



16 CHARLES DARWIN

1809 - 1882

Charles Darwin, the originator of the theory of organic evolution by means of natural selection, was born in Shrewsbury, England, on February 12, 1809 (on exactly the same day that Abraham Lincoln was born). At sixteen, he entered the University of Edinburgh to study medicine; however, he found both medicine and anatomy dull subjects, and after a while transferred to Cambridge to study for the ministry. At Cambridge, he found such activities as riding and shooting far more agreeable than his studies. Nevertheless, he managed to impress one of his professors sufficiently to be recommended for the position of naturalist on the exploratory voyage of the *H.M.S. Beagle*. His father at first objected to Charles's accepting the appointment, feeling that

such a trip would simply be a further excuse for the young man to delay settling down to serious work. Fortunately, the elder Darwin was persuaded to give his consent to the trip, for this was to prove one of the most rewarding ocean voyages in the history of Western science.

Darwin set sail on the *Beagle* in 1831, at the age of twenty-two. In the course of the next five years, the *Beagle* sailed around the world, skirting the coasts of South America at a leisurely pace, exploring the lonely Galapagos Islands, and visiting other islands of the Pacific, the Indian Ocean, and the South Atlantic. During the long course of the voyage, Darwin saw many natural wonders, visited primitive tribes, discovered large numbers of fossils, and observed an enormous number of plant and animal species. Furthermore, he took voluminous notes on everything that he observed. These notes provided the basis for almost all his later work; from them, he derived many of his principal ideas, as well as the immense wealth of evidence by which he made his theories prevail.

Darwin returned home in 1836, and over the next twenty years he published a series of books which established his reputation as one of the leading biologists in England. As early as 1837, Darwin became convinced that animal and plant species were not fixed, but had evolved over the course of geologic history. At that time, however, he had no idea what might be the cause of such evolution. In 1838, however, he read *An Essay on the Principle of Population* by Thomas Malthus, and that provided him with the vital clue to his notion of natural selection through competition for survival. But even after Darwin had formulated the principle of natural selection, he did not rush to present his ideas in print. He realized that his theory was bound to arouse a good deal of opposition, and he therefore spent a long time carefully assembling the evidence and marshalling the arguments in favor of his hypothesis.

He wrote an outline of his theory as early as 1842, and by 1844 was working on a full-length book. However, in June 1858, when Darwin was still adding to and revising his great work, he

received a manuscript from Alfred Russel Wallace (a British naturalist who was at that time in the East Indies) outlining Wallace's own theory of evolution. In every essential point, Wallace's theory was the same as Darwin's! Wallace had developed his theory completely independently and had sent his manuscript to Darwin in order to obtain the opinion and comments of an established scientist before publishing it. It was an embarrassing situation, which could easily have developed into an unpleasant battle over priority. Instead, Wallace's paper and an outline of Darwin's book were presented as a joint paper before a scientific body the following month.

Oddly enough, that presentation did not arouse a great deal of attention. However, Darwin's book, *The Origin of Species*, published the following year, created a furor. In fact, it is probable that no scientific book ever published has been so widely and vigorously discussed, by scientist and layman alike, as *On The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. The arguments were still going strong in 1871, when Darwin published *The Descent of Man, and Selection in Relation to Sex*. That book, which propounded the idea that man was descended from ape-like creatures, added still more fuel to the raging controversy.

Darwin himself took no part in the public debates on his theories. For one thing, he had been in bad health ever since the voyage of the *Beagle* (probably the result of a recurrent ailment, Chagas' disease, which he had contracted from insect bites in South America). Furthermore, the partisans of evolution possessed, in Thomas H. Huxley, a skilled debater and a vigorous defender of Darwin's theories. The large majority of scientists had accepted the basic correctness of Darwin's theories by the time he died, in 1882.

Darwin was not the originator of the idea of the evolution of species; quite a few persons had postulated that theory before him, including the French naturalist, Jean Lamarck, and Charles's own grandfather, Erasmus Darwin. But these hypotheses had never gained the acceptance of the scientific world,

because their proponents were unable to give convincing explanations of the means by which evolution occurred. Darwin's great contribution was that he was able to present not only a mechanism—natural selection—by which evolution could occur, but also a large quantity of convincing evidence to support his hypothesis.

It is worth noting that Darwin's theory was formulated without any reliance on genetic theory—or indeed, any knowledge of it. In Darwin's day, no one knew anything about the way in which particular characteristics were passed on from one generation to the next. Although Gregor Mendel was working out the laws of heredity during the same years that Darwin was writing and publishing his epoch-making books, Mendel's work—which supplements Darwin's so perfectly—was almost totally ignored until the year 1900, by which time Darwin's theories were already well established. Thus, our modern understanding of evolution, which combines the laws of genetic inheritance with natural selection, is more complete than the theory proposed by Darwin.

Darwin's influence on human thought has been immense. In the purely scientific sense, of course, he revolutionized the entire subject of biology. Natural selection is a very broad principle indeed, and attempts have been made to apply it to many other fields, such as anthropology, sociology, political science, and economics.

Even more important, perhaps, than their scientific or sociological import, has been the impact of Darwin's theories upon religious thought. In Darwin's day, and for many years thereafter, many devout Christians believed that the acceptance of Darwin's theories would undermine belief in religion. Their fears were perhaps justified, although it is obvious that many other factors have played a role in the general decline of religious sentiment. (Darwin himself became an agnostic.)

Even on a secular level, Darwin's theory has caused a great change in the way that human beings think about their world. The human race as a whole no longer seems to occupy the central

position in the natural scheme of things that it once did. We now have to regard ourselves as one species among many, and we recognize the possibility that we may one day be superseded. As a result of Darwin's work, the viewpoint of Heraclitus, that "there is nothing permanent except change" has gained much wider acceptance. The success of the theory of evolution as a general explanation of the origin of man has greatly strengthened belief in the ability of science to provide answers to all physical questions (although not, alas, to all human problems). The Darwinian terms "the struggle for existence" and "the survival of the fittest" have passed into our vocabulary.

It is obvious that Darwin's theories would have been expounded even had he never lived. In fact, in view of Wallace's work, this is perhaps more obviously true of Darwin than of any other person on this list. Still, it was Darwin's writings which revolutionized biology and anthropology, and which have so altered our view of man's place in the world.

Beagle Channel was named after Darwin's ship "The Beagle."

