

# Charles Darwin

1809 – 1882

## An amazing story about evolution

What would Charles Darwin tell us if we could travel through time and ask him about his scientific discoveries?



I was born into a family with a history of thinking outside of the box. Among others, my grandfather on my father's side, Erasmus Darwin, was a scientist and published many works, including *Zoonomia*, in which he wrote about **evolution**. Although the world was not ready for them at the time, I would later build upon his ideas and make my name as one of the most important scientists of all time.

My father had wanted me to become a doctor. However, being very squeamish, I neglected my studies in medicine at the University of Edinburgh. I preferred to spend my time studying animals, learning **taxidermy** and assisting in studies of Scottish coastal life. My father was rather cross that I'd not focused on my medical studies, and eventually sent me to the University of Cambridge to study religion. However, I remained much more interested in activities like collecting beetles and studying fossils.

Everything changed while I was on a field trip to Wales, as I received the invitation of a lifetime. I had been recommended by a university professor to join a global research trip on a ship called the *HMS Beagle*, visiting different coastlines and studying their wildlife, rocks and plants.

After four years spent travelling to many different countries, keeping detailed records of all that I found, we arrived at the **Galapagos Islands**, near the equator in the Pacific Ocean. Very few people lived on the islands at the time, which were instead home to thousands of animals and birds - a treasure trove of nature. Furthermore, the landscape of each island was quite different and I could compare my findings on each. I kept records of the different creatures that I saw on each different island, many of which had never been seen before.

On my return to Britain, I studied all that I'd collected and reviewed all of my notes, including those from the islands. I had studied many creatures including finches, tortoises and mockingbirds. Among the many things I noted, I realised that my pictures of finches were all essentially the same apart from their beaks, claws and overall size. These seemed to vary with the different islands I had seen them on. I came to the idea that over time, the birds had **adapted** to best suit their environment.

I continued my research and by 1837 I formed a view that species adapted over time by evolution, gradual change in their characteristics and features across generations.

My grandfather had held similar beliefs, but now I had the evidence that he lacked. Nevertheless, I was aware that his views had been strongly criticised. The established view of society at the time was that the world was created by God, with each and every species created once, with no new species having been created since. To go against this view was unthinkable, and would have been incredibly unpopular, so I feared a backlash myself. Despite this, I couldn't escape the conclusion that nature evolves by the **inheritance** of features that are useful for species' survival.

Over many years I worked on explaining the process of evolution. I began to realise that animals which were better suited to their environment lived longer and had more children. Species that did not suit their environment as well simply died out. This led to characteristics which helped species to survive being passed on over generations, while characteristics that gave them a disadvantage would be lost over time. I would come to call this '**natural selection**'. Over many, many generations, groups of animals and plants gradually change as they become better and better adapted to their environments. This on-going process explains the wide variety of different species of animals and plants that exist in the world.

I published my journal of the *Beagle* voyage in 1839, but I kept my theory of evolution private for almost twenty years. By 1858 I had written around a quarter of million words on the subject but hadn't published a single one. One day I received a letter from another scientist, Alfred Russell Wallace. He said that he was about to publish a paper on evolution himself. His ideas were similar to mine, and I realised I had to act before

Wallace got all of the credit! In order to treat Wallace fairly, his paper was presented with my own writing to the Linneus Society, one of the most respected scientific societies in Britain.

A year later, in 1859, I published my book *On the Origin of Species by Means of Natural Selection*. This laid out my theory of evolution based on 'survival of the fittest', that is, the survival of only those most well-adapted to their environment. The book became a worldwide bestseller, though reaction to it was mixed. Some dismissed my ideas, while others, were willing to listen. Many were upset by the idea that all mammals, including humans, had evolved from a common **ancestor**, although this was something I had only hinted at. Society was strongly divided about my work and what it meant for Christian teachings. I was nominated for a knighthood for my work; however, Church officials stepped in to stop the process. Even Captain Fitzroy, who led the HMS Beagle, opposed my ideas.

In 1871, I published *The Descent of Man*. By now, I had the confidence to write in detail about human evolution from apes. And many people were ready for these ideas - surprisingly it did not get the strong negative reaction I had expected and many respected scientists came to believe my theory.

In time, most scientists would come to accept my ideas, which would change the way people saw the natural world, opening their eyes to the history of the different species that inhabit the planet and humankind's relationship to them.

## Glossary

**Evolution** – the process by which different kinds of living things are believed to have developed from earlier forms

**Taxidermy** - the art of preserving animal bodies by preparing, stuffing and mounting their skins for lifelike effect

**Galapagos Islands** – a group of small islands in the Pacific Ocean, located around the equator and home to a large variety of animal and plant species

**Adaptation** – the development of features that help animals and plants to survive in their habitat

**Inheritance** – the passing on of features from animals or plants to their offspring

**Natural selection** – the idea that animal and plant species evolve over time as individuals that are well-adapted to their environment pass on the features that are useful to their survival, while those who are not well-adapted die out

**Ancestor** – an early person, animal or plant from which others have evolved over generations



## Timeline

- 1809 Charles Darwin was born in Shrewsbury, Shropshire, United Kingdom. He was the fifth of six children
- 1817 At the age of eight, Charles' mother died
- 1825 Charles attended The University of Edinburgh, studying Medicine. He would spend much of his time pursuing his interests in the natural world
- 1827 Charles left his studies at Edinburgh to study religion at the University of Cambridge
- 1831 Charles was invited on board the *HMS Beagle* expedition around the coasts of South America, Australasia and South Africa. He accepted and set sail on December 27th
- 1835 Charles studied the natural history of the Galapagos Islands and first considered the evolution of species.
- 1836 After nearly five years aboard the *HMS Beagle*, Charles returned to England on October 2nd
- 1839 Charles married his cousin, Emma. They moved to London and later had ten children. Sadly, only seven survived to adulthood. He published *The Journal of a Naturalist* and was elected a Fellow of the Royal Society
- 1840 He published *Zoology of the Voyage of HMS Beagle*
- 1855 – 1856 Charles started work on the first version of *On the Origin of Species*
- 1858 Charles received a letter from Alfred Russell Wallace about his own theory of evolution. Both scientists' work was presented to the Linnean Society
- 1859 Charles published *On the Origin of Species by Natural Selection*, which contained his theory of evolution by natural selection. The 1,250 printed copies were quickly sold. Charles was nominated for knighthood however the Church opposed and stopped the process
- 1864 The Royal Society of London presented Charles with their highest scientific honour, the Copley Medal
- 1871 *The Descent of Man* was published
- 1882 Charles Darwin died, aged 73, at his home in Downe, Kent. He was buried in Westminster Abbey



## Exercises

1. Choose three animals that live in different environments and give examples of how they have adapted to live in those places.
2. Snow leopards and tigers are both big cats, and are more closely related than many animals, yet they live in very different habitats. Which features do they share? Which features are different? Can you explain the reasons for these differences?
3. Dolphins are mammals, while sharks are fish. However, they share a number of similar features. What features do they share? Why do you think they both developed them?
4. Alfred Russell Wallace also developed a theory of evolution by natural selection. Can you research his story?

