

The origin of species

[Science](#), [Biology](#)



First published on November 24, 1859, *The Origin of Species* (full title *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*) by English naturalist Charles Darwin is one of the pivotal works in scientific history, and arguably the pre-eminent work in biology. In it, Darwin makes "one long argument," with copious empirical examples as support, for his theory that "groups" of organisms, (now called populations) rather than individual organisms, gradually evolve through the process of natural selection—a mechanism effectively introduced to the public at large by the book. The work presents detailed scientific evidence he had accumulated both on the *Voyage of the Beagle* in the 1830s and since his return, painstakingly laying out his theory and refuting the doctrine of "Created kinds" underlying the theories of Creation biology which were then widely accepted. Even for the non-specialist the book is quite readable, and it attracted widespread interest on publication. Although the ideas presented in it are supported by overwhelming scientific evidence and are widely accepted by scientists today, they are still, in some parts of the world, highly controversial, particularly among non-scientists who perceive them to contradict their own view of the facts and various religious texts (see *Creation-evolution controversy*).

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[edit] Background [edit] Before "The Origin" Main article: history of

evolutionary thought The idea of biological evolution was supported in Classical times by the Greek and Roman atomists, notably Lucretius. With the dominance of Christianity came belief in the Biblical story of creation according to Genesis, with the doctrine that God had directly " Created kinds" of organisms which were immutable. Other ideas resurfaced, and in 17th century English the word evolution (from the Latin word " evolutio", meaning " unroll like a scroll") began to be used to refer to an orderly sequence of events, particularly one in which the outcome was somehow contained within it from the start. Natural history, aiming to investigate and catalogue the wonders of God's works, developed greatly in the 18th century. Discoveries showing the extinction of species were explained by catastrophism, the belief that animals and plants were periodically annihilated as a result of natural catastrophes and that their places were taken by new species created ex nihilo (out of nothing). Countering this, James Hutton's uniformitarian theory of 1785 envisioned gradual development over aeons of time. By 1796 Charles Darwin's grandfather Erasmus Darwin had put forward ideas of common descent with organisms " acquiring new parts" in response to stimuli then passing these changes to their offspring, and in 1802 he hinted at natural selection. In 1809 Jean-Baptiste Lamarck developed a similar theory, with " needed" traits being acquired then passed on. These theories of Transmutation were developed by Radicals in Britain like Robert Edmund Grant. At this time the work of Thomas Malthus showing that human populations increased to exceed resources influenced liberal thinking, resulting in the Whig Poor Law of the 1830s. Various ideas were developed to reconcile Creation biology with

scientific findings, including Charles Lyell's uniformitarian idea that each species had its "centre of creation" and was designed for the habitat, but would go extinct when the habitat changed. Charles Babbage believed God set up laws that operated to produce species, as a divine programmer, and Richard Owen followed Johannes Peter Müller in thinking that living matter had an "organising energy", a life-force that directed the growth of tissues and also determined the lifespan of the individual and of the species. The publication of the anonymous *Vestiges of the Natural History of Creation* (1844) then paved the way for the acceptance of Origin. [edit] Inception of Darwin's theory Main article: Inception of Darwin's theory Charles Darwin's education at the University of Edinburgh gave him direct involvement in Robert Edmund Grant's evolutionist developments of the ideas of Erasmus Darwin and Jean-Baptiste Lamarck. Then at Cambridge University his theology studies convinced him of William Paley's argument of "design" by a Creator while his interest in natural history was increased by the botanist John Stevens Henslow and the geologist Adam Sedgwick, both of whom believed strongly in divine creation and in a uniformitarian ancient earth. During the Voyage of the Beagle Charles Darwin became convinced by Charles Lyell's uniformitarianism, and puzzled over how various theories of creation fit the evidence he saw. On his return Richard Owen showed that fossils Darwin had found were of extinct species related to current species in the same locality, and John Gould startlingly revealed that completely different birds from the Galápagos Islands were species of finches distinct to each island. By early 1837 Darwin was speculating on transmutation in a series of secret notebooks. He investigated the breeding of domestic

animals, consulting William Yarrell and reading a pamphlet by Yarrell's friend Sir John Sebright which commented that " A severe winter, or a scarcity of food, by destroying the weak and the unhealthy, has all the good effects of the most skilful selection." At the zoo in 1838 he had his first sight of an ape, and the orang-utan's antics impressed him as being " just like a naughty child" which from his experience of the natives of Tierra del Fuego made him think that there was little gulf between man and animals despite the theological doctrine that only mankind possessed a soul. In late September 1838 he began reading the 6th edition of Malthus's Essay on the Principle of Population which reminded him of Malthus's statistical proof that human populations breed beyond their means and compete to survive, at a time when he was primed to apply these ideas to animal species. Darwin applied to his search for the Creator's laws the Whig social thinking of struggle for survival with no hand-outs. By December 1838 he was seeing a similarity between breeders selecting traits and a Malthusian Nature selecting from variants thrown up by chance so that " every part of newly acquired structure is fully practised and perfected", thinking this " the most beautiful part of my theory". [edit] First writings on the theory Main article:

development of Darwin's theory Darwin was well aware of the implication the theory had for the origin of humanity and the real danger to his career and reputation as an eminent geologist of being convicted of blasphemy. He worked in secret to consider all objections and prepare overwhelming evidence supporting his theory. He increasingly wanted to discuss his ideas with his colleagues, and in January 1842 sent a tentative description of his ideas in a letter to Lyell, who was then touring America. Lyell, dismayed that

his erstwhile ally had become a Transmutationist, noted that Darwin "denies seeing a beginning to each crop of species".