subject.

Here, again, we confess ourselves greatly disappointed. There can be no doubt that the author carries with him the approval of a large number of the leading physiologists of the day in his views concerning the alleged *structural* differences between man and the ape; but from the illustration before us we should say that it is an easier task for him to pull down an edifice than it is to build it up afresh with the old materials.

Man is no longer to be judged by structural peculiarities, he tells us; and first he proceeds to drive his opponents out of the field before installing himself in their place, and introducing a new *régime*.

He has been asked, he says, how he accounts for the vast intellectual

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\* We lay stress upon these words, because the author does mention that the results of an intercrossing of species produces different results (when it occurs) to that of varieties.



difference that exists between man and the ape, as compared with the almost imperceptible structural variations between them; whilst at the same time he affirms that all functions—intellectual, moral, &c.—are the *result of structures*.

Here is the reply:—

There is a great misconception as to the “real relations which exist between structure and function, between mechanism and work.” Although one is related to the other, function being “the expression of molecular forces and arrangements,” yet it does not follow that one must keep pace with the other; and if it could be shown “that a variation in function which follows on a variation in structure may be enormously greater than the variation in structure, then, you see, the objection falls to the ground.”

But of course this is an “hypothesis,” and one which, it might be thought, could easily be proved by natural phenomena in the same manner as the Darwinian hypothesis. The author, however, prefers having recourse to the mechanical world for his evidence, and proceeds to tell his hearers that he will take two watches, “made by the same maker, and as completely alike as possible, and, laying them side by side, will set them going.” He then, with the aid of a pair of pliers, “just lightly crushes together the bearings of the balance-wheel” of one of them, and the watch so treated will cease to go. Thus, he says, a “slight structural alteration” leads to “an infinite difference in the performance of the functions of these two instruments.”

Passing from mechanical art to the natural world, he says that it is the power of speech which makes man what he is; that a slight imperfection or derangement in his organs of speech would make man dumb; that “a race of dumb men, deprived of all communication with those who could speak, would be little indeed removed from the brutes;” and that “the moral and intellectual difference between them (such men) and ourselves would be practically infinite, whilst the naturalist would not be able to find a single shadow of even specific structural difference.”

The author has expressed such contempt for “inductive and deductive philosophy” (and perhaps with justice, in speaking to the working classes), that we feel almost disposed to follow his directions and weigh his argument, as he endeavoured to test Mr. Darwin’s hypothesis—namely, by analogies in every-day life. But we have no more space for long stories, so we must be excused if we in this instance revert to the old system, and thus endeavour to ascertain whether the reasoning is sound and conclusive, and whether the propositions are based upon facts.

This appears to be the author’s argument:—

- 1st. Slight variations in structure may produce immense differences in the accompanying function, which is the expression of structure.
- 2nd. Of two watches made exactly alike, you may stop the function of one (which function is its rate of going) by slightly altering its mechanism. *And, again,* speech is the function which distinguishes man from the brutes, and speech is the result of a slight structural attribute, which, being deranged or rendered imperfect, induces dumbness.
- 3rdly. Therefore, a trifling difference in the structure of man (the im-



perceptible change which might be caused in his glottis) is followed by an infinite variation in function (speech or dumbness, as the case may be, and its results).

As in the former case, the argument may seem clear and conclusive to our author ; but it is not so to our apprehension.

The first proposition, which it is unnecessary to repeat, is denied by his opponents, or rather he undertakes to prove its accuracy, and that he seeks to do in his second. But his second does not appear to us to consist of facts, for in dealing with the watches he neither brings about a structural alteration, such as he requires for his argument, nor does that alteration result in a variation in functional *action* (for that is the point at issue). He simply *injures* the mechanism, and completely arrests, or destroys, its functional action. If the author had shown that by effecting some imperceptible change in the mechanism of one watch, he could make it go *immeasurably faster* than the other, then his simile would have been appropriate ; but we could not have accepted it as evidence in favour of his argument. It would *then* only have been a simile ; but as it now stands, it is not even a pertinent one. Had the author told us to place by the side of these watches two men made by the same Maker, and as completely alike as possible ; and that if we or the Maker (the Maker in preference, as He understands His handiwork the best) were to derange some minute vital organ, he would cease to live, and that all his vital functions would be stopped, we should have said that the analogy holds good, and should have seen in it an evidence of the feeble tie that unites body and soul. But as it stands, it does not bring us a step nearer to a conclusion, being simply irrelevant, and we must pass it by ; and proceeding to the natural illustration, man's speech, we take exception to it on the ground that it assumes as a fact what is not so, namely, that it is speech which "constitutes and makes man what he is," &c.

In the first place, speech is a mere instrument of the mind ; and, secondly, it is not by any means so infallible an instrument as the hand (aided, of course, by the chisel, the pen, or the pencil). It is certainly not tradition which has "enabled man to record his experience," and constituted him what he is at present. And, finally, it is very doubtful whether a race of dumb men, circumstanced as the author states, would be so degraded as he seems to think. Their progress would be slow, but their human attributes would not be extinguished by the absence of this one faculty.\*

Now if these exceptions which we have made to the author's propositions be well grounded, he has simply failed (as far as his examples go) to prove that a "variation in function, which follows on a variation in structure, may be enormously greater than the variation in structure ;" but if he had proved this exceptional law (and we apprehend that the author does not regard it as a *general* one), still we should have protested

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\* We should add that precisely the same mode of treatment has been adopted by the author in dealing with his *men*, as with his *watches*. He does not bring about an immense variation in function ; but, as in the case of the watches, he completely *stops* the functions of one of them.



against its application to the nature of man, in the sense in which the author applies it ; namely, that the advantage which he has over the lower animals in being able to speak, “constitutes and makes him what he is ;” and we believe that in so doing we should have the approval of our readers ; and perhaps, after mature consideration, that of our author.

In another place,\* we thus endeavoured, in a familiar manner, to point out the characteristic which distinguishes man from the lower animals :—

“The advocates of such theories as that of Darwin, and those who refuse to acknowledge some trifling attribute of man’s bodily nature as a sufficient evidence to justify his severance from the lower animals, are even in this enlightened age branded as heretics and infidels, and the more charitably disposed speak of their doctrines in a fearful whisper. But is it not far more ‘orthodox’ to discard such trifling considerations, and seek the true characteristics of our race in those *mental* attributes by virtue of which man towers so high above his inferior companions on earth ? Is not the power to write the name of his Maker a more obvious distinction than the ‘opposable thumb’ with which he holds his pen to perform the act ? Are not the mental qualities that enable him to appreciate the beneficence of that Maker far more important attributes of his nature than any trifling peculiarity in the temporary and perishable organ by which his mind operates ?”

In the same place, too, we referred with satisfaction to the opinions of one who claims a higher title to be heard on such matters than we do ; and the particular expression which seemed to call for our approval was this :—

“For whether, as some think, man is by his origin distinct from all other living beings, or whether, as others suppose, he is the result of the modification of some other mammal, his duties and his aspirations must, I apprehend, remain the same. The proof of his claim to independent parentage will not change the brutishness of man’s lower nature ; nor, except to those valet souls who cannot see greatness in their fellow because his father was a cobbler, will the demonstration of a pithecoïd pedigree† one whit diminish man’s divine right of kingship over nature, nor lower the princely dignity of perfect manhood, which is an order of nobility, not inherited, but to be won by each of us, as he consciously seeks good and avoids evil, and puts the faculties with which he is endowed to their fittest use.”

In this definition of the nature of man, as compared with the lower animals, no reference is made to his organ of speech ; but his characteristic attributes are found in the *mind*, and in his conscious power of discriminating between right and wrong. His prerogative is not any unimportant structural feature, nor yet his function of speech—it is his *moral nature*, and we accepted this definition from its author, Professor Huxley,‡ as an earnest of something nobler that was concealed in the background.

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\* The *Times*, April 3, 1861. “Natural History,” by John Hunter : a Review.

† *i.e.*, descent from the ape.

‡ “Natural History Review,” No. I., 1861, p. 67.



But in the present work we seek in vain for the recognition of man's religious nature, and we are tempted to inquire whether the conviction of his "pithecoïd pedigree" has, after all, entailed with it a less noble estimate of his character, in contradiction to the very principles laid down in the foregoing extract, and whether we are to understand that he is now hung up a little higher than the parrot and the jackdaw. We prefer, however, to abide by the old definition of years gone by, and to hope on for a recognition of his noblest attribute—his faith in, and reverence for, an invisible Creator.

And, finally, we must be excused if we indulge in a little personality, which is indispensable to a full statement of our reasons for having given such prominence to this little work.

Had it emanated from an ignorant fanatic, or from some unknown scribbler, who would seek through the enunciation of extreme views to obtain notoriety where fame was unattainable, we should have ignored its existence. But it is not so; and if we may judge by rumour—

"A pipe,  
Blown by surmises, jealousies, conjectures,"

and not usually given to undeserved laudation, the author of this treatise is a gentleman who, through the affection which he inspires in his students (young men whose opinions will mould the fair form of Science, God's handmaid, in the future, and *to whom Mr. Darwin appeals for judgment on his labours*), through his generosity and kindness to rising men of his own profession, and through his daily increasing fame arising from his researches in the field of science, is likely to exercise a wide and permanent influence on every class of society. We should be undeserving, therefore, of the confidence to which we aspire, if we failed to direct public attention to what appears to us unsound reasoning in a work written by such a man, and directed to the particular class for whose instruction these lectures have been published.

POSTSCRIPT.—Since the foregoing notice was concluded, we have received Professor Huxley's work on "Man's Place in Nature." We, of course, reserve our judgment on its merits until we have read it carefully. Meanwhile, we may mention that whilst the author employs more caution in speaking of Mr. Darwin's hypothesis in this later work, which is intended for scientific men and the general public, yet a hasty glance over its contents affords us no opportunity of recalling anything that we have said concerning the one here reviewed, which was specially addressed to the working classes.

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