

# Charles Darwin

**Lived 1809 – 1882.**

Charles Darwin is often cited as the greatest biologist in history. His most famous work, *On the Origin of Species*, explains the theory of evolution by natural selection, providing numerous supporting examples. Darwin believed that all of life on earth had descended from a common ancestor, whose offspring could vary slightly from the previous generation. Successive generations of life took part in a struggle for existence in which the best adapted variations survived to seed new generations. Less well adapted variations became extinct.



## Beginnings

Charles Robert Darwin was born into a wealthy family on February 12, 1809 in the town of Shrewsbury, England, UK. He was the fifth child of six.



Charles Darwin,  
aged 7

His grandfather was Erasmus Darwin, a prosperous physician and scientist who had already made significant contributions to scientific ideas about evolution.

His father, Robert Darwin, was a physician. Robert Darwin had grown rich by shrewdly investing money earned from his medical practice.

Charles's mother was Susannah Wedgewood, from the famous pottery family. She died when Charles was eight years old. He then started attending an elementary school

### School

At the age of nine, Charles was sent to Shrewsbury School, about a mile from his family home. He boarded there, often briefly returning home to keep up with family goings-on.

His boarding school followed a traditional classical curriculum revolving around Ancient Greek and Latin, which Charles loathed. He was not considered to be particularly smart. His foreign language skills were poor.

He enjoyed hunting and going for long walks, observing and collecting things from the natural world. At one point he became so obsessive about hunting that his father declared:

**“You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family.”**

**ROBERT DARWIN**

Charles Darwin's Father

Despite his father's uncharacteristic outburst, the young Charles Darwin was very enthusiastic about science. He was taught geometry by a private tutor, which he enjoyed, and he also enjoyed learning how complex things worked. He was captivated by a book *Wonders of the World*, which planted a seed in him to travel. The seed would later bloom into his famous voyage on HMS Beagle.

His brother built a chemistry laboratory in the garden tool-house, and Charles helped with experiments, often late into the night. Chemistry became his favorite subject. Unfortunately, it was not part of his school's curriculum. In fact he was reprimanded his headmaster for 'wasting his time' on chemistry!

### **Edinburgh and Medical School**

In 1825, aged 16, Charles became a medical student at the University of Edinburgh, as his father had done 42 years earlier. His father had pleasant memories of Edinburgh, where he was taught by the great chemist Joseph Black, who discovered magnesium, carbon dioxide, and latent heat.

Unlike his father, however, Charles did not enjoy medical school.

He found that dissecting human bodies disgusted him, being present during surgical operations horrified him, and visiting hospital wards distressed him. Moreover, attending lectures bored him:

“The instruction at Edinburgh was altogether by lectures, and these were intolerably dull, with the exception of those on chemistry.”

**CHARLES DARWIN**

Autobiography, written 1876

Confident his father would give him enough money to live in comfort, he decided not to worry about passing his exams.

In his second year at Edinburgh, Charles became interested in zoology, and he collected and dissected marine creatures. He also attended geology lectures, but found them incredibly boring.

His exasperated father decided to halt Charles's medical studies. He withdrew his son from Edinburgh and sent him to the University of Cambridge with the idea that his idle son would eventually become a Church of England clergyman.

### **Cambridge and an Easy Degree**

Early in 1828, just before his twentieth birthday, Charles Darwin enrolled at the University of Cambridge to study for a Bachelor of Arts degree.

After three easy years he received his B.A. degree with marks placing him near the top of the class. He had spent much of his time hunting, dining, drinking, and playing cards – all of which he enjoyed heartily.

Ironically, given Darwin's later work, his favorite book at university was *Evidences of the Existence and Attributes of the Deity*. Its author, William Paley, used the example of a watch and a watchmaker in support of his argument that the natural world had been designed by God. Each species of life is much more complex than a watch, Paley said, therefore clearly these species must have been designed by someone – and that someone was God.

### **The Natural World**

During his time in Cambridge, Darwin continued to pursue his scientific interests, particularly in botany and zoology: his greatest interest by far was in collecting different species of beetle.

“One day, on tearing off some old bark, I saw two rare beetles, and seized one in each hand; then I saw a third and new kind, which I could not bear to lose, so that I popped the one which I held in my right hand into my mouth. Alas! it ejected some intensely acrid fluid, which burnt my tongue so that I was forced to spit the beetle out, which was lost, as was the third one.”

### **CHARLES DARWIN**

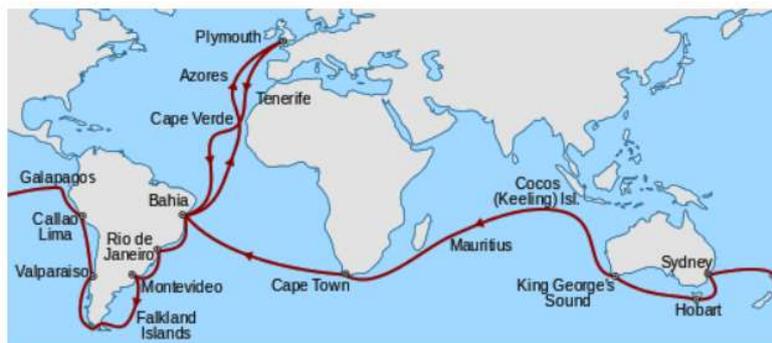
Autobiography, written 1876

Reading Alexander von Humboldt's book *Personal Narrative of travels 1799-1804* and John Herschel's *Introduction to the Study of Natural Philosophy* energized Darwin. He thirsted for overseas adventures and scientific discoveries.

After finishing at Cambridge, he began taking a serious interest in geology, studying rocks near his hometown of Shrewsbury and going on a two week expedition to Wales mapping rock strata.

## **Charles Darwin's Contributions to Science**

### **The Voyage of the Beagle 1831 – 1836**



Darwin spent nearly five years traveling around the world on the Beagle.

Near the end of summer 1831, after completing his degree, Darwin was offered a position as a naturalist on HMS Beagle, one of the British Royal Navy's survey ships. The position had previously been offered to John Henslow, a geologist and naturalist at Cambridge, but he had turned it down and recommended Darwin.

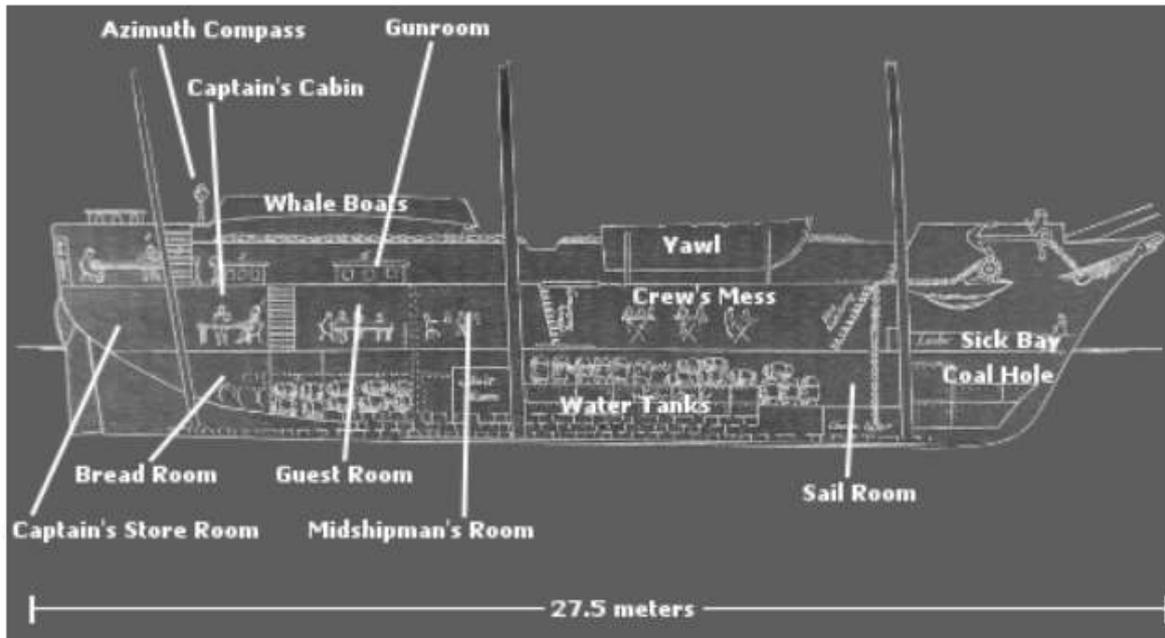
The Beagle was scheduled to make a long expedition to the South Seas. Darwin would have to pay for his place on the ship, but would be at liberty to collect specimens and send them back to the United Kingdom for his own use or profit.

It was a wonderful opportunity to emulate his hero Alexander von Humboldt. Darwin was determined to grab it with both hands. His father, with some reluctance, agreed to pay for his son's voyage.

The voyage, much like the fictitious Starship Enterprise's, was a five year mission. It followed the route shown on the map above. The conditions on the small ship were much less comfortable

than those enjoyed by the Starship Enterprise's crew!

## Plan of HMS Beagle



**The Beagle – A cramped home for a five year voyage**

### The Voyage

While sailing southward from the British Isles, the Beagle's first stop was at the volcanic Cape Verde Islands, west of Africa. Darwin found seashells high up in cliffs there. The Beagle's captain, who had a great interest in the natural world, helped Darwin explain the observation, giving him a copy of Charles Lyell's *Principles of Geology*.

*Principles of Geology* explained uniformitarian ideas in geology – the theory of gradualism, first proposed late in the previous century by [James Hutton](#). A few years later the book's author, [Charles Lyell](#), would become one of Darwin's greatest friends and supporters.

The expedition continued, with Darwin writing about his experiences in each new place he visited, collecting samples of flora, fauna, and fossils, and observing rock formations.

He saw a variety of unusual, unique species on the Galapagos Islands. Each separate island seemed to have its own distinct varieties of wildlife. Observations like these provoked him to write late in the voyage:

“such facts would undermine the stability of Species.”

**CHARLES DARWIN**

1835

### Back Home Again

Darwin arrived back in England in October 1836. He had kept in touch with John Henslow, sending him notes regularly about his geological work on the expedition. Henslow put these notes together into a 31 page pamphlet, which he distributed to Cambridge's scientific community and beyond.

Henslow also showed paleontologists fossils Darwin sent him, which caused more excitement.

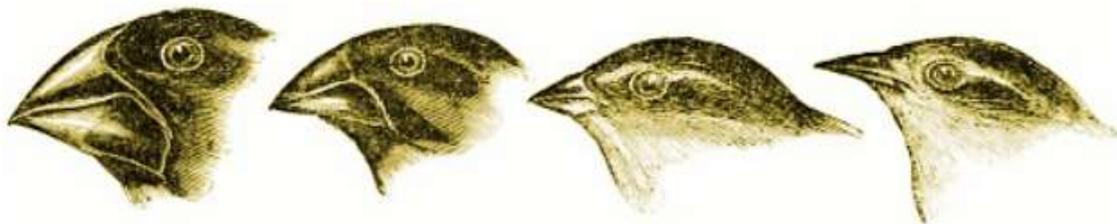
Although Darwin embarked on the voyage as an unknown recent graduate, he returned as a respected, well-known scientist. Also, he assembled a large, exciting collection of specimens that naturalists were queuing up to study and catalog.

His father was relieved his prediction that Charles would disgrace the family had been proven wrong. Charles Darwin was now admired in the world of natural science, and his father agreed to continue funding his work. In fact, other people also recognized the value of Darwin's work, and he now received a large grant from the British government to write up his observations from the Beagle's expedition.

## Scientific Results from Darwin's Voyage

Darwin established that the South American continent is gradually rising from the ocean. Charles Lyell, whose geology book influenced Darwin on the voyage, arranged for Darwin to present this work to the Geological Society of London at the beginning of 1837.

At the same meeting Darwin presented specimens of birds he had collected from the Galapagos Islands. Within a week, the ornithologist John Gould examined the specimens and declared the birds belonged to an entirely new group of finches. Darwin had discovered 12 new finch species and a new group of finches.



**Darwin decided that the different species of finches on the Galapagos Islands were all descended from a single finch ancestor.**

If Darwin had been an ambitious scientist, he could have published a theory of evolution by natural selection in 1839, but he didn't. He continued:

- gathering and weighing evidence and assessing specimens from his voyage
- breeding animals and plants to determine how species could be modified by artificial selection
- writing books and papers about a variety of topics including geology