

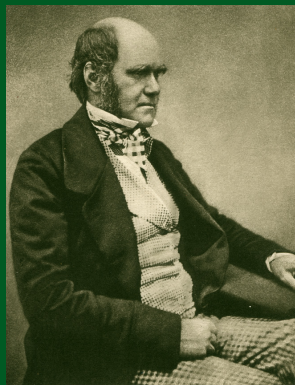


Jacques Christophe Valmont de Bomare (1731–1807)  
*Dictionnaire raisonné universel  
d'histoire naturelle* (1764; Lyon, 1791)

Since antiquity, science had meant uncovering the unchanging elements that underlay a changing world. This science meshed with religious accounts, which depicted the creation as intentional and hierarchical. By the early 19th century, revolutions in science, politics, and technology had thrown all this into doubt. Into this upended world came Charles Darwin.

# REWRITING THE BOOK OF NATURE

CHARLES DARWIN *and the* RISE of EVOLUTIONARY THEORY



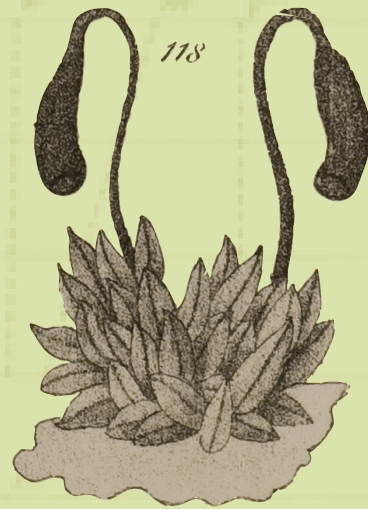
CHARLES DARWIN'S VISION—"from so simple a beginning, endless forms most beautiful and most wonderful have been, and are being evolved"—now forms the foundation of the biological sciences. Radical in sweep, evolutionary theory laid bare the deep connections within the living world—and implicated humanity as deeply as any other species. Darwin rewrote the book of nature, and forced us to rethink our own place within it.



THE YOUNG CHARLES DARWIN JOINED THE FIVE-YEAR GLOBAL EXPEDITION OF H.M.S. *Beagle* in 1831. Darwin was overwhelmed with geological, botanical, and zoological observations—fossil mammals in Argentina, earthquakes in the Andes, platypuses in Australia. Upon his return home to England, he put the pieces together. Using the metaphor of the tree of life, he saw that variations within species grew until new species branched out. The engine of change lay in the competition for food and shelter.



Evolutionary tree, Charles Darwin, Notebook B (1837–1838)  
Courtesy of Cambridge University Library / Darwin Online



An exhibition in celebration of the 200th anniversary of the birth of Charles Darwin (12 February 1809 – 19 April 1882) and the 150th anniversary of the publication of *On the Origin of Species* (24 November 1859)

Produced by the History of Medicine Division of the National Library of Medicine and the Office of History, National Institutes of Health

Curators: Paul Theerman & Michael Sappol

Design: Joanna Ebenstein

THE FOLLOWING PEOPLE CONTRIBUTED TO THE MAKING OF THIS EXHIBITION:

Kathleen Amos, Doug Atkins, Roxanne Beatty, Janet Browne, David Cantor, Ba Ba Chang, Rachel-Ray Cleveland, Kathy Cravedi, Amy Donahue, Laurie Duquette, Sarah Eilers, Elizabeth Fee, Stephen Greenberg, Holly Herro, Adam Hetland, Margaret Kaiser, Sheldon Kotzin, Donald A.B. Lindberg, Michele Lyons, Robert Martensen, Melanie Modlin, Christie Moffatt, Jill Newmark, Michael North, Gregory Pike, Karen Pitts, Shana Potash, Emmett Powell, Amanda Smith, Cheri Smith, Crystal Smith, Sandy Taylor, Patti Tuohy, Anamarie Urrutia, Déshaun Williams

<http://www.nlm.nih.gov/exhibition/darwin/>

<http://www.nlm.nih.gov/hmd/index.html>

<http://history.nih.gov/>



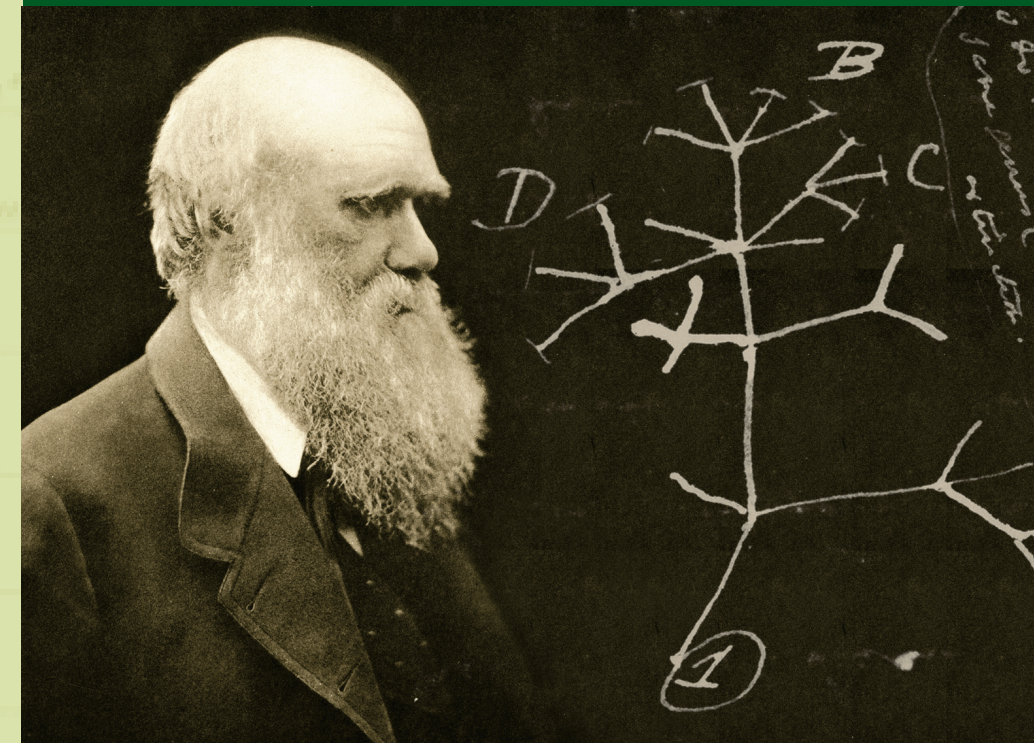
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

# REWRITING THE BOOK OF NATURE

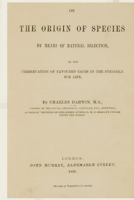
CHARLES DARWIN

*and the* RISE of

EVOLUTIONARY THEORY

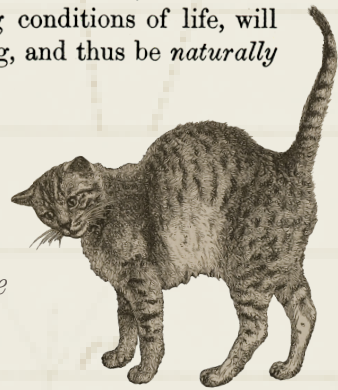


*Charles Darwin's vision—"from so simple a beginning, endless forms most beautiful and most wonderful have been, and are being evolved"—now forms the foundation of the biological sciences.*



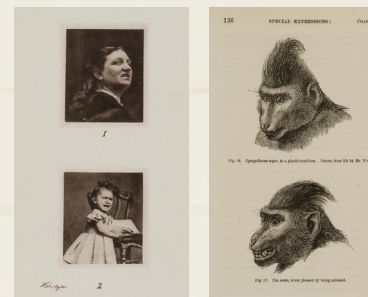
“there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be *naturally selected*.”

In a remarkable series of books—of which *On the Origin of Species* was the first—Charles Darwin (1809–1882) made his case for evolution...



**PUBLISHED NOVEMBER 24, 1859, THE ORIGIN IS “ONE LONG ARGUMENT.”** VARIATIONS AMONG individuals, if providing some adaptive advantage, would be selected by the hand of Nature.

Through inheritance, these traits would be passed on to descendants. Over time, as the traits became established in more and more individuals, the original form would change. By imperceptible stages, one species could turn into several. Natural selection explained the fact that related species of animals arose in close-by but isolated areas, such as on the islands of the Galápagos archipelago, and that extinct and now living species of South American armadillos strongly resembled one another.



Charles Darwin, *The Expression of the Emotions in Man and Animals* (1872)

**THE ORIGIN OF SPECIES** laid the foundations of evolutionary theory. Over the next 20 years, Darwin developed and expanded his argument into the fields of zoology, botany, psychology, and anthropology—most controversially claiming that human beings were fully subject to the principles of natural selection and had descended from non-human species.

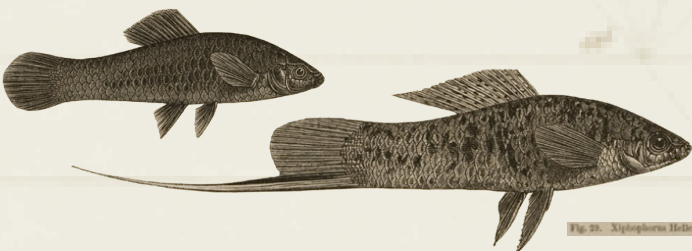
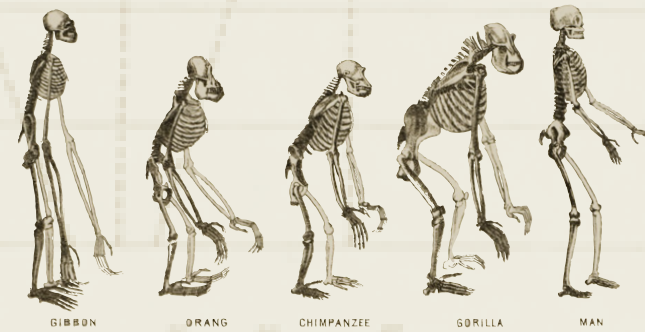


Fig. 25. *Xiphophorus heterotis*. Upper figure, male; lower figure, female.



Darwin's writings, carefully argued and beautifully crafted, were enormously persuasive. He quickly acquired a vocal cadre of explicators and popularizers—an international army of scientists who defended and contributed to evolutionary theory.

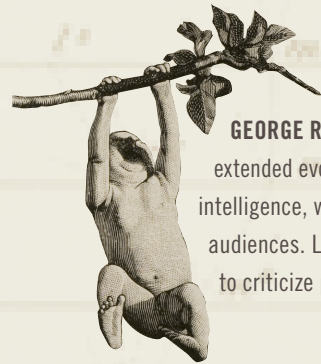
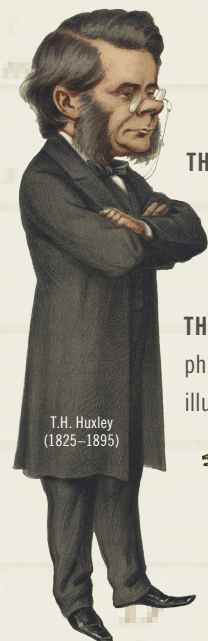


FIG. 14.—An infant here works off supporting its own weight for over two minutes. The attitude of the lower limbs, feet, and toes, physiologically united, reproduced from an instantaneous photograph, first given for the purpose by Dr. G. Silliman.

**GEORGE ROMANES, A CANADIAN-BORN PHYSIOLOGIST,** extended evolutionary theory to the development of human intelligence, while tirelessly writing and speaking to public audiences. Like many of Darwin's defenders, he felt free to criticize problematic aspects of evolutionary theory.



George Romanes (1848–1888)

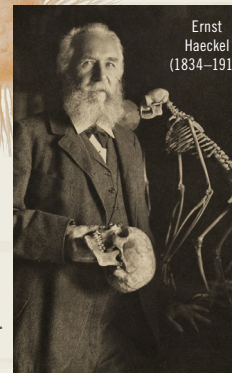
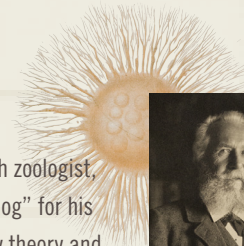


T.H. Huxley (1825–1895)

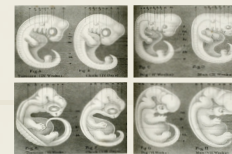


**THOMAS HENRY HUXLEY, AN** English zoologist, became known as “Darwin's bulldog” for his forceful exposition of evolutionary theory and vociferous attacks on Darwin's critics.

**THE FLAMBOYANT GERMAN** zoologist and philosopher, **ERNST HAECKEL,** wrote widely-read illustrated books that popularized Darwinian theory.



Ernst Haeckel (1834–1919)



Fun Magazine, London (1872). Yale University Library

Darwin's ideas circulated widely. Colonialism, racism, capitalism, socialism, atheism, materialism, sexism, feminism, modernism, and, of course, the life sciences, all claimed the Darwinian mantle. What united these different projects was the insight that the human species was just another biological organism, fully subject to the natural order of things.



PROFILE VIEW OF THE BRAIN OF GAUSS



PROFILE VIEW OF THE BRAIN OF THE HOTTENTOT VENUS

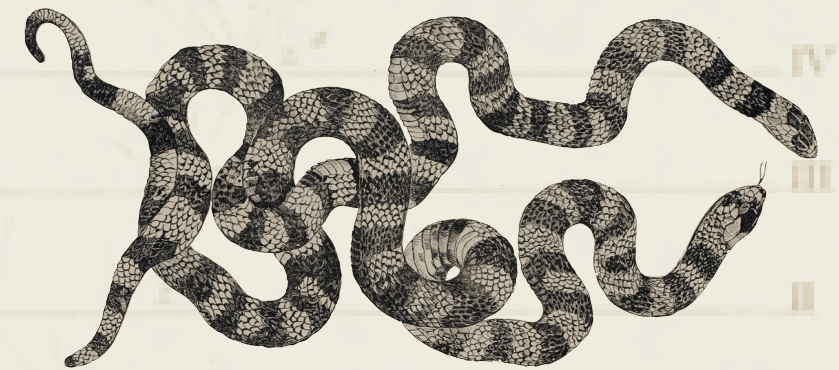


PROFILE VIEW OF THE BRAIN OF THE ORANG OUTANG

**DARWINIAN THEORY DEVELOPED** in ways that Darwin never envisioned. **Francis Galton,** his cousin, coined the term *eugenics* for a science that hoped to “improve” the species through “the self-direction of human evolution;” its most extreme followers promoted forced sterilization and genocide. Social critics such as **Herbert Spencer** argued that “survival of the fittest” justified laissez-faire capitalism, while **Karl Marx** claimed Darwin for “scientific socialism.”



From 'The Hottentot Venus' by Francis Galton, 1869. Original in the collection of the Wellcome Library, London. Reproduced by permission of the Wellcome Foundation.



That Darwin's thought could be so fertile should not surprise us. On the *Origin of Species* evoked life in all its intricacy, fecundity, and creativity. This is the world that Darwin explored and surveyed, described and explained—his enduring legacy to science, and to us.