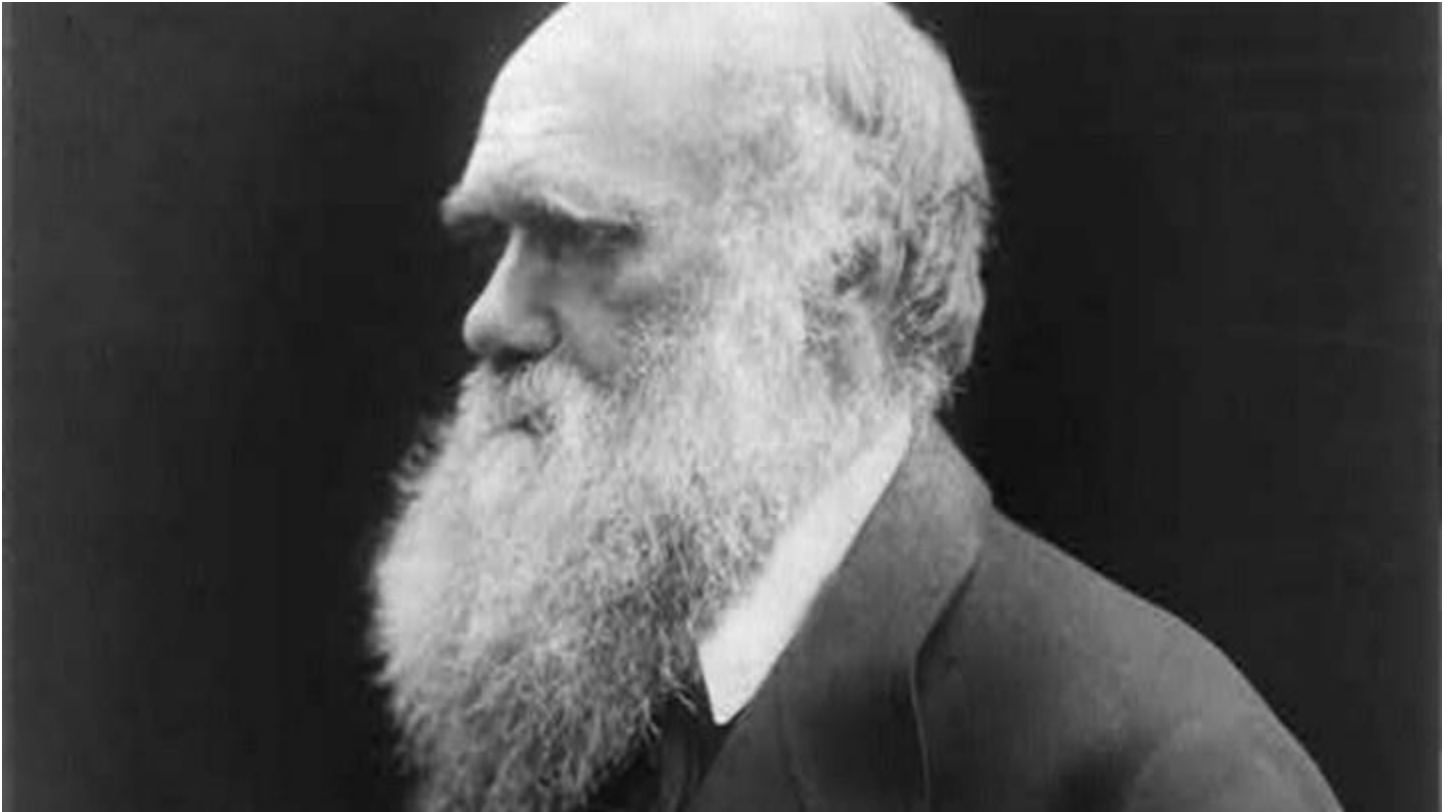


Darwin on the Origin of Species

A book review



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Novelties are enticing to most people: to us they are simply annoying. We cling to a long-accepted theory, just as we cling to an old suit of clothes. A new theory, like a new pair of breeches, ("The Atlantic" still affects the older type of nether garment,) is sure to have hardfitting places; or even when no particular fault can be found with the article, it oppresses with a sense of general discomfort. New notions and new styles worry us, till we get well used to them, which is only by slow degrees.

Wherefore, in Galileo's time, we might have helped to proscribe, or to burn had he been stubborn enough to warrant cremation—even the great pioneer of inductive research; although, when we had fairly recovered our composure, and had leisurely excogitated the matter, we might have come to conclude that the new doctrine was better than the old one, after all, at least for those who had nothing to unlearn.

Such being our habitual state of mind, it may well be believed that the perusal of the new book "On the Origin of Species by Means of Natural Selection" left an uncomfortable impression, in spite of its plausible and winning ways. We were not wholly unprepared for it, as many of our contemporaries seem to have been. The scientific reading in which we indulge as a relaxation from severer studies had raised dim forebodings. Investigations about the succession of species in time, and their actual geographical distribution over the earth's surface, were leading up from all sides and in various ways

to the question of their origin. Now and then we encountered a sentence, like Professor Owen's "axiom of the continuous operation of the ordained becoming of living things," which haunted us like an apparition. For, dim as our conception must needs be as to what such oracular and grandiloquent phrases might really mean, we felt confident that they presaged no good to old beliefs. Foreseeing, yet deprecating, the coming time of trouble, we still hoped, that, with some repairs and make-shifts, the old views might last out our days. *Après nous le deluge*. Still, not to lag behind the rest of the world, we read the book in which the new theory is promulgated. We took it up, like our neighbors, and, as was natural, in a somewhat captious frame of mind.

Well, we found no cause of quarrel with the first chapter. Here the author takes us directly to the barn-yard and the kitchen-garden. Like an honorable rural member of our General Court, who sat silent until, near the close of a long session, a bill requiring all swine at large to wear pokes was introduced, when he claimed the privilege of addressing the house, on the proper ground that he had been "brought up among the pigs, and knew all about them,"—so we were brought up among cows and cabbages; and the lowing of cattle, the cackling of hens, and the cooing of pigeons were sounds native and pleasant to our ears. So "Variation under Domestication" dealt with familiar subjects in a natural way, and gently introduced "Variation under Nature," which seemed likely enough. Then follows "Struggle for Existence,"— a principle which we experimentally know to be true and cogent,— bringing the comfortable assurance, that man, even upon Leviathan Hobbes's theory of society, is no worse than the rest of creation, since all Nature is at war, one species with another, and the nearer kindred the more internecine,—bringing in thousand-fold confirmation and extension of the Malthusian doctrine, that population tends far to outrun means of subsistence throughout the animal and vegetable world, and has to be kept down by sharp preventive checks; so that not more than one of a hundred or a thousand of the individuals whose existence is so wonderfully and so sedulously provided for ever comes to anything, under ordinary circumstances; so the lucky and the strong must prevail, and the weaker and ill-favored must perish;— and then follows, as naturally as one sheep follows another, the chapter on "Natural Selection," Darwin's cheval de bataille, which is very much the Napoleonic doctrine, that Providence favors the strongest battalions, that, since many more individuals are born than can possibly survive, those individuals and those variations which possess any advantage, however slight, over the rest, are in the long run sure to survive, to propagate, and to occupy the limited field, to the exclusion or destruction of the weaker brethren. All this we pondered, and could not much object to. In fact, we began to contract a liking for a system which at the outset illustrates the advantages of good breeding, and which makes the most "of every creature's best."

Could we "let by-gones be by-gones," and, beginning now, go on improving and diversifying for the future by natural selection,— could we even take up the theory at the introduction of the actually existing species, we should be well content, and so perhaps would most naturalists be. It is by no means difficult to believe that varieties are incipient or possible species, when we see what trouble naturalists, especially botanists, have to distinguish between them,— one regarding as a true species what another regards as a variety; when the progress of knowledge increases, rather than diminishes, the number of doubtful instances; and when there is less agreement than ever among naturalists as to what the basis is in Nature upon which our, idea of species reposes, or how the word is practically to be defined. Indeed, when we consider the endless disputes of naturalists and ethnologists over the human races, as to whether they belong to one species or to more, and if to more, whether to three, or five, or fifty, we can hardly help fancying that both may be right,— or rather, that the unihumanitarians would have been right several thousand years ago, and the multihumanitarians will be a few thousand years later; while at present the safe thing to say is, that, probably, 'there is some truth on both sides. "Natural selection," Darwin remarks, "leads to divergence of character; for more living beings can be supported on the same area the more they diverge in structure, habits, and constitution," (a principle which, by the way, is paralleled and illustrated by the diversification of human labor,) and also leads to much extinction of intermediate or unimproved forms. Now, though

this divergence may "steadily tend to increase," yet this is evidently a slow process in Nature, and liable to much counteraction wherever man does not interpose, and so not likely to 'work much harm for the future. And if natural selection, with artificial to help it, will produce better animals and better men than the present, and fit them better to "the conditions of existence," why, let it work, say we, to the top of its bent. There is still room enough for improvement. Only let us hope that it always works for good: if not, the divergent lines on Darwin's diagram of transmutation made easy ominously show what small deviations from the straight path may come to in the end.

The prospect of the future, accordingly, is on the whole pleasant and encouraging. It is only the backward glance, the gaze up the long vista of the past, that reveals anything alarming. Here the lines converge as they recede into the geological ages, and point to conclusions which, upon the theory, are inevitable, but by no means welcome. The very first step backwards makes the Negro and the Hottentot our blood-relations; — not that reason or Scripture objects to that, though pride may. The next suggests a closer association of our ancestors of the olden time with "our poor relations" of the quadrumanous family than we like to acknowledge. Fortunately, however,— even if we must account for him scientifically,—man with his two feet stands upon a foundation of his own. Intermediate links between the *Bimana* and the *Quadrumana* are lacking altogether; so that, put the genealogy of the brutes upon what footing you will, the four-handed races will not serve for our forerunners;— at least, not until some monkey, live or fossil, is producible with great-toes, instead of thumbs, upon his nether extremities; or until some lucky 'geologist turns up the bones of his ancestor and prototype in France or England, who was so busy "napping the chuckie-stanes" and chipping out flint knives and arrow-beads in the time of the drift, very many ages ago,—before the British Channel existed, says Lyell,¹— and until these men of the olden time are shown to have worn their great-toes in a divergent and thumblike fashion. That would be evidence indeed: but until some testimony of the sort is produced, we must needs believe in the separate and special creation of man, however it may have been with the lower animals and with plants.

No doubt, the full development and symmetry of Darwin's hypothesis strongly suggest the evolution of the human no less than the lower animal races out of some simple primordial animal,— that all are equally "lineal descendants of some few beings which lived long before the first bed of the Silurian system was deposited."

But, as the author speaks disrespectfully of spontaneous generation, and accepts a supernatural beginning of life on earth, in some form or forms of being which included potentially all that have since existed and are yet to be, he is thereby not warranted to extend his inferences beyond the evidence or the fair probability. There seems as great likelihood that one special origination should be followed by another upon fitting occasion, (such as the introduction of man,) as that one form should be transmuted into another upon fitting occasion, as, for instance, in the succession of species which differ from each other only in some details. To compare small things with great in a homely illustration: man alters from time to time his instruments or machines, as new circumstances or conditions may require and his wit suggest. Minor alterations and improvements he adds to the machine he possesses: he adapts a new rig or a new rudder to an old boat: this answers to variation. If boats could engender, the variations would doubtless be propagated, like those of domestic cattle. In course of time the old ones would be worn out or wrecked; the best sorts would be chosen for each particular use, and further improved upon, and so the primordial boat be developed into the scow, the skiff, the sloop, and other species of water-craft, the very diversification, as well as the successive improvements, entailing the disappearance of many intermediate forms, less adapted to any one particular purpose; wherefore these go slowly out of use, and become extinct species: this is *natural selection*. Now let a great and important advance be made, like that of steam-navigation: here, though the engine might be added to the old vessel, yet the wiser and therefore the actual way is to make anew vessel on a modified plan: this may answer to *specific creation*. Anyhow, the one does not

necessarily exclude the other. Variation and natural selection may play their part, and so may specific creation also. Why not?

This leads us to ask for the reasons which call for this new theory of transmutation. The beginning of things must needs lie in obscurity, beyond the bounds of proof, though within those of conjecture or of analogical inference. Why not hold fast to the customary view, that all species were directly, instead of indirectly, created after their respective kinds, as we now behold them, -and that in a manner which, passing our comprehension, we intuitively refer to the supernatural? Why this continual striving after "the unattained and dim,"— these anxious endeavors, especially of late years, by naturalists and philosophers of various schools and different tendencies, to penetrate what one of them calls "the mystery of mysteries," the origin of species? To this, in general, sufficient answer may be found in the activity of the human intellect, "the delirious yet divine desire to know," stimulated as it has been by its own success in unveiling the laws and processes of inorganic Nature, -in the fact that the principal triumphs of our age in physical science have consisted in tracing connections where none were known before, in reducing heterogeneous phenomena to a common cause or origin, in a manner quite analogous to that of the reduction of supposed independently originated species to a common ultimate origin, -thus, and in various other ways, largely and legitimately extending the domain of secondary causes. Surely the scientific mind of an age which contemplates the solar system as evolved from a common, revolving, fluid mass, — which, through experimental research, has come to regard light, heat, electricity, magnetism, chemical affinity, and mechanical power as varieties or derivative and convertible forms of one force, instead of independent species, — which has brought the so-called elementary kinds of matter, such as the metals, into kindred groups, and raised the question, whether the members of each group may not be mere varieties of one species, - and which speculates steadily in the direction of the ultimate unity of matter, of a sort of prototype or simple element which may be to the ordinary species of matter what the *protozoa* or component cells of an organism are to the higher sorts of animals and plants, — the mind of such an age cannot be expected to let the old belief about species pass unquestioned. It will raise the question, how the diverse sorts of plants and animals came to be as they are and where they are, and will allow that the whole inquiry transcends its powers only when all endeavors have failed. Granting the origin to be supernatural, or miraculous even, will not arrest the inquiry. All real origination, the philosophers will say, is supernatural; their very question is, whether we have yet gone back to the origin, and can affirm that the present forms of plants and animals are the primordial, the miraculously created ones. And even if they admit that, they will still inquire into the order of the phenomena, into the form of the miracle. You might as well expect the child to grow up content with what it is told about the advent of its infant brother. Indeed, to learn that the new-comer is the gift of God, far from lulling inquiry, only stimulates speculation as to how the precious gift was bestowed. That questioning child is father to the man, - is philosopher in short-clothes.

Since, then, questions about the origin of species will be raised, and have been raised, — and since the theorizings, however different in particulars, all proceed upon the notion that one species of plant or animal is somehow derived from another, that the different sorts which now flourish are lineal (or unlineal) descendants of other and earlier sorts, — it now concerns us to ask, What are the grounds in Nature, the admitted facts, which suggest hypotheses of derivation, in some shape or other? Reasons there must be, and plausible ones, for the persistent recurrence of theories upon this genetic basis. A study of Darwin's book, and a general glance at the present state of the natural sciences, enable us to gather the following as perhaps the most suggestive and influential. We can only enumerate them here, without much indication of their particular bearing. There is, -

1. The general fact of variability; the patent fact, that all species vary more or less; that domesticated plants and animals, being in conditions favorable to the production and preservation of varieties, are apt to vary widely; and that by interbreeding, any variety may be fixed into a race, that is, into

a variety which comes true from seed. Many such races, it is allowed, differ from each other in structure and appearance as widely as do many admitted species; and it is practically very difficult, perhaps impossible, to draw a clear line between races and species. Witness the human races, for instance. Wild species also vary, perhaps about as widely as those of domestication, though in different ways. Some of them appear to vary little, others moderately, others immoderately, to the great bewilderment of systematic botanists and zoologists, and their increasing disagreement as to whether various forms shall be held to be original species or marked varieties. Moreover, the degree to which the descendants of the same stock, varying in different directions, may at length diverge is unknown. All we know is, that varieties are themselves variable, and that very diverse forms have been educed from one stock.

2. Species of the same genus are not distinguished from each other by equal amounts of difference. There is diversity in this respect analogous to that of the varieties of a polymorphous species, some of them slight, others extreme. And in large genera the unequal resemblance shows itself in the clustering of the species around several types or central species, like satellites around their respective planets. Obviously suggestive this of the hypothesis that they were satellites, not thrown off by revolution, like the moons of Jupiter, Saturn, and our own solitary moon, but gradually and peacefully detached by divergent variation. That such closely related species may be only varieties of higher grade, earlier origin, or more favored evolution, is not a very violent supposition. Anyhow, it was a supposition sure to be made.
3. The actual geographical distribution of species upon the earth's surface tends to suggest the same notion. For, as a general thing, all or most of the species of a peculiar genus or other type are grouped in the same country, or occupy continuous, proximate, or accessible areas. So well does this rule hold, so general is the implication that kindred species are or were associated geographically, that most trustworthy naturalists, quite free from hypotheses of transmutation, are constantly inferring former geographical continuity between parts of the world now widely disjoined, in order to account thereby for the generic similarities among their inhabitants. Yet no scientific explanation has been offered to account for the geographical association of kindred species, except the hypothesis of a common origin.
4. Here the fact of the antiquity of creation, and in particular of the present kinds of the earth's inhabitants, or of a large part of them, comes in to rebut the objection, that there has not been time enough for any marked diversification of living things through divergent variation,— not time enough for varieties to have diverged into what we call species.

So long as the existing species of plants and animals were thought to have originated a few thousand years ago and without predecessors, there was no room for a theory of derivation of one sort from another, nor time enough even to account for the establishment of the races which are generally believed to have diverged from a common stock. Not that five or six thousand years was a short allowance for this; but because some of our familiar domesticated varieties of grain, of fowls, and of other animals, were pictured and mummified by the old Egyptians more than half that number of years ago, if not much earlier. Indeed, perhaps the strongest argument for the original plurality of human species was drawn from the identification of some of the present races of men upon these early historical monuments and records.

But this very extension of the current chronology, if we may rely upon the archaeologists, removes the difficulty by opening up a longer vista. So does the discovery in Europe of remains and implements of pre-historic races of men to whom the use of metals was unknown,— men of the *stone age*, as the Scandinavian archaeologists designate them. And now, "axes and knives of flint, evidently wrought by human skill, are found in beds of the drift at Amiens, (also in other places, both in France and

England,) associated with the bones of extinct species of animals." These implements, indeed, were noticed twenty years ago; at a place in Suffolk they have been exhumed from time to time for more than a century; but the full confirmation, the recognition of the age of the deposit in which the implements occur, their abundance, and the appreciation of their bearings upon most interesting questions, belong to the present time. To complete the connection of these primitive people with the fossil ages, the French geologists, we are told, have now "found these axes in Picardy associated with remains of *Elephas primigenius*, *Rhinoceros tichorhinus*, *Equus fossilis*, and an extinct species of *Bos*."² In plain language, these workers in flint lived in the time of the mammoth, of a rhinoceros now extinct, and along with horses and cattle unlike any now existing,— specifically different, as naturalists say, from those with which man is now associated. Their connection with existing human races may perhaps be traced through the intervening people of the stone age, who were succeeded by the people of the bronze age, and these by workers in iron.³ Now, various evidence carries back the existence of many of the present lower species of animals, and probably of a larger number of plants, to the same drift period. All agree that this was very many thousand years ago. Agassiz tells us that the same species of polyps which are now building coral walls around the present peninsula of Florida actually made that peninsula, and have been building there for centuries which must be reckoned by thousands.

5. The overlapping of existing and extinct, species, and the seemingly gradual transition of the life of the drift period into that of the present, may be turned to the same account. Mammoths, mastodons, and Irish elks, now extinct, must have lived down to human, if not almost to historic times. Perhaps the last dodo did not long outlive his huge New Zealand kindred. The auroch, once the companion of mammoths, still survives, but apparently owes his present and precarious existence to man's care. Now, nothing that we know of forbids the hypothesis that some new species have been independently and supernaturally created within the period which other species have survived. It may even be believed that man was created in the days of the mammoth, became extinct, and was recreated at a later date. But why not say the same of the auroch, contemporary both of the old man and of the new? Still it is more natural, if not inevitable, to infer, that, if the aurochs of that olden 'time were the ancestors of the aurochs of the Lithuanian forests, so likewise were the men of that age if men they were— the ancestors of the present human races. Then, whoever concludes that these primitive makers of rude flint axes and knives were the ancestors of the better workmen of the succeeding stone age, and these again of the succeeding artificers in brass and iron, will also be likely to suppose that the *Equus* and *Bos* of that time were the remote progenitors of our own horses and cattle. In all candor we must at least concede that such considerations suggest a genetic descent from the drift period down to the present, and allow time enough— if time is of any account— for variation and natural selection to work out some appreciable results in the way of divergence into races or even into so-called species. Whatever might have been thought, when geological time was supposed to be separated from the present era by a clear line, it is certain that a gradual replacement of old forms by new ones is strongly suggestive of some mode of origination which may still be operative. When species, like individuals, were found to die out one by one, and apparently to come in one by one, a theory for what Owen sonorously calls "the continuous operation of the ordained becoming of living things" could not be far off.

That all such theories should take the form of a derivation of the new from the old seems to be inevitable, perhaps from our inability to conceive of any other line of secondary causes, in this connection. Owen himself is apparently in travail with some transmutation theory of his own conceiving, which may yet see the light, although Darwin's came first to the birth. Different as the two theories will probably be in particulars, they cannot fail to exhibit that fundamental resemblance in this respect which betokens a community of origin, a common foundation on the general facts and the obvious suggestions of modern science. Indeed, ,— to turn the point of a taking simile directed against

Darwin,— the difference between the Darwinian and the Owenian hypotheses may, after all, be only that between homoeopathic and heroic doses of the same drug.

If theories of derivation could only stop here, content with explaining the diversification and succession of species between the tertiary period and the present time, through natural agencies or secondary causes still in operation, we fancy they would not be generally or violently objected to by the *savans* of the present day. But it is hard, if not impossible, to find a stopping-place. Some of the facts or accepted conclusions already referred to, and several others, of a more general character, which must be taken into the account, impel the theory onward with accumulated force. *Vires* (not to say virus) *acquirit eundo*. The theory hitches on wonderfully well to Lyell's uniformitarian theory in geology,— that the thing that has been is the thing that is and shall be,— that the natural operations now going on will account for all geological changes in a quiet and easy way, only give the time enough, so connecting the present and the proximate with the farthest past by almost imperceptible gradations,— a view which finds large and increasing, if not general, acceptance in physical geology, and of which Darwin's theory is the natural complement.

So the Darwinian theory, once getting a foothold, marches boldly on, follows the supposed near ancestors of our present species farther and yet farther back into the dim past, and ends with an analogical inference which "makes the whole world kin." As we said at the beginning, this upshot discomposes us. Several features of the theory have an uncanny look. They may prove to be innocent: but their first aspect is suspicious, and high authorities pronounce the whole thing to be positively mischievous.

In this dilemma we are going to take advice. Following the bent of our prejudices, and hoping to fortify these by new and strong arguments, we are going now to read the principal reviews which undertake to demolish the theory;— with what result our readers shall be duly informed.

Meanwhile, we call attention to the fact, that the Appletons have just brought out a second and revised edition of Mr. Darwin's book, with numerous corrections, important additions, and a preface, all prepared by the author for this edition, in advance of a new English edition.

END NOTES:

1. Vide *Proceedings of the British Association for the Advancement of Science*, 1859, and *London Athenaeum*, passim. It appears to be conceded that these "celts" or stone knives are artificial productions, and of the age of the mammoth, the fossil rhinoceros, etc.
2. See Correspondence of M. Nicklès, in *American Journal of Science and Arts*, for March, 1860.
3. See Morlet, *Some General Views on Archaeology*, in *American Journal of Science and Arts*, for January, 1860, translated from *Bulletin de in Société Vaudoise*, 1859.

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