



THE WORLD OF SCIENCE.



DAVID (CANNON) AND GOLIATH (DARWIN).

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THERE probably was a time in the history of mankind when people argued less, or wondered less, how the earth and the living things upon it came into existence. In such times, so difficult for us now to imagine, there must have been a simple and fully-satisfactory answer. The earth and all that therein is was created. The concept of the force or forces responsible for that creation may have varied with the age or the race, but it is epitomised in what we now speak of as God. To-day, the argument tends to be mainly between two opposing scientific schools. There are those who see the whole solution in accidental changes occurring within the germ-plasm, or random mutation, as it is preferably now called, acted upon by natural selection. This is the Darwinist school. The opposing school maintains that each organism, by its own behaviour, contributes something to its own evolution. This is the Lamarckist school, which believes in the possibility of the inheritance of acquired characters. But this two-party scheme may not represent the whole, for, as an eminent zoologist remarked drily, a few years ago, in the course of a scientific discussion, the idea of natural design being the work of a Creator was an hypothesis we had not yet fully explored.

So far as the two scientific schools are concerned, the debate has largely petered out. The Darwinist school is so much in the ascendant that "Opposition to it has been subdued, partly perhaps because of the prestige which the exact sciences have now acquired and, more remarkable, because genetics appears to have become a branch of mathematics, and even the scientist who works with living things is loath to dispute with the mathematician." This quotation is from the jacket of a recent book, "The Evolution of Living Things," by H. Graham Cannon, F.R.S. (Manchester University Press; 12s. 6d.). Quoting again from the jacket: "This book is therefore something of an event. A zoologist has come forward to challenge first the dictum that blind chance is the main-spring of evolution, and secondly, that the gene theory can possibly account for the capacity of an organism not only to admit new characters, but to adjust the functioning of its existing parts in the process, so that the organism forms a new whole and works as a new unit." David (Professor H. Graham Cannon) has come forth to do battle with Goliath (Darwinism, or Neo-Darwinism as it is called, now that the views originally held by Charles Darwin have been so much modified by the principles first enunciated by Gregor Mendel). The year for this chosen battle is precisely the centenary year of Darwin's announcement of his theory of the origin of species.

Professor Cannon's book consists of an historical survey of the theory of evolution—which, as he points out, did not originate with Darwin—followed by chapters on Darwinism, Mendelism, Lamarckism, Neo-Darwinism, Neo-Lamarckism and, finally, a chapter on Balanced Evolution. Much of what is contained in the early chapters is familiar to all students of biology and to large numbers of laymen. There is a difference here, however, for Professor Cannon is determined to show that Lamarck's views have been consistently mis-stated, and that, in fact, what he really did say has much to commend it. He points out that

Lamarck's two laws, published in 1809, are that: The development and effectiveness of organs are proportional to the use of those organs; and that everything acquired or changed during an individual's lifetime is preserved by heredity and transmitted to that individual's progeny.

Then on page 63, Cannon says: "It is Lamarck's Law 2 of 1815 which forms the central part of his hypothesis. This states: 'The production of a new organ in an animal body results from a new need which continues to make itself felt, and from a new movement that this need brings

himself must have realised this, for he attacks his subject vigorously and, one may say, courageously. Symptoms of the determination of his attack are seen in the style in which he writes. This book is no gem of English prose, and could profit from a ruthless editing. The single-mindedness of the author is also evident in the marshalling of his arguments, some of which show that either he has not sufficiently examined the evidence or that he is in such a hurry to reach his main conclusions that he cannot be bothered fully to convince his readers before rushing on to the next point in the narrative.

There is, however, no question of the author's sincerity or of the way his mind is turning, for over and over again in the course of the book one feels that he is about to say that the design of nature, to use a hackneyed phrase, is evidence of a Creator. Not until his final paragraph, however, does he say fully what he has in mind. Then we read: "And now, on a personal note and very briefly, I realise that in putting forward these views I am laying myself open to a charge of gross materialism. To some this will even imply an atheistic conception of things. But to me it is, in fact, far otherwise. As I see it, this law of evolution is something of sheer beauty because of its omnipotence, and what Power there must be behind it is something very wonderful but something also perhaps beyond the feeble machinery of the human intellect and certainly beyond the scope of this book."

This expression of faith presumably crystallises the thoughts of this experienced zoologist, and to that extent cannot be lightly set aside. They have a value, however, only in so far as they can be supported by his previous arguments, and in this connection one would wish that the book could have been much longer and that the author could have given more care to presenting his arguments. It is not possible here to examine these in detail, but there is one more especially upon which I would like to comment. It is, that in the lower animals, those at the base of the animal scale, and which presumably represent the forerunners in geological time of the animal kingdom as we know it to-day, it is extremely difficult to apply the principles embodied in random mutation acted upon by natural selection. In fact, it is difficult to see a working

of natural selection at all, and, although one assumes it must have taken place, assumption is not proof.

If in only one group of animals it is difficult to see how natural selection can account for all we can now observe, then there must be room for an alternative hypothesis, and this must apply, if to a varying degree, to all sections of the animal kingdom. It is possible that natural selection may have operated more intensively on the higher animals and plants. Certainly, it is with these that the more devoted supporters of Darwinism have mainly worked. It may be, also, that such a varying degree by which natural selection may have been at work is responsible for the differential evolution of the various organisms. At all events, Cannon argues that there must be some other process that precedes the action of natural selection, and that this alone justifies re-opening the whole subject. To say the least, he has given us plenty of material for debate.



POSING THE AGE-OLD QUESTION—"WHICH CAME FIRST, THE CHICKEN OR THE EGG?" : TWO YOUNG CHICKS, SHOWING THE SPECIAL EGG-TOOTH ON THEIR BEAKS WITH WHICH THEY OPEN THE SHELL TO HATCH.

It is currently accepted that reptiles evolved from amphibians and birds from reptiles. Amphibians lay eggs enclosed in a soft jelly which is ruptured to allow the larvæ to escape. Reptiles and, more especially, birds lay hard-shelled eggs and the young hatch after opening the shell with a special egg-tooth on the beak. Professor Cannon, whose book is reviewed on this page, accepts this as a general thesis but cannot accept the current explanation of how the shell and egg-tooth have arisen. Thus: "... the shell could not have appeared without the egg-opener. Any one without the other would be senseless. They must have evolved together. And that is what according to Darwin and the neo-Darwinians we are asked to believe is the result of random variation!"

Photograph by Jane Burton.

about and maintains. Although he only published this as a separate law in 1815 it is clear, as I have already said, that he believed in it in 1809. But what a pity it was that he did not incorporate it as a separate law in that first publication to the general scientific world of his views. It might have altered the whole history of evolutionary thought. After quoting his two laws in 1809 he states in the next paragraph but one that naturalists have believed that the possession of certain organs led to their employment. But he says this is wrong for it is easy to demonstrate that it is to the contrary: 'The needs and uses of organs which have developed these same parts, which have even given origin to them where they did not exist.' This is something more than the inheritance of acquired characters."

An obvious question arises, whether this interpretation of Lamarck's views makes them any more acceptable to orthodox biologists, and the answer is certainly in the negative. Cannon