

THIS is a remarkable book, and it has been eagerly read by thousands. It is remarkable as a scientific book, and as such could not have failed in securing the applause of the philosophic world. It is also remarkable for its theological tendencies, and, we will venture to say, that many who watch the progress of natural history with profound indifference have waded through much of what must have been, to them, very tedious reading, to arrive at the conclusions which are supposed to achieve a triumph over revealed religion and the revealed history of mankind. Fortunately, the world has long been familiar with reports of the latest triumphs of natural science. For a century—one might say for many centuries—it has been hoped that Moses' inspired narrative had met with its death-blow. But, notwithstanding the triumphs of his enemies, the old Jewish legislator continues to receive the respect and the belief of Christendom. Dr Darwin has not accomplished more than his predecessors. Supported by more solid and specious learning, heralded by a rationalist press, his attack has not met with the success which his friends had anticipated; and thinking men, while recognising his powers of observation, and his talent in combining and classifying results, have come to the conclusion that he is able to furnish the premises of an argument, but not equal to the undertaking of drawing a logical inference.

In order to put Dr Darwin's argument in its true light, we will premise a short account of the problem which he has undertaken to discuss, and the solution which he believes to be the true one.

All the organised beings with which our universe is peopled naturally fall into two great groups—the one including organised beings whose life is vegetative and sensitive, the other including organised beings whose life is only vegetative. The former is called by naturalists the Animal Kingdom, the latter the Vegetable Kingdom. The nature and the habits of the individuals embraced in these kingdoms cannot be studied to advantage without the aid of a system of classification. It would seem an easy task to arrange such a system: points of likeness and unlikeness are so numerous, that the most casual observer could scarcely find it difficult to combine them. But the history of classification from the time of Aristotle to our own day shows how much intimate a knowledge of nature, how much minute conscientious examination and experiment are pre-supposed by a satisfactory system.

The system now adopted is called the Natural System; it rests its divisions on resemblances in the *structure* of animals and plants. In this system, the Animal Kingdom is divided into sub-kingdoms, the sub-kingdoms into classes, the classes into orders, the orders into families, the families into genera, the genera into species, the species into varieties. The members of the Vegetable Kingdom are grouped into varieties, the varieties into species, the species into genera, the genera into families.

In the Natural System, the "species" occupies a prominent position in all disputes among systematists; genera, varieties, &c., in comparison escape observation. Not so the species; it is felt that many important doctrines depend on this division. Apart from one system or another, a species generally implies a collection of individuals who agree among themselves, and differ from other individuals in some point which is held to be essential. Where the system is artificial, or arbitrarily determined on merely external resemblances, the assignment of the species is not so difficult or so important. No confusion is entailed if, in an arbitrarily arranged system, the species be considered as a genus, its varieties as the species, its sub-varieties the varieties of the new genus.

But by the advocates of the Natural System it has been tacitly assumed—by some indeed it has been explicitly stated—that there are certain differences and resemblances in the structure of organised beings which are not only *essential in the eyes of the systematist*, but *essential in nature*, determined from all time, and to continue to the end of time, or rather as long as individuals of the species are preserved; that amidst all the modifications which the forms of organisation may and do undergo, the specific or essential resemblances can never be lost. The naturalist, it is allowed, may err in calling this or that resemblance essential; it may be discovered that a resemblance held to be essential is not so in reality; but it is presumed that essential resemblances do exist in nature, and it is the duty of the systematist to discover them and make them the starting points in his classification. Those who consciously hold this view maintain that species are fixed: they allow that species may disappear and become extinct; but they will not admit the possibility of new species starting into existence without a positive act of the Creator. And to be consistent with themselves they must also maintain that the parent

fo each species was called into existence by Almighty God, by a distinct and independent act of creation.

Dr Darwin, whose work entitles him to be adduced as the leader of those who partake his opinions, rejects this view and all its parts. He denies the existence of any structural differences which are essential in nature: he denies the invariability of species: he denies that nature has fixed any limits to the modifications which may present themselves in the forms of organised life. He upholds a contrary theory, and contends that existing forms may be so modified by forces actually working in nature, as ultimately to exhibit varieties specifically or essentially different from the parent stock. And, consistently with this theory, he teaches that it is not necessary to suppose that the founder of each species was called into existence by an independent creation: he considers it certain, that many at least of the founders of distinct species now met with have sprung from pre-existing forms of organised life, and owe their existence and preservation to forces whose action we can ourselves observe. The chief among these forces he calls Natural Selection.

This force of Natural Selection he explains from the methodical selection employed by bird fanciers, cattle breeders, and gardeners. Nature constantly presents new variations in form. She has a tendency to transmit these variations by inheritance; and by attending to these variations many improvements in plants, birds, and animals have been perpetuated under the fostering care of man. Dr Darwin presumes that in the same way, in nature, "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."

No one even moderately acquainted with Natural History, no one who even casually observes what passes around him in the animal and vegetable kingdom, can have failed to remark the plasticity of the forms of organised life and the frequent appearance of varieties, often very striking. The readers of Dr Darwin's work will be prepared to follow him in his statement of many laws of organised life which he has arrived at and illustrated by numerous and happily selected examples. They will probably infer that he is justified in concluding that many varieties have been erroneously treated as specifically and essentially different. But his warmest admirer will be startled at the breadth of his generalisations. They will scarcely adopt his belief "that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number." P. 484.

They will be astounded that the writer of so able a treatise can, in his enthusiasm for his imagined discovery, have penned the ensuing paragraph:—"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. Nevertheless, all living things have much in common; in their chemical composition, their germinal vesicles, their cellular structure, and their laws of growth and reproduction. We see this even in so trifling a circumstance as that the same poison often similarly affects plants and animals; or that the poison secreted by the gall-fly produces monstrous growths on the wild rose or oak-tree. 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 first breathed by the Creator."

Man, the lion, the hare, the mouse, the beetle, the whale, the oyster, the oak-tree, the microscopic mosses, have probably all descended from some primordial form, some organised combination of cells, and the force of Natural Selection has determined the endless variety of life which adorns the universe. And Ch. Darwin, M.A., Fellow of sundry scientific societies, sits down gravely to write a learned work in support of this thesis, and with all possible solemnity puts forward objections and considers them wisely and refutes them. What a comment on the folly of human wisdom! Unfortunately, the absurdity is a mischievous one, and will probably lend a support to weak minds who shrink from the consideration of the claims of revealed religion and wish it to be false.

But how is Dr Darwin's book supposed to have injured the cause of revealed religion? He does not avow himself to be an infidel; he admits the existence of God, of a Creator; at the head of his work he gives a quotation from *Butler's Analogy* implying that the assertion of secondary causes by no means involves the denial of a primary cause. And he is right. Even had he succeeded in making out his primordial organised combination of cells, working out its destiny in plants, animals, and rational beings, yet that combination, with its laws of growth and reproduction, with its force of Natural Selection would no less require the hand of the Creator than does the complex system of life explained on the doctrine of those who maintain the fixity of species. So we owe our thanks to Dr Darwin for still leaving a Creator to the Universe, though he does at the same time scarcely conceal his conviction that the act of creation is an impossibility.—p. 207.

As to the remainder of his religious creed, he is at no pains to disguise his disbelief in the history of Adam and Eve; he sneers at those who accept the deluge recorded in Scripture. This is all well in the eyes of his Rationalistic friends; but the great service which he is supposed to have rendered to their cause, and for which he has received the expression of their gratitude, is the imagined annihilation of Scripture chronology. Countless ages are required for the action of Natural Selection and the other natural forces, before we can pass from the first cell to the present variety of life which we see in the world. "The whole history of the world as at present known, although of a length quite incomprehensible by us, will hereafter be recognised as a mere fragment of time, compared with the ages which have elapsed since the first creature, the progenitor of innumerable extinct and living descendants was created"—p. 488.

The task which devolves on the advocate of the Bible is a very simple one. The value of Dr Darwin's conclusion as to the date of the creation is in exact proportion to the value of his theory regarding the original cellular combination, i.e. simply *nil*. When Dr Darwin can offer any tangible conclusion, when he is in a condition to substitute certainty for his present wild conjectures, then it will be time to see how the results of science may be shown not to be at variance with the doctrines or the records of revelation. We do not fear ever to find them in antagonism; we are prepared to meet with difficulties in the undertaking of reconciling science and revelation; but

difficulties arising, not from the deficiencies or imperfections of the Scripture, but from our limited knowledge and our eagerness to anticipate the discovery of truth, by embracing our fancied discoveries or interpretations, for the genuine voice of science or the genuine voice of revelation. Yes; difficulties may and will occur, but contradictions never. Happily, Dr Darwin's book cannot be said to have created a difficulty. He has indeed rejected Moses; but in his stead he devises a fabulous history of mankind, in its wildness and absurdity not inferior to the clumsiest inventions of Pagan mythology.

But apart from the theology of Dr Darwin's Origin of Species, what are its claims as a scientific work? Has it demolished the theory of the fixity of species? No; it advances many arguments which certainly militate against that theory, and which will render its adherents very cautious in future observations and statements; and some readers will think that it will at least impose certain important restrictions and limits; but Dr Darwin, though he has raised many difficulties to the hypothesis of the fixity of species, has not succeeded in showing the hypothesis to be false.

Has the book established its own theory of a common primordial type of organised life, or of a small number of primordial types? The facts are not adduced as equal to the burden of the former supposition; it requires the support of analogy and even then does not merit any consideration. The small number of primordial types Dr Darwin considers *proved*. Probably few scientific or thinking readers will consider his proof a conclusive one; the majority will admit the probability of species having been unnecessarily multiplied by older systematists; some may even go the length of accepting the theory of four or five primordial forms for either kingdom as not altogether devoid of probability; they may allow the possibility of such an origin of species, but they cannot allow it to be *proved*.

Dr Darwin has embraced his theory with all the zeal and not a little of the indiscretion common in discoverers. He has no eyes except for his own views; the facts and arguments which seem to make for his supposition he sees in all their force; but he is too occupied with them to attend to other facts and other arguments which might prove the existence of forces in nature which would limit the action of Natural Selection. Thus, for instance, he omits nothing which may place in its strongest light the tendency in nature to produce frequent and startling variations and to perpetuate them by transmission. But he has not bestowed the same study in ascertaining the extent or the action of the laws to which must be referred the acknowledged extinction of many variations. And yet, after all, the determination of the limits to variation is vital in any discussion on the origin of species.

Then, again, his statement of the difficulties involved in the theory of the fixity of species is complete. But he nowhere collects into focus the numberless and astounding difficulties which his own theory involves. We do not wish it to be understood that he passes over all objections, for several chapters are devoted to a very detailed examination of what Dr Darwin conceives to be the most important difficulties, and he conducts his examination with marked fairness and impartiality. What we mean is, that he nowhere puts his hypothesis to the test of the consequences which it involves. Now, it happens that the hypothesis presents its fairest side on the first inspection—it offers a simplicity and symmetry which conciliate our assent; the difficulties do not appear at first, but as we advance they rise up around us and multiply until the mind yields to the overwhelming opposition.

The traveller, invited by the open glade in the forest, may easily imagine that he has found a pleasurable path; but the attempt to follow it often shows that the greatest obstacles are not met with at the outset of a journey in an unknown land.

What then are the services rendered by Dr Darwin to science? He is an admirable observer—he has the genius of observation—he knows how to plan his experiments—he is a distinguished master of the Baconian weapon of induction; indeed to such a degree, that he imagines it can be employed to advantage where Bacon never dreamt of its being used at all. He has called the attention of scientific men to laws of nature, which had previously been little studied. He has shown the importance of whole classes of facts, which older naturalists had passed over. He has pointed out very cleverly the uncertainty of opinions which had been received as first principles by some. He has offered a theory, which, though not proved to be more than a theory, will, in all probability, aid the cause of scientific invention. He has furnished the means of accounting satisfactorily for some of the most difficult riddles of scientific history. And, though such an object did not fall within the domain of his scheme, he has suggested much that will be turned to advantage by those who love to show science as supporting and confirming the voice of revelation.

Let us now leave the critic's task for the more welcome one of showing, in a few extracts, the style and the method of the writer. To many, his remarks on the plasticity of the animal organisation will be new:—

"Breeders habitually speak of an animal's organisation as something quite plastic, which they can model almost as they please. If I had space I could quote numerous passages to this effect from highly competent authorities. Youatt, who was probably better acquainted with the works of agriculturists than almost any other individual, and who was himself a very good judge of an animal, speaks of the principle of selection as "that which enables the agriculturist not only to modify the character of his flock, but to change it altogether. It is the magician's wand, by means of which he may summon into life whatever form or mould he pleases." Lord Somerville, speaking of what breeders has done for sheep, says:—"It would seem as if they had chalked out upon a formal tablet, perfect in itself, and then had given it existence." That most skilful breeder, Sir John Sebright, used to say, with respect to pigeons, that "he would produce any given feather in three years, but it would take him six years to obtain head and beak." In Saxony, the importance of the principle of selection in regard to Merino sheep is so fully recognised that men follow it as a trade. The sheep are placed on a table, and are studied like a picture by a connoisseur. This is done three times, at intervals of months, and the sheep are each time marked and classed, so that the very best may ultimately be selected for breeding."—p. 31.

There are some instances of a law which seems to regulate variations, called by Dr Darwin correlation of growth. "Any change in the embryo or larva will almost certainly entail changes in the mature ani-

mal. In monstrosities, the correlations between quite distinct parts are very curious; and many instances are given in *Lisidore Geoffroy St Wilaire's* great work on this subject. Breeders believe that long limbs are almost always accompanied by an elongated head. Some instances of correlation are quite whimsical; thus, cats with blue eyes are invariably deaf, where the conditional peculiarities go together, of which many remarkable cases could be given amongst animals and plants. From the facts collected by Hensinger, it appears that white sheep and pigs are differently affected from coloured individuals by certain vegetable poisons. Hairless dogs have imperfect teeth; long-haired and coarse-haired animals are apt to have, as is asserted, long or numerous horns; pigeons with feathered feet have skin between their outer toes; pigeons with short beaks have small feet, and those with long beaks large feet."—p. 12.

The mutual dependence of all organised life is well illustrated at p. 73. "I am tempted to give one more instance, showing how plants and animals most remote in the scale of nature are bound together by a web of complex relations. I shall hereafter have occasion to show that the exotic *lobelia fulgens*, in this part of England, is never visited by insects, and consequently, from its peculiar structure, never can set a seed. Many of our orchidaceous plants absolutely require the visits of moths to remove their pollen masses, and thus to fertilise them. I have also reason to believe that humble-bees are indispensable to the fertilisation of the heartsease (*viola tricolor*), for other bees do not visit this flower. From experiments which I have lately tried, I have found that the visits of bees are necessary for the fertilisation of some kinds of clover; but humble-bees alone visit the red clover (*trifolium pratense*), as other bees cannot reach the nectar. Hence, I have very little doubt that, if the whole genus of humble-bees became extinct, or very rare in England, the heartsease and red clover would become very rare, or wholly disappear. The number of humble-bees depends, in a great degree, on the number of field mice, which destroy their combs and nests; and Mr H. Newman, who has long attended to the habits of humble-bees, believes that "more than two-thirds of them are thus destroyed all over England." Now, the number of mice is largely dependent, as everyone knows, on the number of cats; and Mr Newman says, "Near villages and small towns I have found the nests of humble-bees more numerous than elsewhere, which I attribute to the number of cats which destroy the mice." Hence, it is quite credible that the presence of a feline animal in large numbers in a district might determine, through the intervention, first of mice and then of bees, the frequency of certain flowers in that district."

The chapter on instinct is a peculiarly interesting one. Dr Darwin undertakes to show the possibility of the loss of instincts and the acquirement of new instincts under existing laws of nature, especially under the great law of natural selection. He selects as his illustrations the instinct which leads the cuckoo to lay her eggs in other birds' nests; the slave-making instincts of certain ants, and the comb-making power of the hive bee. The two latter instincts suggest the most favourable extracts; but their length would carry us too far. We must content ourselves with his theory of the development of the cuckoo's instinct. "It is now commonly admitted that the more immediate and final cause of the cuckoo's instinct is, that she lays her eggs, not daily, but at intervals of two or three days; so that, if she were to make her own nest and sit on her own eggs, those first laid would have to be left for some time unincubated, or there would be eggs and young birds of different ages in the same nest. If this were the case, the process of laying and hatching might be inconveniently long, more especially as she has to migrate at a very early period, and the first hatched young would probably have to be fed by the male alone. But the American cuckoo is in this predicament—for she makes her own nest, and has eggs and young successively hatched all at the same time. Now, let us take the supposition that the ancient progenitor of our European cuckoo had the habits of the American cuckoo, but that occasionally she laid an egg in another bird's nest (as various birds have been known to do). If the old bird profited by this occasional habit, or if the young were made more vigorous by advantage having been taken of the mistaken natural instinct of another bird than by their own mother's care, encumbered as she can hardly fail to be by having eggs and young of different ages at the same time, then the old birds or the fostered young would gain an advantage. And analogy would lead me to believe that the young thus reared would be apt to follow by inheritance the occasional and itinerant habit of their mother, and in their turn would be apt to lay their eggs in other birds' nests, and thus be successful in rearing their young. By a continual process of this nature, I believe that the strange instinct of our cuckoo could be, and has been, generated."—p. 218.

Perhaps this sample of Dr Darwin's belief in the force of natural selection will prevent some from following him in his investigations into the generation of the slave-making instinct and the cell-building instinct of the hive bee. But we can promise them that, however they may shrink from the theory, they will read his experiments with interest and delight.

THE CONJUGAL RIGHTS (SCOTLAND) BILL.—In committee on this bill (in the House of Lords on Thursday evening), the Lord Chancellor said he did not mean to propose any amendments. The object of the bill was to limit the jurisdiction of the Divorce Courts in Scotland to cases where the parties had been wholly domiciled in Scotland. Hitherto it had been held by the Scotch Courts that forty days' residence was enough, and also that if either of the parties had been once domiciled in Scotland, although he might afterwards have been settled for years in England, and married in England, the case came under the Scotch jurisdiction. This view had, however, been disputed by the Courts in England, and the consequence was, that a divorce there pronounced might be valid in Scotland and not valid in England, that a woman might be the wife of one person on the north of the Tweed, and of another person on the south, and the children might be legitimate in one country and illegitimate in the other. It was to get rid of that monstrous anomaly that the bill was introduced. He regretted that from the learned Faculty of Advocates at Edinburgh it still encountered some opposition. They wished to claim a jurisdiction for the Scotch Courts, *ratione delicti*, where the offence of adultery had been committed in Scotland; but though that argument might apply in case of a prosecution, supposing adultery to be an indictable offence, it should not give a local jurisdiction, in a civil suit like this, to the Courts where the act was committed. Lord Brougham remarked that he had on a former occasion brought in a bill with a similar object to this, but different in some of its provisions. That bill obtained the entire concurrence of the Faculty of Advocates, and the objections they had now raised did not appear to him of any weight. The bill then passed through committee. On Friday evening the bill was read a third time and passed.