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FEBRUARY 4, 2009

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RECOMMENDED CITATION: Pew Research Center, February 2009, "Darwin and His Theory of Evolution"

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At first glance, Charles Darwin seems an unlikely revolutionary. Growing up a shy and unassuming member of a wealthy British family, he appeared, at least to his father, to be idle and directionless. But even as a child, Darwin expressed an interest in nature. Later, while studying botany at Cambridge University, he was offered a chance to work as an unpaid naturalist on the *HMS Beagle*, a naval vessel embarking on an exploratory voyage around the world. In the course of nearly five years at sea – during which time the *Beagle* surveyed the coast of South America and stopped in such places as Australia and, most famously, the Galapagos Islands – Darwin took advantage of countless opportunities to observe plant and animal life and to collect both living and fossilized specimens for later study.

After the *Beagle* returned to England in October 1836, Darwin began reflecting on his observations and experiences, and over the next two years developed the basic outline of his groundbreaking theory of evolution through natural selection. But beyond sharing his ideas with a close circle of scientist friends, Darwin told no one of his views on the origin and development of life. Indeed, he did not publish his now-famous volume, *On the Origin of Species by Means of Natural Selection*, until 1859, more than 20 years after he had first formulated his theory.

On the Origin of Species may never have been written, let alone published, if it had not been for Alfred Russel Wallace, another British naturalist who independently proposed a strikingly similar theory in 1858. Wallace's announcement prompted Darwin to publicly reveal that his own research had led him to the same conclusion decades earlier. This being the age of Victorian gentlemen, it was agreed that the two scientists would jointly publish their writings on the subject. Their work – comprising a collection of Darwin's earlier notes and an essay by Wallace – was read to the Linnean Society, an association of naturalists, in London on July 1, 1858. The following year, Darwin published *On the Origin of Species*, a lengthy, fleshed-out treatment of his ideas on evolutionary theory. The book was an immediate bestseller and quickly set off a firestorm of controversy.

Darwin had expected no less – fear of a backlash from Britain's religious and even scientific establishment had been the primary reason he had delayed publicizing his ideas. Yet the concept of species adaptation was not so radical at the time. Scientists had been debating whether animals evolved decades before Darwin put forth his theory. The idea of "transmutation of species" had been rejected by many prominent naturalists, among them French scientist Georges Cuvier, who

believed that species had been created much as they appeared in his day. But transmutation also had early champions, including Darwin's grandfather, the famed Birmingham physician Erasmus Darwin.

The younger Darwin's achievement was to offer a plausible and compelling explanation for how species evolve and to use this explanation to trace the history of life's development. All existing creatures, he argued, descended from a small number of original or progenitor species. Darwin compared the history of life to a great tree, its trunk representing these few common ancestors and an extensive system of branches and twigs symbolizing the great variety of life that has evolved from them.

This evolution, Darwin wrote, is due to two factors. The first factor, Darwin argued, is that each individual animal is marked by subtle differences that distinguish it from its parents. Darwin, who called these differences "variations," understood their effect but not their cause; the idea of genetic mutation, and indeed the scientific study of genetics, would not arise fully until the early 20th century. The second factor, Darwin argued, is that although variations are random, some of them convey distinct advantages – superior camouflage, a heartier constitution or greater speed, for example – that better equip a creature to survive in its environment. A greater chance of survival allows for more opportunity to breed and pass on advantageous traits to a greater number of offspring. Over time, an advantage spreads throughout a species; in turn, the species is more likely to endure and reproduce. Thus, over the course of many generations, subtle changes occur and accumulate, eventually morphing into bigger changes and, possibly, even a new species.

While Darwin's ideas initially challenged long-held scientific and religious belief systems, opposition to much of Darwin's thinking among the scientific communities of the English-speaking world largely collapsed in the decades following the publication of *On the Origin of Species*. Yet evolution continued to be vigorously rejected by British and American churches because, religious leaders argued, the theory directly contradicted many of the core teachings of the Christian faith.

Darwin's notion that existing species, including man, had developed over time due to constant and random change seemed to be in clear opposition to the idea that all creatures had been created "according to their kind" by God, as described in the first chapter of the biblical book of Genesis. Before Darwin, the prevailing scientific theory of life's origins and development had held that species were fixed and that they never changed. This theory, known as "special creationism," comported well with the biblical account of God creating the fish, fowl and mammals without mention of subsequent alteration.

Darwinian thinking also appeared to contradict the notion, central to Christianity and many other faiths, that man had a special, God-given place in the natural order. Instead, proponents of evolution pointed to signs in human anatomy – remnants of a tailbone, for instance – showing common ancestry with other mammals.

Finally, the idea of a benevolent God who cared for his creation was seemingly challenged by Darwin's depiction of the natural world as a savage and cruel place – "red in tooth and claw," as Darwin's contemporary, Alfred Lord Tennyson, wrote just a few years before *On the Origin of Species* was published. Darwin's theory challenged the idea that the natural world existed in benevolent harmony.

Darwin fully understood, and at times agonized over, the threat that his work might pose to traditional religious belief, explaining in an 1860 letter to American botanist Asa Gray that he "had no intention to write atheistically." But, he went on, "I cannot see as plainly as others do … evidence of design and beneficence on all sides of us. There seems to be too much misery in the world."

Regardless of his intentions, Darwin's ideas provoked a harsh and immediate response from religious leaders in Britain. For instance, England's highest-ranking Catholic official, Henry Cardinal Manning, denounced Darwin's views as "a brutal philosophy – to wit, there is no God, and the ape is our Adam." Samuel Wilberforce, the Anglican Archbishop of Oxford and one of the most highly respected religious leaders in 19th-century England, also condemned natural selection in a now-famous speech on what he deemed the theory's scientific deficiencies at an 1860 meeting of the British Association for the Advancement of Science. At one point during the meeting, Wilberforce reportedly asked biologist Thomas Henry Huxley whether he was related to an ape on his grandmother's or grandfather's side. Huxley, whose vigorous defense of evolutionary theory would earn him the nickname "Darwin's bulldog," allegedly replied that he would rather be the ancestor of a monkey than an advanced and intelligent human being who employed his "knowledge and eloquence in misrepresenting those who are wearing out their lives in the search for truth."

Some scholars now contend that Huxley's rebuke of Wilberforce never occurred. Regardless, it was around this time that the British scientific establishment gained the upper hand in the debate over evolution. And while the public disagreement between ecclesiastical and scientific authorities did not end in the 1860s, religious thinkers became more wary of directly challenging evolution on scientific grounds. In the late 19th and early 20th centuries, churches instead focused much of their energy on resisting the idea that man had evolved from lower animal orders and hence had no special place in creation or, for that matter, a soul. Indeed, while some churches, including the

Catholic Church, eventually accepted evolution as a God-directed mechanism of biological development, none questioned the role of God as the sole creator of man.

By the time of his death, in 1882, Darwin was considered the greatest scientist of his age. Moreover, the very church his theory had challenged accorded him a full state funeral and burial in Westminster Abbey, near the grave of Sir Isaac Newton. Darwin's idea was still provocative, but by the time of his death it had gained general acceptance in Britain, even among many in the Anglican clergy. Indeed, his interment in the abbey was seen by some contemporaries as symbolic of an uneasy truce between science and religion in Britain.