EVOLUTION

Best Seller for a Century

This year marks the centenary of the publication of a revolutionary scientific work, Charles Darwin's "On the Origin of Species," a best seller from the day of its appearance.

By BENITA TALL

➤ ALMOST ONE HUNDRED years ago, on July 1, 1858, an epoch-making paper was read before a famous English scientific society. Those attending the meeting of the Linnean Society that date heard a joint communication entitled "On the Tendency of Species to Form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection."

One of the authors was A. R. Wallace, a young teacher and "beetle and butterfly collector." The other was Charles Darwin, a naturalist fairly well-known to scientists of the time for his studies of fossils and for his theories, expressed mostly in private communications, about the possible causes of evoluton.

Publication of the paper launched both men, but particularly Darwin into the center of the scientific world with the magic words "natural selection" and "struggle for existence."

The name Darwin became synonymous with a revolutionary, and sometimes ridiculed, theory explaining the evolution of different species of animals and plants.

For Wallace the joint paper meant fame. It placed him among the leading exponents of what came to be called Darwinism. But it always remained a kind of fame-by-association.

Darwin was the pivotal figure when publication of the paper made his private theories public.

Revolutionary Theory

Darwin himself felt this was premature publication of concepts he had been developing for some 20 years. But it forced him to prepare the great work of his life. "On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life" appeared on Nov. 24, 1859, when Darwin was 50 years old. The whole edition of 1,250 copies was sold out on the first day.

It is difficult now, 100 years later, to imagine the furor caused by this book's publication. It was not read solely by naturalists and other scientists. The man-in-the-street read it. Theories appearing on its pages were argued in scientific societies, in saloons and sitting rooms, in coffee houses and gentlemen's clubs. Newspapers carried stories. Public lectures brought opponents and proponents together to argue the case for natural selection.

What was this natural selection? For Darwin and his followers it was, and is, the main causal agency of evolution. Because of natural selection mainly we have the great number of different species in the plant and animal kingdoms.

Natural selection, as its name implies, is the selection by non-human processes or instruments of those species better adapted for survival in a given environment. It is similar to the artificial selection carried on by the farmer when he selects the best milk-producer from his dairy herd for breeding purposes.

Perhaps a recent observation of natural selection can show how it operates in terms of evolution.

Black Moths from White

Scientists have observed that dark forms of about 70 species of moths have been increasing in industrial areas of Great Britain. One species, with white wings that carried fine black spots, has given way to a black form that dominates these coal-smoke blackened areas. This has happened due to natural selection against the conspicuous white form. Birds will feed on the more conspicuous moth preferentially.

Evidence of the intensity with which natural selection influenced the development of the new form was gained when both light and dark moths were released in industrial and rural wooded areas. Counts from traps showed the less conspicuous form was about twice as "fit" for survival as the more conspicuous.

Nature had selected the individual moths that carried the black genetic determinants for survival, thus giving rise to what became a new form.

In the "Origin of Species" the facts for natural selection, or as the scientist Herbert Spencer, a contemporary of Darwin's, phrased it, "survival of the fittest," were presented.

Darwin worked on the foundations provided in the works of Sir Charles Lyell, particularly the Principles of Geology which gave evolutionists the enormous time span they needed. He was admittedly influenced by Malthus' statements on human populations and the struggle for existence.

The times were also ripe for the theory of natural selection.

Evolution and various theories accounting for it was an important scientific topic. An American W. C. Wells formulated what was practicallly a Darwinistic statement of natural selection in an 1813 paper delivered before the Royal Society of London. Patrick Matthew, a Scotsman, published a book in 1831 that, in Darwin's own words, "most expressly and clearly anticipated" his views.

Perhaps the root of Darwin's genius lay, not in his formulation and enunciation of the theory of natural selection, but in his unceasing attention to the facts with which to prove his theory. He could think out the consequences of long chains of observations and marshall his evidence, presenting it clearly and forcefully. He had a love of scientific work, experiment and detail that dominated his life.

Actually, many of the facts Darwin used to support his theories where uncovered during his five-year cruise on board the H.M.S. Beagle.

The boy of 22 who signed on board the ship as naturalist in 1831 and set out on a voyage through the Atlantic and Pacific Oceans returned as a man with evidence for a new theory of evolution.

He spent some 50 years studying and observing nature, living quietly and for the most part taking little part in the scientific battles engendered by his theories.

In many ways Darwin himself, and his theory of evolution, was a product of natural selection.

His grandfather, Erasmus Darwin, was known both as a distinguished medical doctor and a poet. He even anticipated his grandson's venture into the why's and wherefore's of evolution with some theories of his own.

Robert Darwin, Charles' father, was also a very successful physician. His mother was the daughter of Josiah Wedgewood—the famous potter who gave his name to the blue ware that bears delicate relief figures in classic Greek poses.

Survival of the Fittest

Darwin was also fortunate for, in addition to his intellectual inheritance and environment, he never had to earn his own living. He was always able to devote his time and energies to his studies. This was particularly important since his health broke down after the Beagle cruise. Darwin worked while in almost continuous pain during most of his life. Yet he was known for his patience, good temper and kindliness. His ill health made necessary a quiet life and regular routine which probably helped him carry on his work.

Protected by a devoted wife and surrounded by his ten children, Charles Darwin carried on a life's work dedicated to science.

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ENGINEERING

Work on British Nuclear Power Station Continues

See Front Cover

➤ WORK BEGAN about one and one-half years ago on Britain's nuclear power station at Berkeley, Gloucestershire, England. Due to be fully operational by 1961, it is expected to be one of 16 in 1965.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows night work on the construction.

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