

PREFACE

The British naturalist Charles Robert Darwin (1809–82), author of *On the Origin of Species by Means of Natural Selection or the Preservation of the Favoured Races in the Struggle for Existence*, is rightfully known as the “father of evolution.” In his lifetime, Darwin’s accomplishments were recognized and appreciated. At his death he was buried in that British Valhalla, Westminster Abbey, where he lies today, next to the great Isaac Newton. He is still respected and venerated, both publicly and professionally. In the world of everyday life, his bearded face peers out from the back of the British ten pound note. In the world of science, he is recognized as one of the truly great thinkers whose achievements are the foundation for much of contemporary biology.

From the very beginning, Darwin and his ideas were highly controversial. During his lifetime the religiously orthodox began an attack that has continued to the present day, especially in the United States. Though some churchmen have made accommodation to evolutionary theory, religious fundamentalists still regard Darwin as the enemy; and they are often abetted by conservative politicians. In the scientific community, no serious biologist doubts what might be called the fact of evolutionary descent, though researchers still debate the precise role of natural selection in producing species change. Among social scientists, humanists, and philosophers, the reaction to Darwinian theory is mixed; few deny its power in explaining the development of plant and animal species, but many would hesitate to apply evolutionary considerations to account for human behavior and social relationships.

Given the magnitude and reaction to Darwin's theory, it is hardly surprising that historians and philosophers of science have taken a deep interest in his intellectual development and the precise nature of his accomplishment. They have been aided in their research by Darwin's own habits of mind—he retained almost every scrap of paper to which he put pen. The collection of manuscripts at Cambridge Library and other archives has allowed scholars to follow Darwin in the production of his ideas; and much of this material is now in print or online. The Cambridge edition of Darwin's correspondence, for example, has now reached volume 22, with at least another ten planned; and many of his manuscripts have been digitized and made available on the Internet.

You might expect that with all the resources now available to Darwin scholars a consensus would have been reached about the nature of his achievement. Certainly there is agreement about the broad outlines. We know, for example, about when and under what conditions Darwin came to endorse the transmutation of species, and what stimulated him to formulate the principle of natural selection. We can track with some assurance the fate of his religious convictions, and be confident about his intention to bring human beings under the explanatory framework of his theory. But the facts of Darwin's development and the claims of his theory do not speak for themselves. Or rather, they speak for themselves only when the historian has put them in proper context and the philosopher has entered into the mind of Darwin to understand how he conceived these facts and claims. With respect to the interpretative framework and the conclusions to be drawn about Darwin's intentions, we, the authors of this book, do differ and passionately so. In the pages that follow, our differences will be on vibrant display: our arguments will be pointed and the responses aggressive. Our dispute has been of long standing, but it has not tainted our friendship.

It might be thought that our differences are essentially a function of disciplinary boundaries. One of us, Ruse, has always been located in departments of philosophy. The other, Richards, has long been a member of departments or centers of history. Hence, it might be supposed that the disagreements come from talking past each other, as

the philosopher wants to stress unadorned, timeless concepts and the historian wants to place everything in time-bound culture. This is not so. We both take on questions of historical context and philosophical interpretation, and recognize that our disagreements are more profound and more interesting than simple disputes about disciplinary methods. We are not talking past each other but right at each other. Yet each comes to quite different conclusions and thinks the other has simply been wandering in the intellectual wilderness.

Darwin was British-born and educated in the English system. Apart from a five-year voyage on HMS *Beagle* that took him around the globe, he spent the whole of his life in Britain. Is this the essential key to the man and his work? One of the authors, Ruse, thinks that it is, absolutely and completely. He sees Darwin's science as British as (let us say) Lord Palmerston's foreign policy or Charles Dickens's fiction or Joseph Paxton's Crystal Palace built for the Great Exhibition. The other author, Richards, argues that it is not Darwin's physical geography that essentially matters, but his mental geography, which extends far beyond British shores. It was, after all, the German Romantic Alexander von Humboldt's account of his travels to the new world that led Darwin to embark on his own romantic adventure. Richards believes that to ignore the impact of the German Romantics and their legacy—especially that legacy transported to England and traveling under the guise of British names—would be to miss the significance of Darwin's achievement in the *Origin of Species* and the *Descent of Man*.

This is our disagreement. Was Charles Darwin quintessentially British, or was his attitude thoroughly cosmopolitan, encompassing as well ideas from German Romantic sources? More specifically, this is a debate about such topics as mechanism or mind in nature; teleology faux or real; human beings deluded about their moral character or intrinsically moral. And what does this tell us about the present? We are both sufficiently indoctrinated into modern historiographical practices that we rear with horror at the thought of writing something that simply tells a story of progress from the mistaken past to the enlightened present; but we are both evolutionists, and we think that, in culture as in biology, in order to understand the present you

must understand the past. Hence we do not look upon this clash as an exercise in self-indulgence, two good friends simply having a vigorous game of intellectual handball.

We think that what we have to say matters and that, depending on the side you think is the more convincing, so will you view evolutionary thought and its implications today. We will be especially keen to indicate how these historical matters impinge on our understanding not only of nature writ large, but also on human nature and especially on the moral character of our species. The conflagrational disputes over sociobiology, evolutionary psychology, and selfish genes have concerned the way Darwinian theory has construed human nature—indeed, we might ask, can we even speak of a distinctively human nature in the wake of evolutionary considerations? We believe that these disputes will achieve greater clarity when we return to their original site in the work of Charles Darwin.

We had thought that we might be able to write a neutral historical introduction laying out some of the established facts about Darwin and his work. Very quickly we found that this was impossible. In an almost Kantian fashion, as soon as we started to look at the real world, interpretation kept rushing in. So we have set about telling the story in our own ways, although we have constantly exchanged ideas and drafts in order to focus our own thinking and to sharpen our points of disagreement; we do, though, provide a shared timeline of the main events. After each of our essays, we make a concise response to the other's arguments. In the epilogue to this book, we join together to trace the consequences of Darwin's accomplishment for the development of evolutionary theory in the period of the late nineteenth century to the present. We are especially attentive to what Darwinian theory implies for that most characteristic of human traits, conscious thought and religious aspiration. This essay thus seeks to discover what is still living and vital in the ideas that have given rise to modern biology—yet more, the role of those ideas in coming to understand ourselves.

Childhood through University

Charles Robert Darwin was born to Robert Waring Darwin (1766–1848) and Susannah (née Wedgwood, 1765–1817) Darwin on February 12, 1809, at the family home in Shrewsbury, England. Charles was the fifth of six children, including an elder brother and four sisters; the sisters served as surrogate mothers for their younger brother when Susannah Darwin died in 1817. Robert Darwin was a wealthy doctor and the son of Erasmus Darwin (1731–1802), who himself had advanced evolutionary proposals in *The Botanic Garden* (1789–91),¹⁴ his effort at a poetical science that Coleridge compared to “mists that occasionally rise from the marshes at the foot of Parnassus.”¹⁵ The grandfather's (figure 8) more prosaic but influential treatise—*Zoonomia; or The Laws of Life* (1796–98), which dealt with transmutation, heredity, and disease—won the admiration of the grandson and initially stimulated in him thoughts about the possibility of species change. Since *Zoonomia* was immediately translated into German and taken up by the Goethe circle, it made some of the circle's ideas preadapted, as it were, for the grandson's use.¹⁶

At age sixteen, Charles followed in the footsteps of grandfather, father, and elder brother Erasmus and enrolled at Edinburgh medical school. Darwin's father, however, seems to have held scant hope for his success. Darwin recalled in his *Autobiography* that his father once admonished him: “You care for nothing but shooting, dogs, and rat-catching and you will be a disgrace to yourself and all your family.” Darwin immediately added to this recollection that his father, “who was the kindest man I ever knew,” must have been out of sorts on this occasion.¹⁷ At Edinburgh Darwin came into contact

with Robert Grant (1793–1874), an expert on sponges and an advocate of Lamarck’s transmutational hypothesis. He and Darwin became friends, and spoke about the evolutionary ideas of Lamarck and, likely, of Erasmus Darwin, whose books Grant knew quite well.¹⁸ Darwin came down from Edinburgh after two years of a generally dreadful experience, though he did pick up, through Grant and his new friend and fellow student John Coldstream (1806–63), a taste for natural history.

Darwin felt the disappointment of his family, and so finally submitted to his father’s insistence that he become a clergyman, a fitting profession for a younger son of the English gentry. After being crammed in Latin and Greek, Darwin enrolled (1828) at Christ College, Cambridge University. He felt no keen desire to pursue holy orders, but the idea of a country parsonage did have some appeal and, after all, he had to make good at something. Darwin spent a fair amount of his time at college collecting beetles and enjoying dinner parties, and thereby seemed to ratify his father’s low expectations. But his time was not completely wasted. He became quite friendly with the botanist and polymath John Henslow (1796–1861), who introduced him to certain questions coming out of Germany about the origins of life and embryological development.¹⁹ Through Henslow he also came to know several other of the dons, and occasionally walked home from Henslow’s house with the formidable William Whewell (1794–1866). In order to pass out among those not seeking an honors degree, Darwin had to “get up” William Paley’s (1743–1805) *Evidences of Christianity* and his *Moral Philosophy*. He read as well the theologian’s *Natural Theology*, the logic of which gave him “as much delight as did Euclid.”²⁰ But the book that inspired him as no other was *Personal Narrative of Travels to the Equinoctial Regions of the New Continent, during the Years 1799–1804* by the Romantic adventurer and friend of Goethe, Alexander von Humboldt (1769–1859).²¹ Humboldt’s (figure 10) aesthetic descriptions and exciting challenges kindled in the naive and parochial student a desire for exotic travel and research. He later avowed that “my whole course of life is due to having read & reread as a Youth [Humboldt’s] *Personal Narrative*.”²²

The Beagle Voyage

Through the aid of Henslow, Darwin had opportunity to sail to the tropics on HMS *Beagle*. The *Beagle*, under the command of the twenty-seven-year-old Robert Fitzroy (1805–65), had the task of charting the waters off the coasts of South America, Australia, and the Pacific Islands. Darwin was to act as ship’s naturalist and companion to the captain. The ship embarked from Plymouth harbor on December 27, 1831 and would not return until October 2, 1836. During the voyage Darwin and the manic-depressive Fitzroy had a rocky relationship. Darwin fancied Fitzroy could have been a Napoleon or a Nelson—he had that kind of commanding force; but he was also given to “austere silence,” and indulged his “vanity & petulance.”²³ As the ship lay at anchor in the various ports along the coast of South America, Darwin would travel inland to survey the geology (with Lyell’s *Principles of Geology* as a guide) and to collect samples of the animal and plant life. He sent back many specimens to England, including the fossil remains of a giant *Megatherium*. The ship reached the Galapagos archipelago on September 15, 1835, and remained visiting the various islands of the group for about a month. Darwin noted many of the peculiarities of the fauna, especially the particular varieties of tortoise on the different islands. The only hint that he may have been thinking in terms congenial to his grandfather and Lamarck was a brief observation made on the return voyage. He recognized the similarity of fauna on the mainland of South America to that on the near islands, especially the animals on the Galapagos and Falklands: “If there is the slightest foundation for these remarks, the Zoology of Archipelagoes will be well worth examining; for such facts would undermine the stability of species.”²⁴ Upon his return to London, after almost five years away from England, Darwin (figure 12) set to work cataloging his collections. In March of 1837, through conversations with John Gould, chief ornithologist of the British Museum, he became convinced that the three types of mockingbird he brought back from the Galapagos were not simply varieties of one species that had been altered by different environments, as he had originally supposed, but that they were good and true species. Thus

what initially seemed merely varieties of the mainland species appeared to have breached the presumed species barrier. These reflections ignited a brain ready to explode with fresh ideas about natural history.²⁵

Work on the Theory, 1837–59

While on the *Beagle*, Darwin kept a diary and notes on geology, zoology, birds, insects, and plants. The evidence from these sources indicates that he remained orthodox in biology for most of the journey, and only when sailing back to England did he jot in his ornithological notes the passage indicating some doubts about species stability, which I have cited above. In late May of 1836, while on the return, he opened his *Red Notebook* (so-called because of its cover), in which he made notes on geology and other matters; and he continued to post entries until spring of 1837. This notebook, in entries for March—recorded after the return—contains the first brief speculations on species change.²⁶ In July he began a geology notebook and a series of notebooks on the transmutation of species (his *Notebooks B, C, D, E, M, and N*); other scraps of notes reflecting on species have also survived from the period between 1837 and 1842.²⁷ These notebooks and loose compilations would furnish ideas for the first extended essay draft in which Darwin began to lay out his theory of species change by natural selection; this was his pencil sketch (thirty-five manuscript pages) of 1842. Two years later, he greatly expanded the essay to some 230 pages, for which he had a fair copy made lest he die before his theory could be published. These essays contain the skeleton of the *Origin of Species*.²⁸

During the time Darwin worked on his species theory, he was also quite busily engaged in the publications that surveyed the results of his voyage. His diary and the geological and zoological notes kept on the *Beagle* supplied material for the first edition (1839) of his *Journal of Researches into the Geology and Natural History of the Various Countries visited by H.M.S. Beagle*. While certain passages in the book hinted at his new hypothesis about species, only in retrospect could they be so recognized. In the second edition (1845), several added

passages alluded to the new perspective, but again these generally passed unnoticed. The zoology notebooks, as well as specimens sent back to London from the voyage, served as foundation for the five-part catalog of *The Zoology of H.M.S. Beagle* (1838–43), with introductions and supervision by Darwin but material described by various experts (e.g., Richard Owen, George Waterhouse, John Gould, etc.).²⁹ Darwin himself composed the three volumes of the *Geology of the Voyage of the Beagle* (1842–46).³⁰ In late 1846, he became interested in a small, quite unusual barnacle, one that lived within the shell of a mollusk. Intrigued with this new species, he began an exploration that would occupy him for the next eight years and would yield two folio volumes on living Cirripedia and two on fossil Cirripedia (1851–54).³¹ This exhaustive study again hinted at his theory by implicitly endorsing the principle that ontogeny recapitulated phylogeny, a principle that appeared on the very initial page of his first transmutation notebook.³²

After completing his work on barnacles, Darwin finally resolved to produce a big book on species that would spell out his theory and the complex evidence that supported it. His pocket diary records on May 14, 1856: “Began by Lyell’s advice *writing* species sketch.”³³ Lyell had urged Darwin to set down his theory in print, since there was the possibility that someone else might propose similar ideas. Darwin worked on his sketch into the following fall, and it had grown far beyond his initial intention. His expanding composition was to be called *Natural Selection*, and it would likely have gone to two fat volumes, crammed with evidence derived from his voluminous reading, his experiments on plants and in embryology, and his mathematical analyses of species patterns. However, the composition of the book was interrupted on June 18, 1858, by a letter from a sometime correspondent, Alfred Russel Wallace (figure 13), then in Borneo, where he was collecting specimens to be sent back to museums. He included in his letter an essay entitled “On the Tendency of Varieties to Depart Indefinitely from the Original Type.”³⁴ Wallace wanted Darwin’s opinion about the essay and requested that if it had merit would his correspondent send it along to Charles Lyell. Darwin was crushed. It seemed as if this obscure naturalist had been cribbing

ideas from Darwin's own private essays, so similar were their conceptions. Darwin wrote Lyell: "Your words have come true with a vengeance that I sh'd be forestalled. . . . I never saw a more striking coincidence. If Wallace had my M.S. sketch written out in 1842 he could not have made a better short abstract."³⁵ Lyell and Hooker convinced their friend that honor did not require him to retire and give place to Wallace. These supporters arranged to have portions of Darwin's "Essay of 1844" (and excerpts of a letter to Asa Gray) and Wallace's essay read before the Linnaean Society on July 1, 1858. The event and the publication of their papers in the society's journal raised hardly an eyebrow. Darwin then set out to condense what he had already written for his big species book (some seven chapters) and quickly to add the remaining chapters that he had planned. His self-styled "abstract," *On the Origin of Species*, was published on November 24, 1859, in a run of 1,250 copies. It would eventually go through six editions; and with each, Darwin would add material and answer his critics. By the last edition of 1872 (and several subsequent printings) the book had been altered by about 50 percent.³⁶

Darwin's *Origin* was a phenomenal success. In 1859, when it was published, one could hardly find a professional naturalist in Europe or America who believed in the transmutation of species. By 1882, when Darwin died, one could hardly find a professional naturalist who did not accept the evolution of species, even if many yet contended about the causes of species change. The force of the book's argument could not be denied. Nor could the man. Critics and colleagues alike succumbed to the character of this humble, genial Englishman, both as represented in his book and in his person. Ernst Haeckel, Darwin's great champion in Germany—and the individual most responsible for the warfare between evolutionary science and religion—visited Darwin at Down House in 1866 while on his way to the Canary Islands. He left this character impression of that first meeting:

As the coach pulled up to Darwin's ivy-covered country house, shaded by elms, out of the shadows of the vine-covered entrance came the great scientist himself to meet me. He had a tall, worthy form with

the broad shoulders of Atlas, who carries a world of thought. He had a Jupiter-like forehead, high and broadly domed, similar to Goethe's and with deep furrows from the habit of mental work. His eyes were the friendliest and kindest, beshadowed by the roof of a protruding brow. His sensitive mouth was surrounded by a great silver-white full beard. The welcoming, warm expression of his whole face, the quiet and soft voice, the slow and thoughtful speech, the natural and open flow of ideas in conversation—all of this captured my whole heart during the first hours of our discussion. It was similar to the way his great book on first reading had earlier conquered my understanding by storm. I believed I had before me the kind of noble worldly wisdom of the Greek ancients, that of a Socrates or an Aristotle.³⁷

Darwin's Other Projects

While continuously revising the *Origin* through subsequent editions, Darwin worked on an amazing number of other projects. In 1862 and 1865, he published on orchids and climbing plants; and in 1868 his two-volume *The Variation of Animals and Plants under Domestication* appeared.³⁸ In that latter work, he proposed a kind of genetic theory (his hypothesis of “pangenesis”) that would accommodate the inheritance of acquired characters. His cousin, Francis Galton, attempted to test the hypothesis with transfusion experiments, which yield only negative results; Darwin, though, remained undaunted.³⁹ During the late 1860s, he began a series of exchanges on sexual selection with his new friend Wallace. As a result, he began to work on a book that would argue his particular version of sexual selection, which he thought a key to understanding the origin of the human races and sexual dimorphism in humans and animals. At the end of the decade, another dispute with Wallace broke out, a much more serious one this time. Wallace had converted to spiritualism and became convinced that higher spiritual powers were responsible for man's enlarged intellect and moral character. In the *Descent of Man and Selection in Relation to Sex* (1871), Darwin sought to give an extended analysis of sexual selection (in the second volume) and a detailed account of man's distinctive traits, especially his moral nature

(in the first volume).⁴⁰ He thus responded to Wallace and others who doubted the capacious efficacy of natural selection. His theory of the evolution of morality would give rise to a very large response, positive and negative, from his time to ours—something I will consider toward the end of this essay.

Darwin had intended to discuss human and animal emotions at some length in the *Descent*, but with the book already projected to two volumes, he decided to publish separately his *Expression of the Emotions in Man and Animals* (1872). Two features of that book strike the modern reader. First, Darwin employed photographic illustrations, done by some London photographers and by the psychiatrist Duchenne de Boulogne, to show the similarity of emotional expressions among humans and to compare such expressions with those of animals.⁴¹ Some of Duchenne's photos show how, for instance, the grimace of terror could be directly produced by galvanic stimulation of the facial muscles. The second curious aspect is that Darwin did not rely on natural selection to account for emotion expression; the inheritance of acquired habit carried the explanatory burden.⁴²

During the last decade of his life, Darwin continued research on plants, publishing four more books, as well as a final dénouement on the lowly earthworm.⁴³ He died on April 19, 1882, without benefit of clergy, but nonetheless was buried with great ceremony in Westminster Abbey on April 25 of that year.