CENTENNIAL OF DARWIN'S 'ORIGIN OF SPECIES' HAILED

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CURATOR OF VERTEBRATE ANATOMY

CHARLES DARWIN'S celebrated book, *The Origin of Species by Means of Natural Selection*, was published just a hundred years ago, on November 24, 1859. Few ideas affected the whole fabric of human thought so profoundly as the idea Darwin was trying to prove, that species of animals and plants were not created fixed and immutable. In a very real sense the publication of the *Origin* marked the end of an era that goes back to the beginning of recorded human thought, and the dawn of a new era whose consequences we cannot even dimly discern. For the first time man saw himself standing alone in a universe he had scarcely begun to understand. The prospect was terrifying. It is impossible for us today to appreciate the intensity of feeling, the outraged indignation, the emotional panic, with which Darwin's ideas were greeted by many, including many of his fellow scientists. Yet this reaction might have been foreseen (and was indeed foreseen by Darwin himself), for nothing before or since has so humbled man as did the implication that he is kin to the rest of nature. The last serious attempt to demolish this concept by an appeal to irrational emotion was the Scopes trial held in Dayton, Tennessee, in 1925.

A hundred years is enough time to provide some historical perspective, and biologists and humanists the world over are seizing the centennial anniversary of the publication of the *Origin* to assess its status today, and to appraise our present understanding of evolution in general.

Historical research has clarified Darwin's place in the history of man's attempt to understand nature and himself. It has long been clear that Darwin did not originate the idea of evolution, and that he did not prove that evolution took place. Nowhere does he claim to have done so. The idea that species are related through common ancestry is an old one that cannot be attributed to any one man. That evolution did in fact take place can be proved in only one way—by seeing the actual record of evolutionary change in the rocks laid down while these events were happening. If there were no fossil record biologists would still be debating the fact of evolution.

DARWIN'S FORERUNNERS

Darwin did not even originate the idea of natural selection, the concept most intimately associated with his name. His grandfather, Erasmus Darwin, himself a most remarkable man, came close to hitting upon the idea of natural selection in 1794. Recent historical research has unearthed an astonishing number of books and articles written in England during the first half of the 19th century that explicitly attribute the creative role in evolution to natural selection. Most of these are nearly forgotten now, but some were immensely popular in their time, and all were certainly well known to Darwin.

Conspicuous among these pioneers were William Lawrence, a physician, Edward Blyth, a naturalist, and the philosopher Herbert Spencer. Spencer even coined the historic phrases "struggle for existence" and "survival of the fittest," which are often attributed to Darwin. Finally, the young Alfred Russel Wallace, who for years had been collecting and observing animals in the tropical jungles of the East Indies, in 1858 sent Darwin a draft of a theory of evolution by natural selection so similar to Darwin's that Darwin wrote in astonishment and dismay, "I never saw a more striking coincidence." Only now are we beginning to appreciate the extent to which evolutionary thought was working, like yeast, in the minds of Englishmen during the early 19th century. In England the idea of evolution was no philosophical plaything, but a bold attempt to understand the workings of nature in terms of known forces.

Seemingly "scooped" by others on every point, we may well ask why Darwin is celebrated, and why the *Origin* is considered one of the handful of great books that have profoundly influenced humanity. In part the explanation is simple. Except for Wallace, the notions of Darwin's predecessors were not scientific theories but speculations unsupported by facts. The history of philosophy is full of such flights of fancy, which may be stimulating and inspirational but do not represent any real advance in understanding. Wallace's claims are not so easily disposed of, for his explanation of evolution was arrived at exactly as Darwin's was—through deduction from an enormous mass of observations. It was Wallace's misfortune to be far away in the jungles of the East Indies when the storm broke in England. If he had returned to England earlier he might not have been eclipsed so completely by Darwin. Yet we cannot imagine the brilliant but erratic Wallace compiling the *Origin*. It was the overwhelming mass of data painstakingly marshaled by Darwin in the *Origin* that forced a reluctant humanity to abandon its belief in special creation, the most powerful superstitition that ever enslaved the mind of man. Perhaps the most important ingredient in Darwin's genius was the tenacity that kept him patiently gathering and sorting data for twenty-five years.

It was probably inevitable that some would try to deify Darwin as a unique genius whose insight enabled him to peer into the void and see what no man before him had dreamed of. There have been such men in the history of science, but Darwin certainly was not one of them. Nothing in history is more certain than that sometime during the third quarter of the 19th century some British biologist would have written an "origin of species by means of natural selection." Scientific knowledge in general, particularly in geology and paleontology, had reached a level that was making it impossible for any fair-minded person who knew the facts to doubt that evolution did take place. In England the medieval stranglehold of the church on the minds of men had relaxed enough to make it safe to express such opinions publicly. And for more than fifty years influential British scholars had been suggesting—but without any proof—that natural selection is the agent of evolution.

MILESTONE IN HUMAN THOUGHT

The fact that Darwin and Wallace independently developed identical theories at the same time was no accident. In all fairness we must recognize that Darwin was something of a child of fortune, who happened to be at the right place at the right time. It is not quite correct to say that Darwin and the *Origin* altered the course of human thought; rather they are symbols of an important milestone in the evolution of human thought. Yet such an appraisal of Darwin's place in history would be grossly unfair, for it *was* Darwin who wrote the *Origin of Species*, and it *was* the *Origin* that breached the last bulwark of romantic idealism in science. To argue that another might have done it is fatuous. Darwin was far more than a mere plaything of fate, but there is no need to make more of him, or of the book, than they were.

What, then, is the status of natural selection as a scientific theory today? No one can question its historical importance, but in science no concept has standing merely because it once caused a stir, however great. The only test of a scientific theory is whether it continues to account for all new facts as they are discovered. If it does not, the theory is dead and only historians continue to study its corpse.

Natural selection has had its times of trouble when new observations, particularly in paleontology and genetics, seemed to doom it, but it has survived all such temporary misinterpretations. By far the most serious defect in Darwin's argument was the supposition, then general among animal breeders, that the characters of the parents blend in their offspring, like inks of different colors poured together. Discerning critics quickly pointed out that a favorable variation would therefore quickly be diluted and lost, so natural selection could not possibly work. Knowing that artificial selection does work, Darwin wrestled with this problem for years, and lost because the laws of heredity were then unknown. When Mendel's experim ents revealing the laws of hered ity were rediscovered in 1900 the difficulty disappeared, but by then Darwin had been

dead for eighteen years. Today natural selection is more firmly entrenched than ever —one of the foundation stones of our interpretation of living nature. Yet, like any theory in science, it will always be a provisional explanation. It will ever be tested against new observations and experiments, and the moment a discrepancy appears the theory will either be modified or abandoned. There is no place for sentiment in science.

Charles Darwin was a naturalist. Nature is so vast and complex that we are forced to study it by isolating tiny fragments in the laboratory, where each is worked on by a specialist. Such dismemberment may lead to grievously wrong interpretations of nature, and so someone must try to put these fragments back together and view nature as an organized whole. This is the job of the naturalist. Like nearly all naturalists of his time, Darwin was an amateur. Things have become vastly more complex since Darwin's time, and no longer can the amateur command the materials and equipment for carrying on biological research.

CAUTION ALWAYS ESSENTIAL

The naturalists of today are mostly in the world's few great natural history museums, where the tradition of working in the final great laboratory of nature itself is still carried on. This is a proper and necessary function, for biologists, like Antaeus, are strong only as long as their feet touch the ground. Specialists we must have, but it is all too easy to mistake a tiny fragment of nature, isolated in a man-made laboratory, for all of nature and reach catastrophically wrong conclusions. Naturalists may never again discover anything half so important as natural selection, but they will always be science's link with the firm ground of nature from which all science is drawn. Providing this vital link with reality is one of the most important functions of a natural history museum.

As one of the heirs of the Darwinian tradition, it is fitting for Chicago Natural History Museum to join in commemorating the centenary of the publication of the *Origin of Species*. A special exhibit, titled "Darwin's Origin of the Species," will be on display in Stanley Field Hall during the months of November and December. The exhibit consists of six panels that trace the history of the *Origin* and explain the meaning of, and the evidence for, natural selection. Included in the exhibit is a copy of the rare first edition of the *Origin of Species*, loaned for the occasion by the John Crerar Library of Chicago. Holograph letters written by Darwin and specimens from the Museum's collections that were collected by him on the voyage of the *Beagle* will also be on display.

One of the world's outstanding gem collections may be seen in H.N. Higinbotham Hall (Hall 31).

A SPECIAL EXHIBIT OF DARWINIANA

AT A TIME when scholars from all over the world are gathering on the University of Chicago campus to discuss the meaning and modern-day implications of Charles Darwin's *The Origin of Species*, a book that shook the world when it was first printed, and when numerous learned societies are publishing essays discussing that same book, Chicago Natural History Museum is bringing to the public a special graphic exhibit on this subject.

The special exhibit, titled "Darwin's Origin of Species," commemorates the first publication of the theory on November 24, 1859, and will go on display in Stanley Field Hall November 1, continuing through December 31.

Six panels tell the story of *Origin* by explaining the meaning of, and the evidence for, natural selection—the book's theory that in the "struggle for existence" those characteristics will be retained that best enable an organism to cope with life and to survive. The first panel traces the historic voyage of the *Beagle* on a colored map of the world, focusing on specimens that Darwin collected and studied at different points of the voyage. It was on that voyage that Darwin formulated many of his first ideas regarding evolution. Panel 2 presents the logical development of Darwin's ideas that came out of the voyage, in the areas of paleontology, embryology, and comparative anatomy. The third panel is devoted to the numerous books that Darwin wrote before and after publication of *Origin*, each concentrating on a different area of life, but all influenced by his theory of evolution.

EXAMPLES OF PROCESSES

More explicit examples of the basic thinking involved in natural selection, as Darwin saw it, are embodied in Panels 4, 5, and 6. Three examples of the operation of natural selection are shown in Panel 4: oak leaves, beetles, and variations in domestic pigeons. Panel 5 pictorially demonstrates six forces that play a part in natural selection: disease, competition, food, co-operation, climate, enemies. Finally, Panel 6 shows how a species produces progeny in excess of those that will ultimately survive to assure continuity of the species—a point in which Darwin became interested after reading *Malthus On Population*. To demonstrate this point, the panel shows Darwin's classic example of the possible geometric increase of two elephants over a period of 750 years to 19 million elephants—the number that would roam the earth in the event that none of the elephant offspring died or were killed after birth.

Responsible for planning the exhibit are Dr. Austin L. Rand, Chief Curator of Zoology, D. Dwight Davis, Curator of Vertebrate Anatomy, and E. John Pfiffner, Museum Staff Artist.

Daily Guide-Lectures

Free guide-lecture tours are offered daily except Sundays under the title "Highlights of the Exhibits." These tours are designed to give a general idea of the entire Museum and its scope of activities. They begin at 2 P.M. on Monday through Friday and at 2:30 P.M. on Saturday.

Special tours on subjects within the range of the Museum exhibits are available Mondays through Fridays for parties of ten or more persons by advance request.

FILMS FOR CHILDREN ON SATURDAYS

The autumn series of free motion pictures for children continues in November with programs to be presented on each of the four Saturday mornings at 10:30 A.M. in the James Simpson Theatre. Children may come all alone, in organized groups, or accompanied by adults. No tickets are needed.

Dates and titles of films are as follows:

November 7—The Magic Horse

An animated cartoon based on the old Russian folk tale about a boy and his tiny horse that has magical powers

November 14—The Adventures of Chico

A children's favorite: the story of a little boy and his pet bird in Mexico

November 21—Kon Tiki (*Museum Traveler Day—presentation of awards to children who have completed series of Museum Journeys*)

The voyage of a group of young Scandinavians from South America to Pacific islands on a balsa raft

November 28—An All-Cartoon Program

Willy, the Operatic Whale; Susie, the Blue Koop; and A Cowboy Meets a Horse

Each boy and girl attending will be given an exploration sheet directing them to Museum exhibits in which they can see material related to the stories of the films.

Educational Toy

"Pancho," the Grasshopper, currently on sale in the Museum's Book Shop is a recent addition to the line of scientific toys. The accurate reproduction of the grasshopper was made possible by the assistance of Henry S. Dybas, Associate Curator of Insects, and by specimens supplied the manufacturer by this Museum's Division of Insects.

Molded in plastic in natural colors, "Pancho" is an excellent introduction to the study of insects. Because of its enlarged size, 12 inches in length, children can easily observe details of the grasshopper and come to better understand how this insect lives.