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Darwin, Charles

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Charles Robert Darwin (1809–1882) was the primary architect of the fundamental theory of the life sciences—namely, the theory of evolution by natural selection. The son of a well-to-do English doctor, Darwin entered medical school at age 16 but disliked his studies and pursued a more general university education, with a growing focus on natural history. After graduating in 1831, he was rescued from becoming a country parson when his botany professor recommended him for the post of gentleman naturalist aboard the *HMS Beagle*, a Royal Navy ship embarking on a 2-year survey of South America.

The voyage actually lasted almost 5 years, most of which Darwin spent ashore collecting geological and biological specimens. By the time he finally returned to England, his correspondence and collections had established his scientific reputation. He was elected a Fellow of the Royal Society shortly before his 30th birthday, and 5 days later, he married his cousin Emma Wedgwood, who eventually bore him 10 children. In 1842, the couple moved from London to a rural property, Down House, where Darwin spent the rest of his life, chronically unwell but scientifically prodigious.

Darwin's Theory of Evolution by Natural Selection

Whence the adaptive complexity of organisms? Pre-Darwinian thinkers could only suppose that one or more creatures analogous to humans, but unimaginably more powerful, must have designed and created life. Unfortunately, such creationist theories are scientifically worthless for two main reasons: They shift the unexplained complexity to an invisible creator, thus solving nothing, and they have no testable implications. For want of a better idea, however, even biologists were creationists before Darwin discovered the natural process that automatically generates adaptive complexity.

Fossil animals and the geographical distributions of related species convinced the young Darwin that life forms had changed over millennia and that similar species shared common ancestors. This scenario of “transmutation” was not in itself a novel idea. Darwin's originality lay in recognizing that the refinement of adaptive complexity over generations can occur without anyone intending it. He named the process “natural selection” by explicit analogy with the “artificial” selection practiced by farmers to improve their stock. The theory entails three essential premises:

- a. *Consequential variation*: Individuals differ in ways that affect their survival and reproduction.
- b. *Heritability of variation*: Parents and their offspring are more similar, on average, than unrelated pairs of individuals.
- c. *Overproduction of young*: Parents produce more young than can possibly survive to become parents in their turn, resulting in competition for the limited means of reproduction.

Combine these three propositions, each of which is clearly true, and the potential for populations to evolve as a result of the reproductive advantages of the best adapted forms follows logically. That natural selection indeed occurs in wild populations and causes them to evolve has since been abundantly demonstrated. (See any standard textbook of evolutionary biology, such as *Evolutionary Analysis* by Scott Freeman and Jon C. Herron.)

Darwin's notebooks show that he developed this theory many years before he made it public. He might have waited even longer, but another biologist, Alfred Russel Wallace, had

essentially the same insight and sent a manuscript to Darwin that provoked a quick joint paper in 1858 and the first edition of the *Origin of Species* in 1859. Biologists were soon persuaded. No other viable explanation for the adaptive complexity of life has been proposed, nor is there any evident need for one. Like the atomic theory, which is still, after all, “just a theory” of the nature of matter, Darwin’s theory has attained the status of factuality.

Sexual Selection

Most animal attributes seem well “designed” for staying alive and healthy, but some do not. Darwin once wrote that the sight of a peacock’s tail made him ill. His meaning was that this extravagant attribute could not plausibly enhance survival. Producing a new tail each year is energetically expensive, makes the peacock conspicuous to predators, and impedes his movements. How could it have evolved?

The key insight for resolving this puzzle is that what selection maximizes isn’t longevity but, instead, the abundance of one’s progeny. Ultimately, the attributes of any creature have been “designed” by the selective process to achieve one outcome: out-reproducing same-sex rivals. Obviously, traits that keep one alive often contribute to reproductive success, but there are trade-offs. Indeed, if the sole objective were longevity, one would never reproduce at all!

In 1871, Darwin elaborated on this issue with his theory of “sexual selection” in the specific context of differential mating success. He divided the topic into the evolution of attributes that function to defeat same-sex rivals in mating competition and those that function to “charm” the opposite sex, and then showed how traits of both sorts were often costly with respect to survival. Despite arguments for carving selection conceptually in other ways, Darwin’s bipartite organization of the topic remains popular.

Darwinism and Psychology

In the *Origin*, and to an even greater extent in his treatment of sexual selection, Darwin recognized that selection must affect not only anatomy but physiology and psychology as well. In 1872, he published his most explicitly psychological book. *The Expression of the Emotions in Man and Animals* is widely considered to have been the first substantial tome in comparative psychology.

Evolutionary ideas are of growing prominence in social and developmental psychology and in the study of psychopathology. For several decades, psychologists interested in human sex differences and in the ways in which women and men interact have derived much of their theorizing from Darwin’s ideas about sexual selection. Studies of close relationships, of how parents allocate their limited resources, and of factors affecting maturation and adolescent development have also relied heavily on evolutionary thinking.

More generally, if the theory of evolution by selection is sound, then it provides a sort of metatheory for psychological science: All the basic perceptual, emotional, motivational, and inferential elements of the human mind should, in principle, be intelligible as means to the end of reproduction in environments such as those in which humans evolved. This proposition is the guiding premise of evolutionary psychology.

See also [Attraction](#); [Biological Constraints on Learning](#); [Cognitive Evolution](#); [Emotion, Evolution of](#); [Emotion, Expression of](#); [Evolutionary Psychology](#); [Evolutionary Psychological Perspectives on Human Nature, Critical Evaluation of](#); [Gender, Evolutionary Perspectives on](#);

[Group Selection](#); [Hamilton, W. D.](#); [Human Nature](#); [Intelligence, Evolution of](#); [Language, Evolution of](#); [Mating Strategy Evolution and Development](#); [Natural Selection](#); [Sexual Selection](#)

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