

branches, so as to form beautiful obelisks or pyramids rather than crowns. So the *Araucaria imbricata*, where its growth is neither confined by gregarious trees, nor restricted by the gardener's knife, lets the branches of its lowest verticil rest on the ground around the stem, and represents when young, if seen from a distance, a dark-green globe, and later an elongated oval, standing like the egg of Columbus.

According to page 30, the coniferous plants are all distinguished by the straightness and slimmness of their stems; but at page 390, we find a picture of *Pinus pumilio* spreading its crooked stem over the ground, and we might add easily another half-dozen exceptions to what Mr Rudolph states to be the characteristic growth of the coniferæ.

Notwithstanding this and other mistakes, the work is a most agreeable manual of phyto-geography. The author has the aim and ability to imitate in his descriptions Humboldt and other masters of style. He has correct views of the importance and the necessary limitations of phyto-geography. If he goes on improving his pages, not merely negatively by avoiding errors, but also positively, by looking at plants such as they are with the precision of systematic botanists, and consulting the writings of Alphonse Decandolle, Weddell, Delondre, Hasskarl, Junghuhn, and other observers, his volume, without losing its attractions for the general reader, will become valuable as a scientific handbook.

*On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life.* By CHARLES DARWIN, M.A. 8vo. London: Murray, 1859.

"His reason ought to conquer his imagination."—DARWIN.

In the olden time, and in early science, there were many wild and extravagant theories proposed, and their existence lasted for a longer or shorter period, not according to the value of the arguments or facts by which they were supported, but just as the attacks by which they were assailed were numerous and persevered in. In modern days, within the last few years, an anonymous book appeared, the object of which was again to bring before the world of science the origin of the human race and the theory of development. It was so plausibly, so popularly written, and brought forward such an array of what seemed to be facts, apparently gathered from the latest authorities, that by many it was thought dangerous for the general reader, and its principles were

challenged and grappled with, discussed and knocked down, by men standing high in science and theology, heads of universities, and by practical workers in the field of nature, who could observe and judge for themselves whether the facts stated were real or not. And thus it was, that instead of the "spirit being laid" it was roused, and the minds of men of various professions, from the army to the church, aye, and of women too, have been stirred up, and they have thought it necessary, for the correction of views judged to be erroneous, to place upon record what they considered the only true version in volumes of the most varied colouring both inside and out. It is true, that previous to the publication of the anonymous book, allegations had been made against geologists for asserting facts which were said to controvert the Mosaic account of creation. The theory by Agassiz of a black as well as a white Adam, published in an American periodical, and republished in this country by the late Professor Jameson, with most of the objectionable passages suppressed,—the appearance of the works of Nott and Gliddon, and the translation of some of the physiophilosophical works of the Germans, all somewhat prepared the way for these books, but the matter was finally clenched by the celebrated battle of the *Vestiges*, and authors both small and great, are now most numerously developed. Among others, from whom we might have expected better things, "*Omphalos*" hints at our misunderstanding the language of the sacred record, and makes the origin of all things a very easy matter, by an instantaneously-formed universe, with its various strata, containing ready-made fossils and footprints, glacial scratches and ripple-marks. Agassiz, in his remarkable Essay on "Classification," goes back to the ancient maxim, "*Omnia ex ovo*;" while the author, the title of whose work we have placed at the head of this article, is convinced that the development theory is the only true solution of the difficulties of the question, and goes boldly into the subject in all its branches, backed by a powerful name and reputation, and supporting himself by a mass of so-called facts. The "*Origin of Species*" coming before the public under such auspices, and so ably treated as the subject undoubtedly is, we feel constrained not to pass over the work in silence; besides, the time has now gone by when such questions are to be compromised. The more these matters are sifted the sooner we shall reach the truth where attainable at all, and that need not be feared. The facts of geology, where there is an apparent discrepancy, must be explained; and the man of development must have some stronger arguments than he has yet used, to prove that a bear may become a whale, or that an apteryx flew to New Zealand and lost its wings there by disuse.

Mr Darwin states that he has made a large collection of facts, too voluminous for publication in his present work, in which he has only introduced such as bore immediately upon his subject. We

regret this much, because we cannot reason upon them nor estimate their value, and it is upon those so-called facts that the whole truth or untruth of his theory rests. Many of his positions are stated hypothetically; some of the statements given as facts are questionable, or are given on the authority of a "careful or good observer," whose careful or good qualities we are not allowed to judge of; and when we read such passages as that we have placed in a note below,\* we lose some of the faith we had placed in the great research and learning of the man, and feel almost inclined to doubt the capability of his mind *now* to judge impartially. With such a range and plasticity as Mr Darwin pleads for, we know not where to stop—centaurs, dryads, and hamadryads, and all those remarkable forms we enjoyed so much as schoolboys to read about, but were taught to look upon as mere poetic fancy, may have been really our old progenitors in a transition state to improvement; and when so convinced, with how much pity shall we look down upon the Carsons and Dunbars, Sandfords and Pillans, and blame that ignorance which kept our young minds in such darkness. The "*virginci volucres*," then supposed to be "peculiar" to the Strophadic Isles, so beautifully figured in the old editions of Virgil; the dangerous siren which is thus described, "*desinit in piscem mulier formosa superne*," may have all lived; and in latter days, if we follow Darwin, "I can see no difficulty in believing" that mermaids once filled our seas, and that the much disputed sea-serpent exists, or at all events did so within historic time,

" Prone on the flood, extended long and large,  
Lay floating many a rood."

Notwithstanding our scepticism of Mr Darwin's theory, the "*Origin of Species by Means of Natural Selection*" is not a book to be trifled with. The author is well known as a man of reputation in science, who has travelled over a great portion of the world, observing as he went; and he does not hide his name, like some ashamed Vestigian, but boldly propounds his theory, and tells us on what it is based. The whole subject, however, is so extensive, that it would require a book as large as Mr Darwin's to go over his ground, or answer his paragraphs *seriatim*; and we shall only be able to notice its great principle, *Variation* and its laws, and how far these develop, or, as it is termed, improve themselves in a natural state, as it is on this that nearly the whole theory of development under natural selection rests.

\* "In North America the black bear was seen by Hearne swimming for hours, with widely open mouth, thus catching, like a whale, insects in the water. Even in so extreme a case as this, if the supply of insects were constant, and if better adapted competitors did not already exist in the country, I can see no difficulty in a race of bears being rendered, by natural selection, more and more aquatic in their structure and habits, with larger and larger mouths, till a creature was produced as monstrous as a whale." (P. 184.)

Before entering upon this, however, we must explain what "Natural Selection" means. We were for some time at a loss to understand this until we came to Darwin's explanation, "If variations useful to any organic being do occur, assuredly individuals thus characterised will have the best chance of being preserved in the struggle for life; and from the strong principle of inheritance they will tend to produce offspring similarly characterised. This principle of preservation I have called, for the sake of brevity, NATURAL SELECTION." At the beginning of the same chapter, he has added to this, "On the other hand, we may feel sure that any variation in the least degree injurious would be *rigidly destroyed*;" and he includes "sexual selections" as a powerful assistant. The theory is then based upon the animal inclination and capability to vary, and the plasticity of certain groups of animals in a state of domestication is brought forward to show the range to which this may take place.

"Variation" in domesticity, by crossing, or under artificial circumstances, is widely different from that in a state of nature. It will not be denied, we presume, that animals were created for the use of mankind. Man was to have dominion over them. In the great group of ruminants among quadrupeds, and rasorial forms among birds, the provision for becoming serviceable to man, breeding in confinement or restraint, and accommodating themselves to circumstances, whether of climate or country, is very marked. These, from the beginning, were made use of; and a few other animals, such as the dog, were, from the very earliest historic periods, chosen to associate with and assist man; and there is no reason to insist that any of those should have a mingled origin; for, if Mr Darwin will apply the same arguments which he has used in the case of the pigeons, all the varieties of which he acknowledges to be descended from one stock (*C. livia*), there does not seem any great difficulty in believing that most, if not all, our domestic animals have also sprung from some one wild animal, although we cannot with certainty now point that one out. The early domesticated animals were cared for and tended, and various points we know were esteemed of more or less value; and, as man became more luxurious and civilised, animals from a distance were introduced and crossed, and the improvement (as it was termed) of cattle and sheep became almost a science; and those breeds and varieties which had a tendency to be most easily fattened, to yield the greatest quantity, or richest milk, or the finest wool, were assiduously cultivated. But this was all artificial. The slightest inattention deteriorated these breeds (that is, returned them nearer to the original form), and those improved animals, differing from anything in nature, cannot be naturally kept up. Man's species will not last. And here is just the check which God has interposed. These animals are created for

the use of man, and his mind has been allowed to exercise itself and study certain conditions under which qualities in the animals are better associated with the wants he has. God in his goodness allows thus far, but he will not permit man to manufacture a *permanent* species, or to sport at will with his works; and this is proved by the fact, that *none of those breeds or varieties* (Mr Darwin's incipient species) can be maintained, even with the greatest attention and care. Most of our old breeds of domestic cattle do not now exist; some new quality was wanted, the old one was neglected, and the breed died out. The same occurred with our breeds of sheep. And where now among dogs is the Turnspit, the Irish blood-hound, the Spanish pointer? They also were not required, and were supplanted. And were the fox or the hare to be extirpated from Great Britain by any cause, the fox-hound and greyhound would immediately follow them.

We think, therefore, that all the arguments brought forward from plasticity in a domestic condition, just prove that it is unnatural and artificial; that the forms desired cannot be kept up, and that it is only when the whole constitution is artificially worked upon, the natural craving for food kept blinded by constant supply, the natural passion of the sexes curbed by the allowance of some particular improved form only being admitted, with which the beast must either satisfy his natural inclination or want.

The same principles prevail in plants. It is by the art of the gardener or agriculturist that we have our melting pears and incomparable dahlias, with almost all our useful varieties of garden and field vegetables; but can we carry on or maintain these by a natural process? They stand in a stronger position than even the forced varieties of animals. They cannot be produced by impregnation and seeds; all our finest fruits must be layered, budded, or grafted; and even such plants, according to the theory of Mr Knight, which has not been disproved, die with the parent stocks. Where, now, are many of our old much-prized varieties, such as the golden pippin? &c. Florists' flowers are mostly propagated by cuttings; no seed is certain to produce the "incipient species" it was sown from. Our kitchen vegetables—cabbage, cauliflower, broccoli, Brussels sprouts, Savoys, curled greens, &c., all, like the pigeons, spring from one stock, and are kept up only by the greatest care of the nurseryman, whose profit it is to do so. And how often have we to complain of "bad seed," that is, seed returning offspring nearer to its normal state. The same is the position of our agricultural grains, turnips, &c.; they are all changed and changing. Skirving cannot keep up his Swedish turnip; he is obliged to bring out new varieties; and the same causes that have changed our breeds of cattle are acting on our breeds of vegetables. And what will become of these manufactured spe-

cies; their constitutions placed in circumstances foreign to them, and excited by manures and stimulating mixtures, have been weakened, and from the vine to the potato they have died out, or become so precarious in their produce as in many instances to be given up.

It is argued that such artificial breeds of animals would never go back to their original form; very likely not; they never would have the opportunity. The countries where they roamed are now cultivated and peopled—their ancient food and quiet destroyed; they would have no real species to mate with, and the limited variety would breed in and in as long as it could, and at last dwindle and die. But under favourable circumstances many would go back. In a lately published account of New Zealand, it is mentioned that the pigs introduced there by Captain Cook have been naturalised, and “in the deep recesses of the forests they have lost the appearance of domestic pigs, and have acquired the habits and colour of wild animals.” Among plants, the reversion to the original form is common and constant, and takes place within a very short period; witness the camellia, dahlia, rose, daisy, &c. &c., and most of our cultivated garden vegetables.

In a natural condition, variation by crossing is very different. Mr Darwin has drawn most of his arguments from birds. We shall take these also. As a general rule or law, birds do not mingle or interbreed; even allied species frequenting the same localities do not. Mr Darwin has given us no proof that they do, or ever did. Those instances given by authors are all traceable to circumstances occurring at variance with the usual habits—such as that of a winter migratory bird being detained from some cause and mating with an allied species in spring; but even in this case, what would it lead to? The cross would, it is acknowledged, not breed among themselves, and with a true bird of either side it would soon be lost. The pheasant has always been quoted as an instance of two species breeding in a wild state; it is just a proof of the reverse. We have not a true pheasant in all Great Britain. The ring-neck species of China, and the dark coloured species of Persia, have been both introduced. They have been crossed and recrossed, are altogether in an artificial state—are fed, bred in confinement, and sheltered, and so they go on under care; but it is well known to every sportsman that they can only be kept up by the introduction of “new blood,” as it is called; and without this, “preserves” decrease, birds will not breed, and the stock is, or would be gradually lost. But in other instances of allied species said to interbreed, such as *Passer hispaniolensis* and *cisalpina*, *Corvus dauricus* and *monedula*, &c., nothing, we maintain, very different would arise. The sparrows might breed together, they and their families for ever, they never

would produce a bunting or a bullfinch, or the two jackdaws a pigeon, or even the white-necked crow of Africa.

In all those nearly allied species inhabiting different countries, Europe and America for instance, the minute separating characters are *always the same*. The ducks have a great power of flight and are widely distributed, and have every opportunity of intermingling with birds from a distance or closely allied. No difference or intermediation can be detected between the common wild ducks (*Anas boschas*) of Europe, North America, or India. They "sport" widely in domesticity, but, when unrestrained, never vary, no matter how different the countries, climates, and food may be. The American teal again, which an ordinary observer would scarcely detect among a series of European birds, has a white band on each side the breast, and other marks. The American goosander varies still less but is also easily distinguished; and so also the velvet scoter, and some others; but the distinguishing marks in these birds are always the same—quite constant. We do not yet know the geographical range of these, and other birds, sufficiently to say where allied species meet; and we never see intermediate forms now. If at their meeting they were not prevented by natural instinct from intermating, intermediate forms would be produced, and would be circulated, which, so far as we know from very extensive observation, is not the case. In all animals, however, there is a certain natural range of variation, amounting in some to almost nothing, in others very wide; you may place a hundred goshawks, wild ducks, European teal, and American teal, European goosanders, and American goosanders together, and you will scarcely find a feather different in each species; but you may take the same number of specimens of the common European buzzard, or of the ruff in its breeding plumage, and you will not find two similar. We are not, however, entitled to conclude from this last fact that either the buzzard or the ruff sprung from anything very different from what they now are, or that they would ever be developed into anything very different.

Mr Darwin has insisted largely on the influence that interbreeding has on variation and development, which we have endeavoured to show has been much overrated. But it is by "natural selection" that his development system is to be mainly carried out; and this, he says, is a power "immeasurably superior to man's feeble efforts," and should therefore produce far more remarkable modifications and changes than can ever be accomplished by man's scientific breeding, and turn the incipient variety at last to a permanent species, widely differing in structure and form from its ancient progenitor." The strongest and most improved will be "rigidly preserved." Now, how does this work among living species, as we term them? The strongest and most powerful buck will drive off the younger and weaker, and remain

master of his herd. The strongest black-cock will drive off all intruders from his particular green hillock. But will either of these in consequence beget the finest progeny? Will it be the strongest and healthiest females only that attend upon their polygamic lords? Weak and even diseased females may fancy a well-formed stately mate. Overwork may weaken the powers of the most powerful male, and the beaten herd would produce the healthier stock. Many of the prize animals at our late agricultural shows have been gotten by young males. But allowing, for the sake of argument, that there may be improvement by natural selection, that is, greater proportional size and strength, and with all the additions that shelter and quiet, and abundance of food and water could give, could the progeny of the fallow or red deer, under any circumstances, ever be developed into a moose, or elk, or wapiti, or the wild-cat of Europe into a tiger or lion. Yet such, according to Mr Darwin, must be the case, "as I believe that all the species of the same genus have descended from a single parent." Can such be possible under the laws which scientific men have been accustomed to think regulated animal life? Have we any like analogy in all the range of animal and vegetable organisation to speculate upon? can we, with all our knowledge, reach the process by which these transformations are to be accomplished? We simply answer, no; but Mr Darwin meets us by saying, that it was not from a fallow-deer, or stag, or wild-cat, that these larger forms were developed, but from some "ancient prototype of which we know nothing," never saw, and till now never heard of—quite unlike anything now in existence—and that the time required to bring about the monstrous change would be "millions of millions of ages." And he adds, in his concluding chapter, That "as all forms of life are the lineal descendants of those which lived long before the Silurian epoch, we may feel certain that the ordinary succession by generation has never been once broken, and that no cataclysm has desolated the whole world. Hence we may look forward with some confidence to a secure future of equally inappreciable length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection." These are the deliberate, serious assertions of the author. We can do nothing with them. There never will, nor can be, except in imagination, any means of tracing back millions of millions of ages. All that we now know fixes the immutability of once-created species. In the Tertiary strata many of the mollusca are exactly similar to those now inhabiting our seas and fresh waters; and in our limited historic time, animal forms are depicted on monuments above three thousand years old, just as they now are; and the sacred Ibis embalmed in the ancient catacombs does not vary in a bone or feather from that now feeding



by the Nile. All that we have quoted above are mere assumptions, not the calm reasonings of a man of science. Surely Mr Darwin has also for a time forgotten the igneous rocks of his geology, and overlooked the Bible statement, "the world that then was being overflowed with water perished," and that "the elements shall melt with fervent heat, the earth also and the works that are therein shall be burned up."

But it is not always to development that Mr Darwin restricts himself. "Disuse" is a great agent in the change of form:—thus the progenitor of a seal "had not a flipper, but a foot with five toes fitted for walking and grasping." The same may have been the case with the walrus, and the curious whale-like pachyderm of the lakes of Central Africa. "I believe," he writes, "that the wingless condition of several birds which now inhabit, or have lately inhabited, several oceanic islands tenanted by no beast of prey, has been caused by disuse," and the eyes of the mole are a "gradual reduction from disuse." All these circumstances, however, if true, would act against Mr Darwin's theory of "*improvement*," which he states would always be "rigorously preserved." We should call these retrogression from perfection of structure; but it is little matter, as we think them as untenable as improved development.

The theory of some old progenitor of nameless shape, differing from anything now in existence, is to us an unintelligible brain-myth; it is the assumption of a monstrous fact, not a reality—a thing whereon we have no premises to argue upon; and the process of development from that, or, even later, from any form actually before us, trenches so far upon all the attributes of foreknowledge and design which we have of old given to the Creator, that we would ask the beginners, and students of natural science, before many of whom this book will undoubtedly come, to view the theory with the greatest distrust, and to sift every fact and every argument in it to its very bottom. We do not think Mr Darwin intends to lower the power or attributes of Deity—we would gather the reverse from many of his expressions; but when he writes of "mere chance" causing one variety to differ from its parents—when he likens the electric organs present in fishes (for which he can find no ancient progenitor)—so rare, and placed in such different forms—just like separate inventions of two men differently hit on; when he calls creation "a Theory," and speaks of working "in a tail for all sorts of purposes," "a new variety raised by men will be a far more important and interesting object for study than one more species added to the infinitude of already recorded species"—to say the least, it is not the language in which we have been accustomed to see these subjects treated. Wingless birds, remarkable only because we are wont to consider a wing inseparable from a bird, filling

their allotted position, and in every way provisioned for it, whether on land or water; blind animals filling the caves and "waters under the earth;" the birds of the waters so beautifully arranged in all their internal and external appliances for the lives they lead; the birds of the air, the swallow, or the owl, so finely organised for their purposes—long migration, or a noiseless, "downy" flight or nightly vision; the seal, so wonderfully adapted to its watery life; the mole, in all its structure; these and a thousand thousand more due only to creative power and knowledge, are, according to Mr Darwin, the proceeds of mere development, disuse, disease. Can this be so?

Through the whole of Mr Darwin's most interesting volume we find such passages as these—"The result of the various, quite unknown, or dimly seen laws of variation is infinitely complex and diversified." "The laws governing inheritance are quite unknown." "Our ignorance of the laws of variation is profound." "We are profoundly ignorant of the causes producing slight and unimportant variations." "Variability is governed by many complex laws," &c. &c. Are we then yet in a position to judge, or can Mr Darwin settle the question so confidently as he does, under such admissions of ignorance as we have now quoted? We think we are not yet prepared to do so. We have said at the commencement of our remarks that some of Mr Darwin's facts were questionable, and it is perhaps not fair to do this without stating some, though it is impossible here to go into any separate discussion of them. Many of the facts are second-hand, and without authority given. Of others, we dispute that disease was or is present in the eye of the mole; we dispute the La Plata woodpecker never climbing trees, or the upland goose not swimming; we dispute the restricted condition of the Galapagos Fauna and Flora; we dispute Horner's calculations of the Nile Delta; and we dispute several geological positions, &c. &c. All the facts require sifting and analysis, and that is now the duty of our young and active working zoologists; we would say it is also the duty of our clergymen, for the questions will come before them whether they will or not. Let them take them up boldly and without reserve. Let them sift every old fact, and search out as many new ones as they can, we have no fear for the result; but let them do this impartially and with the view to the truth only, and if it is discovered, we shall owe a very large debt to Mr Darwin for having given us so good a scent. We say hunt the OLD PROGENITOR out, and run into him breast high.