

Charles Darwin

XIV. CHARLES DARWIN

1809-1882

BIOGRAPHICAL STUDY

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In the "*Life and Letters of Charles Darwin*," published by his son, is given a brief sketch of Darwin's life, written by himself for the use of his children. It is written, as he says, "as if I were a dead man in another world looking back on my life." The main outlines of Darwin's life have been given many times, but nowhere so charmingly and so vividly as in his own biography. From this sketch I make some quotations in the following notice:

Charles Robert Darwin was born in Shrewsbury, England, on February 12, 1809. His father, Robert Waring Darwin, was an eminent physician. His mother, who died in Darwin's youth, was Susannah Wedgwood. The most noted of Darwin's ancestors was his grandfather, Dr. Erasmus Darwin, known in the last century as poet and philosopher, and as the author of ingenious speculations some of which resemble the views of his distinguished grandson.

Darwin's early school days were marked mainly by a love for collecting and finding the names of things—shells, beetles, postage stamps, minerals—and by his passion for hunting, angling, and other field sports.

He was sent first to a boys' school in Shrewsbury, and afterward to the universities of Edinburgh and Cambridge. In his own estimation none of these schools was of much use to him. Of the boys' school he says: "Nothing could have been worse for the development of my mind than Dr. Butler's school, as it was strictly classical, nothing else being taught except a little ancient geography and history. The school as a means of education to me was simply a blank."

He used to work at chemistry in a little laboratory fitted up by his brother in the garden at home, and this unprecedented taste caused his school-fellows to give him the nickname of "Gas."

"I was once," says he, "publicly rebuked by Dr. Butler for thus wasting my time on such useless subjects."

Later, in the University of Edinburgh, he found the instruction even in natural history "incredibly dull." The sole effect produced upon him by the lectures in geology was "the determination never, so long as I lived, to read a book on geology or in any way to study the science."

After two years in Edinburgh he changed his early determination to become a physician and prepared himself for the career of a country clergyman.

Of this three years at Cambridge Darwin says: "My time was wasted, so far as the academical studies were concerned, as completely as at Edinburgh or at school.

. . . The careful study of these works (Paley's 'Evidences of Christianity,' 'Moral Philosophy' and 'Nat-

ural Theology') . . . was the only part of my academical course which, as I then felt and still believe, was of the least use to me in the education of my mind."

The real value of his stay at Cambridge came from his association with scholars; above all, from his acquaintance with the famous botanist and still more famous teacher, Professor Henslow. Here, too, he met the geologist Adam Sedgwick, whose accuracy of observation and devotion to truth had a marked influence in Darwin's early training.

In 1831, while still engaged in preparation for the ministry, Darwin received from Captain Fitzroy the appointment as naturalist on board the ship *Beagle*. This vessel was to spend some five years in a cruise around the world, mainly for the purpose of exploration and examination of harbors. The story of this famous voyage Mr. Darwin has told in a most charming way, and its value to science has been beyond calculation. Darwin's experiences and discoveries on the coast of South America decided him to give his life to science. His questionings in regard to the relations of the present and past inhabitants of that continent started him on that line of investigation which has made "Darwinism" almost a synonym for modern biological science.

The *Beagle* returned in 1836. Within the next five or six years the results of the voyage were published. The "Journal of Travels," "Coral Reefs," "Geological Observations on South America," with numerous minor papers, at once placed Darwin in the front rank of English men of science.

Darwin was married in 1839 to his cousin, Julia Wedgwood. Their married life was a most happy one, and her

unwearying devotion was one of the great elements of his success. In 1846 Darwin purchased a large mansion, beautifully situated in the outskirts of the little village of Down, in Kent, and here, in the seclusion which his physical sufferings rendered necessary, the rest of his life was spent. His son, Francis Darwin, tells us: "For nearly forty years he never knew one day of the health of ordinary men, and thus his life was one long struggle against the weariness and pain of sickness; and this cannot be told without speaking of the one condition (the devotion of his wife) which enabled him to bear the strain and fight out the struggle to the end."

While in Chile Darwin had become interested in certain forms of cirripedes or barnacles, and in 1846 he began a monographic account of the group. It is one of the most perfect pieces of work ever accomplished. In one of his letters Darwin doubts whether this work, which occupied him during eight years, was really worth the time and strength spent on it. It is, however, the testimony of his fellow-naturalists that these years were well spent. The training thus secured in the exact statement and the systematic arrangement of facts was of the greatest help to him in his later studies.

The problem of the origin of species now began to occupy almost exclusively the time and attention of Mr. Darwin. Year after year was spent in the patient gathering of facts, and in drawing from these facts their natural conclusions. The strength of his work lay in the fact that he rejected all unverified speculation. He was the faithful mirror of nature, and in all the years since then no important statement of fact admitted by Darwin has been cast aside as spurious. As the years went on the amount of

his material became enormous. The greater the accumulation of facts the more distinctly they seemed to point to the truth of the theory of descent as forming the bond of union among species. The amount of Darwin's manuscript soon exceeded the bounds of a single book; so in 1856 he was compelled to begin the laborious task of selecting, re-writing and condensing. Before his manuscript, as abridged, was ready for the printer another naturalist, engaged in another field, had independently come to the same conclusions. A friend of Darwin—Alfred Russell Wallace—then engaged in explorations in the East Indies, had prepared a paper on "The Tendency of Varieties to Depart Indefinitely from the Original Type." This paper he sent in 1858 to Mr. Darwin for examination and for publication in such way, as Mr. Darwin might think advisable. This essay contained exactly the same theory of the formation of species by "natural selection" that Mr. Darwin had spent so many years in elaborating.

It was thought best by the friends of Darwin and Wallace to have the publication of the theory of "natural selection" by the two authors simultaneous. A brief extract of Darwin's studies was therefore published in 1858, side by side with the paper of Mr. Wallace. The generosity with which Mr. Wallace has set aside his own claims in favor of those of his greater friend and noble rival is one of the most charming incidents in the history of zoölogy.

In 1859 Darwin had finished the condensation of his manuscript and it was given to the public under the name of "*The Origin of Species*."

Let me speak of certain traits of this work which gave it a position almost alone among books of science. There is in it no statement of fact of any importance which dur-

ing the twenty-five years since it was first published has been shown to be false. In its theoretical part there is no argument which has been shown to be unfair or fallacious. In these twenty-five years no serious objection has been raised to any important conclusion of his which was not at the time fully anticipated and frankly met by him. Indeed, there are but few of these objections which with our present knowledge are not much less weighty than Darwin then admitted.

There is in this work nowhere a suggestion of special pleading or of overstatement. The writer is a judge and not an advocate, and from his decisions there has been no successful appeal. There is in this or any other of Darwin's works scarcely a line of controversial writing. He has been the faithful mirror of nature. The relations of nature to metaphysics he has left to others. The tornadoes which have blown about the "*Origin of Species*" have left him undisturbed. The word "evolution" is not his word. He felt, perhaps, that most systems of philosophy are like air-plants, which thrive equally well in any soil. With just facts enough for their roots to cling to they may grow and bloom perennially without other food than the air. From the standpoint of the naturalist the greatest work of Darwin has been the total change in our conception of species. It was declared by Linnaeus, and repeated by his successors, that "there are as many different species now as there were different forms created in the beginning by the Infinite Being." In accordance with this statement we have been taught to look upon a species in biology as a fixed entity, a perennial succession of individuals, similar to one another, from the creation at one end of the series to the extinction at the other. We have been told

over and over again that the variations of a species are kept within fixed limits by definite laws, and that one species can never encroach on the traits of another species, nor ever permanently assume any characters other than those with which it was created. Darwin maintained that the form under which any species is known to us is simply a phase in the history of the succession of living forms which constitute that species. He has shown that in fact species are not thus held in check—that with the line of descent goes gradual modification. Thus the living representatives of no species to-day are quite like their ancestry of centuries ago.

This publication of the "*Origin of Species*" marks the beginning of the modern era in biology and in the related sciences. Its theories ran counter to the preconceived opinions of most men learned of science as well as of philosophy. It met with a storm of adverse criticism, some of it well-meaning, much of it ferocious, and unreasonable to an extent that now seems hardly possible. On the other hand, the more able, and especially the younger workers in biology, one or another, gave their assent to its general propositions. This was especially true in England, Germany and the United States. Darwin had felt that a crucial test of his theory would be his ability to convince Lyell, Hooker and Huxley in England, and Asa Gray in America. These four illustrious men were among his first converts.

For the rest of the scientific world Darwin thought the adoption of the theory of descent must be a mere question of time, and that the younger and more observant could not fail to find in their own work confirmation of his conclusions. Nothing in the history of science is more re-

markable than the calm patience and humility with which Darwin awaited the verdict of posterity on the main question involved in his theory of the origin of species. The main question, I say, for as Francis Darwin observes: "It comes out very clearly * * * that he did not rejoice over the success of his own theory of evolution—that modification is mainly due to 'natural selection.' On the contrary, he felt strongly that the really important point was that the doctrine of descent should be accepted."

From the first the growth of the acceptance of the theory of descent has been steady and sure. It is now universal among men whose studies in any line are such as to give them a right to an opinion. No man who has studied animal life would hold the old notion of the special creation of species and look an animal in the face.

The rest of Darwin's life was spent in the preparation and publication of various special works, most of which I need not name here, and which are the overflow of the material gathered for the "*Origin of Species*."

In the "*Descent of Man*," the most important of these, he showed that the human race could be no exception to the common unity of life. For the human race is likewise a species and from its physical side it must be discussed with other species. The study of these relations gave us in 1871 the volumes on the "*Descent of Man*." If we suppose, as we must, that the various forms of lower animals and plants had their origin in pre-existing forms, more or less unlike them, we may conceive it to be true of man also. That it is in fact true of man we know; for not many thousands of years ago our ancestors in Europe were barbarians, cave-dwellers, lake-dwellers, and dwellers in hol-

low trees, with only the rude implements they shaped from metal and flint. Surprisingly like us in form and structure, though far below us in skill and intelligence, are the many races of apes and monkeys. And among these, or, rather, behind them, for they, too, are changing with the changing conditions of life, must our ancestry be traced.

If anything is certain in science it is this. What we call homology represents something real, some law of nature, something other than the mere results of chance. When I compare my arm with that of my neighbor I find some differences—differences in size and in proportions. But these are superficial and there is the underlying correspondence of bone and muscle, each nerve fiber, artery, and vein. When I compare my arm with the fore leg of a dog I find more striking differences, for the dog's station in life is quite unlike my own, and his arm he uses for quite different purposes. When I compare my arm with the wing of a bird, or the pectoral fin of a fish, the results are still similar. Though the differences in each case become more and more striking, and the resemblances less easy to trace, yet the same resemblances exist, and a closer study shows that these resemblances far outweigh the differences.

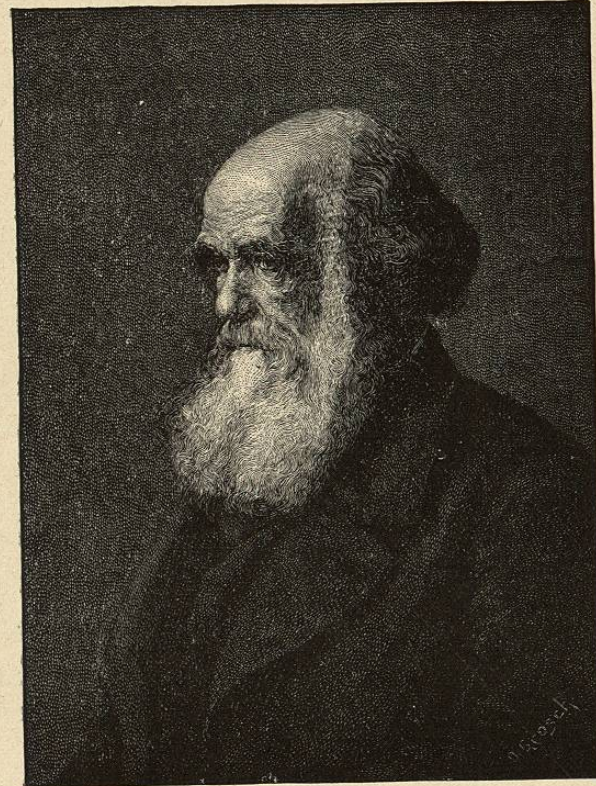
We say, then, that homology is real, and whatever power or influence or cause has acted on fishes to provide them with pectoral fins, has given to birds wings, to the dog forelegs, and to me and my neighbor arms. The arms are appendages more highly finished and suited to more purposes; but all are formed of the same pieces, arranged in the same way, and all bear the stamp of the same maker. But when I compare my arm with the claw of a lobster, the

limb of a tree, the arm of a starfish, or an arm of the sea all resemblances in structure disappear and we have only chance analogies.

This, then, is certain: In nature homology exists, and among us backbone animals all structures, all functions, and at least some of the mental operations, show distinct homology. The essence of the development theory is this: Homology is the stamp of heredity. Homology means blood relationship. No other meaning has ever been shown, nor is there the slightest evidence that any other interpretation is possible. Blood relationship implies a common action of heredity, and heredity is the only known source of the likenesses we call homology.

Not only the lower races of men but the lower animals in their degree show in their structure the unmistakable evidence of kinship by blood. In every bone and muscle my dog shows his likeness to me, and even in every function of his feeble little brain the resemblance is apparent. Let me say again, we have no other explanation of homology than that of kinship by blood. This is Darwinism and this is the lesson of all biological science. There is substantially the same evidence—the same in kind and not much less in degree—for believing that my dog and myself are related by blood in some form of distant cousinship as there is to show a similar relationship between myself and any one of my neighbors about me to-day.

One of the ablest of recent writers on evolution (Dr. Edwin Grant Conklin) has used these words: "On the whole, the facts which are at present at our disposal justify a return to the position of Darwin. Neither Weismannism nor Lamarckism alone can explain the causes of evolution. But Darwinism can explain those causes. Darwin endeav-



CHARLES ROBERT DARWIN.
Painting by G. F. Watts, after the etching of Rajon.