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# CHARLES DARWIN

BIOGRAPHY

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BIG HISTORY PROJECT



# CHARLES DARWIN

NATURALIST & AUTHOR

**Born**  
February 12, 1809  
Shrewsbury, England

**Died**  
April 19, 1882  
Downe, England

By Cynthia Stokes Brown

Before the nineteenth century, scholars generally assumed that living organisms remained as they were created, never changing. Charles Darwin shattered this idea by presenting evidence that species do change over time, in a process he called natural selection.

## Setting out to sea

Charles Robert Darwin was born the same day that Abraham Lincoln was born in Kentucky. Both of these men helped reshape the way we look at the human race.

Darwin was the fifth of six children. His father, Robert Darwin, was a successful doctor who became wealthy investing in new factories. Darwin's mother, Susannah, was the daughter of the famous manufacturer of pottery and china, Josiah Wedgwood. She died when Darwin was 8, and his older sisters took charge of raising him. His family was Unitarian and Abolitionist, both minority beliefs in their day. Darwin considered himself a religious man.

Darwin's father steered him first into medicine, then into the ministry, but Darwin had his heart set on becoming a naturalist. He went to university in Edinburgh, Scotland, and finished at Cambridge University in England. When he was 22, eager to see nature beyond Europe, he signed on to accompany



Painting of the HMS *Beagle* at Tierra Del Fuego, by Conrad Martens

the captain of a ship, the HMS Beagle, on a two-year voyage surveying the coast of South America. The trip extended to almost five years around the world and gave Darwin the opportunity to observe natural life in a great variety of settings.

Among the places that Darwin visited were the Galápagos Islands, a unique set of 14 islands about 600 miles off the coast of Ecuador, on the western side of South America. It was there that Darwin found animals and birds slightly different from each other on each island. He collected many specimens to take back to England, among them examples of different finches.

On returning to England, Darwin showed his finches to expert ornithologists (biologists specializing in birds). They told him that he had about a dozen species of finches, different from those seen anywhere else. When Darwin examined the variations in their beaks, he began to see how they were adapted to dealing specifically with the different kinds of seeds available on the birds' various native islands. The design of each type of beak had developed from the need for food.

Darwin wrote reports about his trip, which qualified him to be elected to the prestigious Royal Society of London when he was not quite 30 years old. Shortly after, Darwin married a cousin of his, Emma Wedgwood. They had 10 children, two of whom died in infancy and one at age 10. Emma and Charles were immensely happy together; near the end of his life he told his children that she had been his greatest blessing.

## Darwin's key idea

By the time he was about 30, Darwin had already formulated his key idea — that small variations occur in reproduction and that the individuals with the variations most suited to their changing environment live to reproduce the same characteristics. Over enough time and with enough isolation these variations result in new species, as had happened on the Galápagos Islands.

Darwin did not rush into print with his idea. He wanted to gather more evidence, and he didn't want to upset people who believed in divine creation at a single moment. Darwin himself struggled with this issue and searched for ways to reconcile his own faith with the scientific evidence he had uncovered. Almost 20 years went by without his publishing his theories.

Then in 1858, Alfred Russel Wallace, an English naturalist traveling in Indonesia at the time, sent Darwin a letter outlining theories similar to Darwin's that Wallace had developed from his own years of field research. Such a story, where two researchers thousands of miles apart independently come to similar conclusions, is a recurring one in the history of science. Wallace's letter, sent aboard a Dutch mail ship from the small island of Ternate on March 9, 1858, clearly motivated Darwin to quickly put his own ideas into print. His book, called *On the Origin of Species*, appeared in 1859. The introduction stated Darwin's main idea:

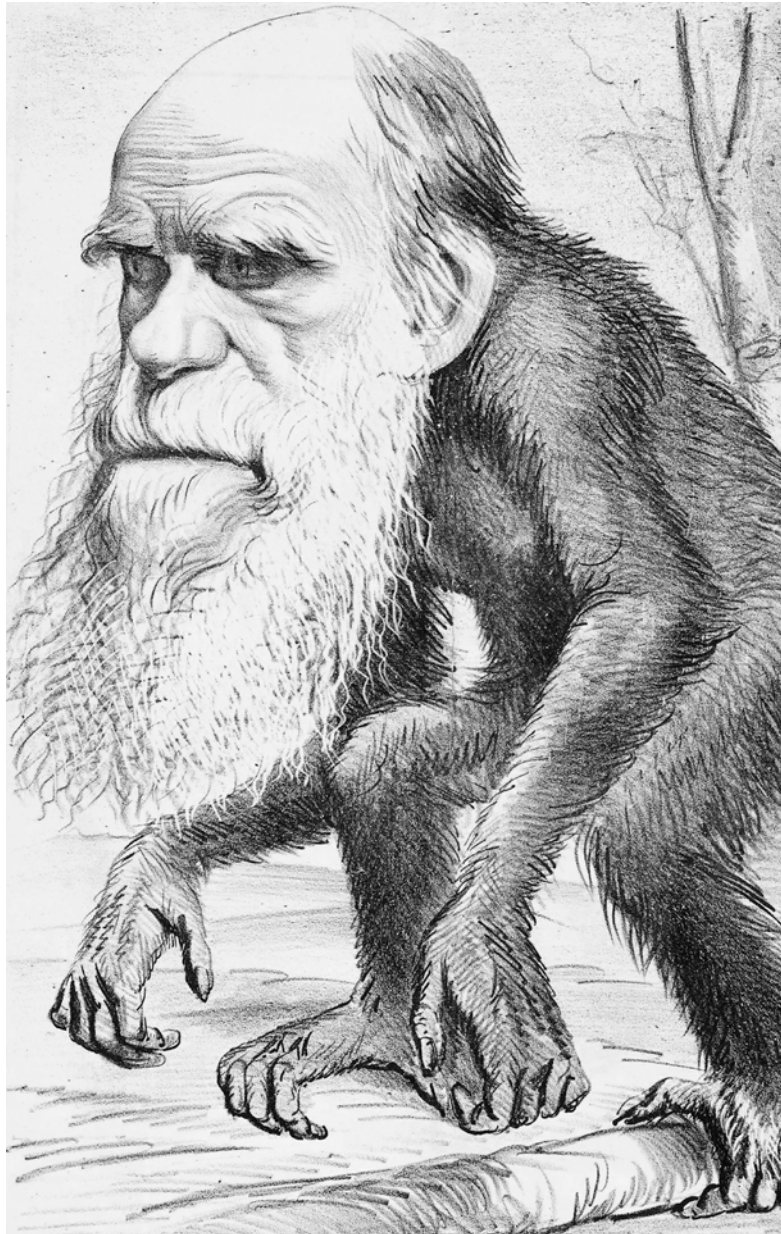
As many more individuals of each species are born than can possibly survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form.

Darwin presented three kinds of evidence in support of his theory of natural selection. First, fossils showed that species have changed over time. Second, geographical distribution showed that species are descended from local ancestors, even if the environment is similar elsewhere. Third, he identified unexpected similarities between species, such as the fact that cats, whales, bats, and humans all have fingers. The finger bones showed that these species, despite their huge differences, are all related to each other.

Darwin's book ignited a widespread controversy, but within a decade many scientists accepted his ideas. Since that time, new evidence has clearly supported Darwin's concepts. For example, biologists have been able to watch species change in relation to their environment. They have discovered the structure of the genetic code, DNA, and understand how it works to pass on traits and to produce a few variations, called "mutations." Genetic and fossil evidence has proved that the human species emerged in Africa and is most closely related to chimpanzees. By the end of the twentieth century, Darwin's theory of evolution had been buttressed by so much confirming evidence that scientists accepted it as fact, and it has become the foundation of modern biology.

Darwin did not know the Earth's age. Educated people in England thought that maybe it was tens of thousands of years old, but Darwin realized that more time than that was needed for species to evolve; he estimated the Earth's age at about 300,000 years. Not until 1953 was the Earth proved to be 4.56 billion years old — plenty old enough for evolution to occur.

Darwin also did not understand how variations occurred in reproduction, as the structure of DNA was not known until 1953 (although occurring in the same year, radiometric dating of the Earth and the discovery of the structure of DNA were unrelated). Yet Darwin knew that variations occurred and could be magnified, as seen in what he termed "artificial selection:" say, when dog or pigeon breeders select animals with the traits they want. They then let these animals reproduce together but not with ones that don't carry the traits, eventually resulting in new breeds of dogs and pigeons. Darwin called his idea "natural selection" to contrast it with artificial selection, or breeding.



An 1871 cartoon lampooning Darwin

## A quiet life of observation

Darwin spent most of his life on his farm with his family, writing and studying. He liked solitude and routine, and he loved playing with his children. He visited his extended family, traveled to London occasionally, and wrote thousands of letters to people all over the world, asking questions and seeking information. Penny postage stamps were introduced in Britain in 1840 (the first in the world), and communication improved steadily as the British built their empire. Darwin made remarkable use of these improvements.

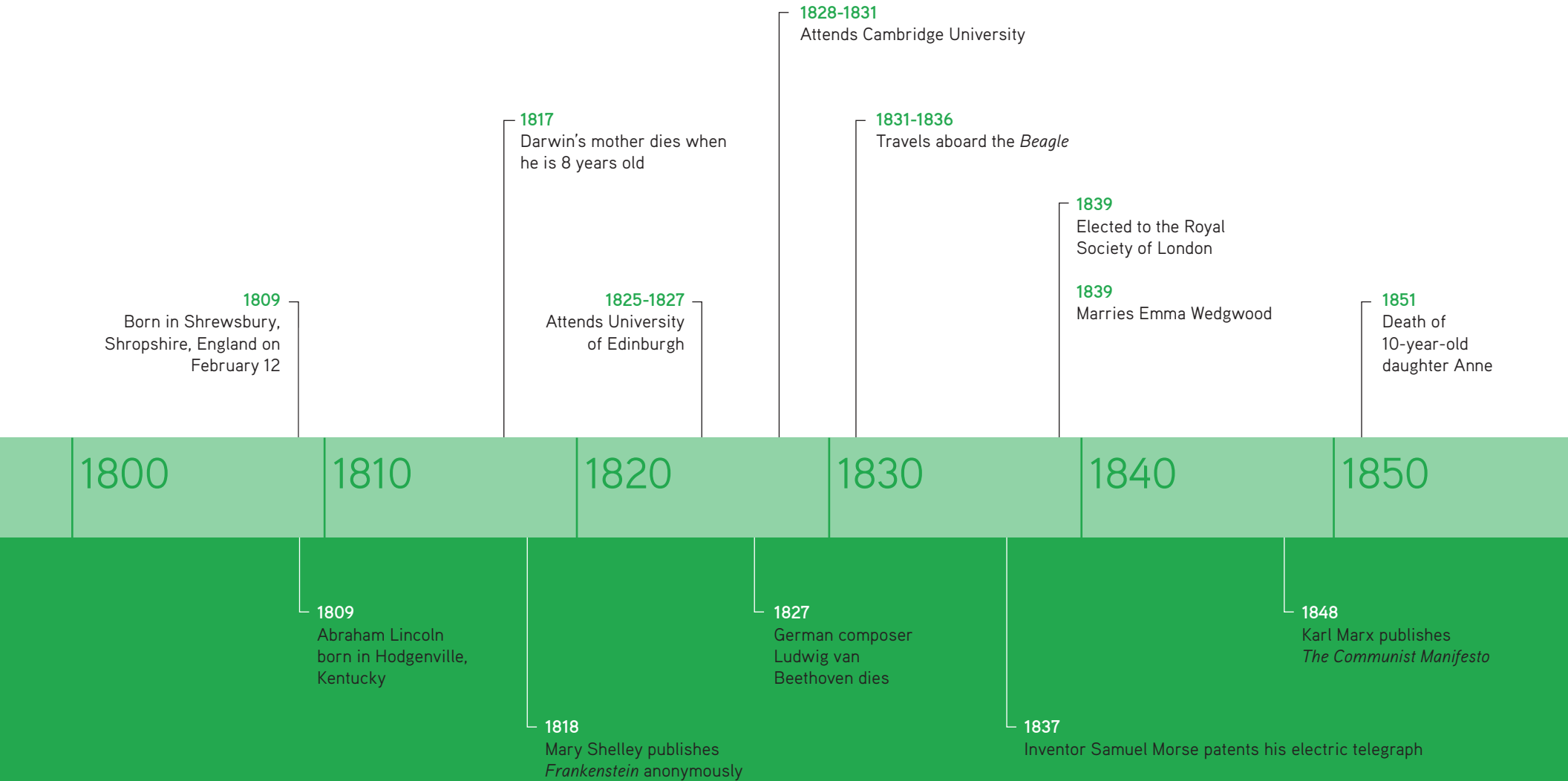
Darwin developed his unusual talent for observing natural phenomena and recording what he saw. The one subject that had fired his imagination at Cambridge University was collecting beetles. During his adult years he studied barnacles, bees, orchids, ants, rabbits, pigeons, earthworms, and insectivorous plants. He tramped over his countryside collecting samples and even paid his staff to help. He filled his hothouse with seedlings. He begged information and samples from correspondents everywhere. His eyes seemed always in tune with the vast diversity of life.

After *On the Origin of Species*, Darwin's other famous work was *The Descent of Man*, and *Selection in Relation to Sex* (1871). In this book, he made explicit his argument that humans descended from apes, which caused his critics to depict him in cartoons with a monkey's body. Darwin guessed that this evolution must have occurred in Africa, since that's where the apes lived, but he did not yet have any concrete evidence for this.

Darwin wrote clearly and memorably. His books sold well and his total earnings on sales came close to a half-million dollars in modern terms, an impressive sum for science books. His best-known sentence is this final one at the end of *On the Origin of Species*:

There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

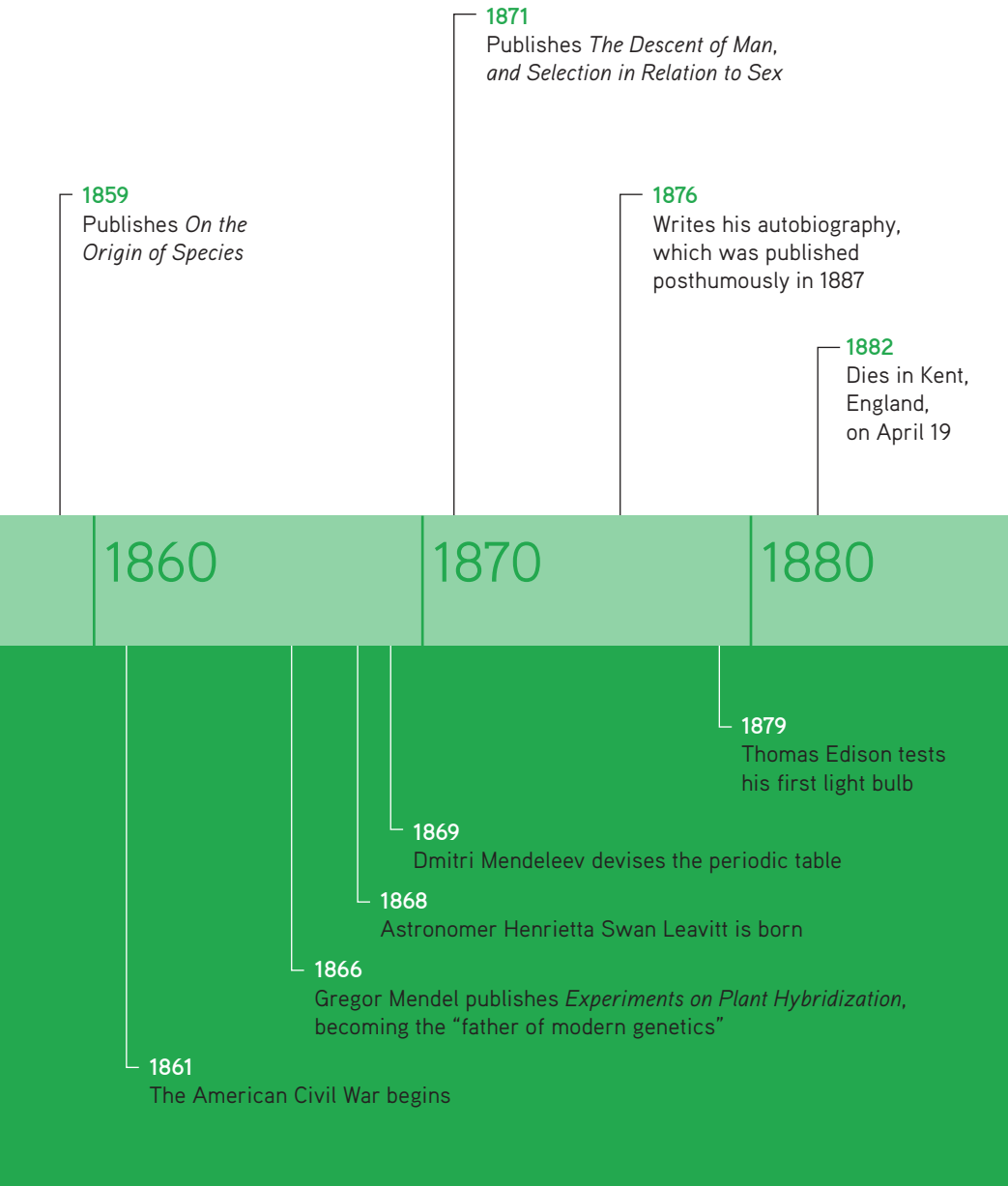
# Timeline of Darwin's life



During the time of Darwin

## Last days, lasting legacy

Darwin suffered all his adult life from stomach problems and heart palpitations, which were never explained in his day or since. In 1882, he died at the age of 73, carefully nursed by his wife. Darwin had expected to be buried in the churchyard in his village of Downe, but his contemporaries insisted that he be buried in Westminster Abbey in London, not far from the tomb of Sir Isaac Newton. Time has confirmed that Darwin did indeed open a new era in our understanding of the living world. He showed us how organisms of today are the product of a long process of change, the grandeur of evolution itself.





## Sources

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A caricature of Charles Darwin from 1871  
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