

Introduction: The Legends of Charles Darwin

The stone is *still there* in the garden. That's what gets me. It's not the house itself – houses decay slowly and can be preserved pretty easily, especially in Britain where even an eighteenth-century country house is not “old.” It's not even the tree behind the house, alive when Charles Darwin still lived in his Down House, now propped up by guywires against inevitable collapse as a kind of totem of the great naturalist's existence. If you leave the rear exit, the one that takes you to Darwin's preserved greenhouse and the stunning flora on a pretty path lined in that particular English way of making the perfectly manicured seem somehow “natural,” you might glance to the left and see behind a small iron fence a one-foot-wide stone. A round mill stone or pottery wheel, it was, or appears to have been. And through the stone's center hole protrude two short metal bars, patinaed teal with age. Given its supposed duration in this location, it's easy to imagine the stone disappearing under the turf. That was, indeed, the intended trajectory of the original stone when it was laid there in the 1870s, not long before Darwin's death in 1882. This one is a replacement, which is carefully lifted and leveled every so often. The always green lawn is cropped short around it, since that stone is absolutely meant to be seen.

It was a kind of investigation, originally. An earthworm experiment conceived of by Francis Darwin, the recently widowed third son of Charles, fifth child overall. It's maintained there as a monument to Charles Darwin, a man who more than any other stands for the life sciences. Ironically, both father and son Darwin believed it would have been covered up by now, part of the inevitable process of bioturbation – worms (other creatures, too, but they were writing

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a book about earthworms, Darwin's last book) excavating soil, turning it over, bringing it to the surface, and things like large flat stones gradually being subsumed into the earth.

Here's the thing, though: in an era when compound microscope technology developed rapidly, when cell theory swept through the multinational life sciences community, when "germs" were gradually replacing explanations of humors and miasmas for health and disease, when chromosomes had been witnessed, when investigators of the patterns of heredity published scores of books – and in an era when peer-reviewed scientific journals published by scientific societies shared all of these new knowledges between a growing cadre of professional biologists who increasingly had to beg for money from wealthy benefactors and governments to continue their work – Charles Darwin did few laboratory experiments.

Sure, he fiddled. He floated seeds in salty water. He bred pigeons and skinned them, comparing skeletons. He let vines twirl in the sun and measured that. He fertilized lots of orchids and fed insectivorous plants. And given the way natural history was done in that age, all those things were good enough. But looking forward just a few decades to the days of randomized trials and arrays of test tubes, what he did looks, well, primitive. He couldn't set up controls, didn't have a microtome, never made microscopy slides, had no idea how to use chemical dyes, did not write grant applications, and could not compute statistics – all standard stuff in a late-nineteenth-century biology laboratory. What Darwin did in his back garden was observe. Plants, mostly. And let's not downplay this: he was the consummate gentleman naturalist observer.

That might be fine, except that he considered himself a *geologist* for a good part of his career – paradoxical since he's the only biologist with an internationally recognized day in his honor. Darwin Day is 12 February, his birthday. That day is used to promote the life sciences, anthropology, really anything that has to do with the study of evolution in any discipline. And that's curious. There is no equivalent day for, say, Curie in chemistry, Faraday in electricity, Herschel in astronomy, Lyell in geology, and so on. In Anglo-American culture, we usually reserve named days for political or military figures or heroes with such tremendous courage and sociocultural importance

that a “day” seems barely adequate – people like Dr. Martin Luther King, Jr., say, or Mahatma Gandhi.

It’s not just Darwin Day, either. In the United Kingdom, his hoary visage appeared on the £10 note for years; in the United States, he has an anti-award named after him for accidental death via exceedingly stupid behavior. There are Darwin figurines and bobble-heads, Darwin coloring books and cookbooks, and, of course, there’s a whole school of thought known as “Social Darwinism,” once publicly advocated by the wealthiest man on the planet, Standard Oil’s John D. Rockefeller, Jr., at least according to legend. (There’s no Rockefeller Day, either.)

Let’s face it: Charles Darwin, a man who actively avoided the public eye, who felt more comfortable staring at barnacles in his home office than at any scientific society meeting, has become a kind of secular saint – a bearded, wizardly face of the life sciences in general and of evolutionary biology particularly. For that reason, we preserve his library, his study, his house, a tree behind that house, and a rock set up in his garden to measure the dirt moved by earthworms. People like me travel a good distance to look at his desk, his makeshift lavatory, his snuff box, and walk the “sandwalk” circuit that he traversed daily through the woods behind his garden. Or we board a ship to the Galápagos Archipelago west of South America and imagine him scrambling up the barren volcanic shores among thousands of crabs and iguanas. Both pilgrimages are buoyed by hopes that we will catch the faintest hint of the man and his great ideas. How that transformation occurred – from homebody stooping over barnacles and pollenating orchids in his back garden to secular saint worthy of statues, museum displays, and brief biographies in every undergraduate biology textbook – is itself an interesting story that I will briefly touch on in the final chapter.

What I want to explore in the rest of the book is a different sort of mystery. How could someone so well known, a scientific icon, really, be so often misunderstood? The resolution to this mystery, it turns out, has a lot to do with what Darwin *represents* rather than what he actually said. In this book (Chapters 1, 3, and parts of 4 and 6), I unpack small parts of his biography to address five widely repeated misunderstandings, not only of the man Darwin in particular, but of what he intended to convey in his publications and what has been made

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of them since. Chapter 2 addresses the misconception that Darwin discovered evolution on the Galápagos Islands; in Chapter 4, that Alfred Russel Wallace independently arrived at the same evolutionary theory as Charles Darwin. A third misconception, that Darwin's Big Idea was merely the process of natural selection, is addressed in Chapter 5. In Chapter 6, I tackle the thorny issue of Darwin's religious beliefs and the misconception that he advocated atheism; finally, in Chapter 7, the misconception that Darwin's theories pointed directly to the death camps of the twentieth century. Tying it together, I finish with an exploration of the "Darwin Industry" that created, and attempts to tear down, the legends accreting around this one man.

With someone attached to such a voluminous body of scholarly biography and popular legendarium, I could hardly attempt to say anything completely new. My goal, instead, is to tug on the old man's beard a bit, to scratch at his ideas, to peck at his words, and see if we could get a smidgen clearer about his own message to the world as he wrote it in a large number of books and hundreds of letters from the 1830s through the end of his life in 1882 at the not-that-old age of 73. That means I'll need to go beyond the mortal Darwin just a bit to address the construction and use of Darwin-*ism* in the twentieth century.

With any luck, this book will wipe away some of the dust accumulating over the old man's image. And just maybe I can convince you that the real story of Darwin is really a story about so many other people who were *not* Darwin.

1 The Evolutionary Darwins, 1794–1835

Transmutation. “*Evolutio*,” if you wanted to be fancy and Italian about it. Whatever you want to call it, the grand unrolling of one type into another, connecting all living things into a single tree of life was all the rage among the society gentlemen. James Burnett, Lord Monboddo, an influential Scottish judge in the 1700s, had said shocking things about it. Monboddo’s metaphysics separated humans from brutes by only the thinnest slice of cognition. And imagine how he scandalized the chattering classes when, according to rumor anyway, he suggested perhaps tails even lingered, dangling from the spinal cords of the underdeveloped. They called him an “eccentric,” a fusty, argumentative judge and a voracious reader. Perhaps too learned – genius and madness, you know.

But mostly, Monboddo used this advocacy for monogenism (the idea that all humans, no matter their external appearance or race, descend from a single ancestral source – and not necessarily a human one if you go back far enough) to poke at Henry Home, Lord Kames, his intellectual sparring partner. Yet even Kames agreed that humans had once been primitive and had changed, grown, developed, *evolved* (again, if you wanted to show off and use the Latinate term for it). Granted, Kames insisted that somewhere back in the mists of time, and less time than Monboddo insisted upon, all human races had their own, independent, non-related, quite separate origin story. He was a polygenist to Monboddo’s monogenism.

This is perhaps why Darwin got involved. Not Charles Darwin. We’re talking about his grandfather, Erasmus Darwin, MD (1731–1802; Figure 1.1). Polygenism undergirded slavery. Different races, different *species*, no

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Figure 1.1 Erasmus Darwin (grandfather of Charles).

scientific reason standing against members of one race owning or exterminating another. And Kames was totally fine with that. Polygenism suggested that of the several races – by then they'd settled on four or five – Caucasians ruled the others. That was the natural way of things. Science had shown it.

Dr. Erasmus Darwin, though, supported abolishing the slave trade, like his old friend Josiah Wedgwood (1730–95), whose renowned pottery workshop pounded out the medallion promoting the Society for Effecting the Abolition of the Slave Trade as well as all the fancy Wedgwood plates and cups adorning the homes of the *nouveau riche*. Because of Wedgwood, the plea “Am I Not a Man and a Brother?” dangled from wrists and adorned hairpins of the fashionable across the Empire until, finally, Member of Parliament for Yorkshire and ardent Anglican, William Wilberforce, overwhelmed pro-slavery opposition to ban the Transatlantic Slave Trade in 1807. Erasmus Darwin and Josiah Wedgwood were members of the Lunar Society of Birmingham, so called because its now-famous members – also including Matthew Boulton, Benjamin Franklin, Joseph Priestley, and James Watt – preferred to return home from their meetings under the light of a full moon.

They hung together in the 1770s and 80s in part from the close relationship between Erasmus Darwin and Josiah Wedgwood, cemented in 1796 when Dr. Darwin's daughter would marry Wedgwood's son. But what if all humans were related, truly, down to their primate roots?

Erasmus Darwin teased evolutionary ideas in a medical work, *Zoonomia; or the Laws of Organic Life* (1794–1796), a text that contained in embryonic form much of what would be considered evolutionary theory for the next 50 years. Dr. Darwin started with the realization that the Earth was very old – a concept he learned from his father, Robert Darwin of Elston, who procured a fossil, later identified as a plesiosaur, and donated it to the Royal Society of London. Fossils prove that living things have had millions of years to adapt, said Erasmus Darwin. Any competent naturalist can see the “great similarity of structure which obtains in all the warm-blooded animals, as well quadrupeds, birds, and amphibious animals, as in mankind.” Examine the paws of a mouse, the wings of a bat, the feet of an elephant, or the flipper of a fossilized plesiosaur and “one is led to conclude that they have alike been produced from a similar living filament.” Examine embryonic development and a careful observer could witness with their own eyes the markers of deep history. Common descent with modification – many, if not all, organisms related to one another over the vast expanse of time.

In some cases, Dr. Darwin pointed out, organisms, as they descended from earlier less specialized stock, “acquired hands and fingers, with a fine sense of touch, as in mankind.” But other organisms evolved out of the same starter package “claws or talons, as in tygers [*sic*] and eagles” or “toes with an intervening web, or membrane, as in seals and geese” or “cloven hoofs [*sic*] as in cows and swine; and whole hoofs [*sic*] in others, as in the horse.” Even in birds, Dr. Darwin insisted, one could see the evidence of common descent, in this case shared with mammals. Over millions of years, similar hard parts (e.g., bones, teeth, horns, beaks) in an overall body-plan were tweaked just so to produce very different organs with different functions: “in the bird kind this original living filament has put forth wings instead of arms or legs, and feathers instead of hair. In some it has protruded horns on the forehead instead of teeth in the fore part of the upper jaw; in others, tushes [short tusks] instead of horns; and in others, beaks instead of either.” He saw the same evidence of evolutionary descent in plants, as he publicized in 1791 in *The Botanic Garden*.

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Truly, as Dr. Darwin proclaimed in *Zoonomia*, “the whole is one family of one parent.” Evolution, transmutation, unrolling, common descent, whatever – it was all part of God’s master plan, a law from the start, like gravity, according to Erasmus Darwin.

In the posthumously published poem *The Temple of Nature; or, The Origin of Society*, published in 1803, Erasmus Darwin went even further in detailing his evolutionary vision. And because it was presented poetically, modern scholars like to dismiss it. But take a look; Dr. Darwin packed the margins around the poem full of detailed footnotes and then tacked on multiple appendices, totaling almost 200 pages. This was no flight of fancy. Dr. Darwin laid out a detailed evolutionary vision several years before his better-known grandson was even born. He even beat the other “father of evolution,” Jean-Baptiste Lamarck (more on him later).

Humans, Dr. Darwin said in *Temple of Nature*, descended from ancestors who probably originated in the place we now call Syria. This conjecture belonged to eccentric Monboddó, who had deduced it from studying human languages. But those human ancestors, Dr. Darwin insisted, had their own primate ancestors: “one family of monkeys on the banks of the Mediterranean; who accidentally had learned to use the *adductor pollicis*, or that strong muscle which constitutes the ball of the thumb, and draws the point of it to meet the points of the fingers...” With their advanced thumbs, accidentally acquired and passed on through the generations, these Mediterranean monkeys began to pick up all the other specialized things we humans do. Eventually, they crossed some sort of a line; they became us. This, explained Dr. Darwin, was the descent of man.

Yet he speculated that this evolution of humanity by passing on acquired characteristics was just a more specialized case of the process beginning at the beginning, when heat and water gave birth to the first cells: “Nursed by warm sun-beams in primeval caves, Organic Life began beneath the waves.” And here’s what I find especially interesting. Very rough outlines of most aspects of evolutionary theory that we study today were already present in Erasmus Darwin’s work. For instance, he realized that early living creatures must have had the power to lock-in some of their common experiences through heredity, but that they also varied substantially generation to

generation. Variation likely came as a result of different environmental conditions including the climate, food, their use-and-disuse of parts to get at food and to escape death, and even disease: “The clime unkind, or noxious food, instills / To embryon nerves hereditary ills; / The feeble births acquired diseases chase, / ‘Till Death extinguish the degenerate race.” He even had a theory for the genesis of sexual reproduction itself. Sex originated in order to combat disease, Dr. Darwin speculated. “As the sexual progeny of vegetables are thus less liable to hereditary diseases than the solitary progenies,” Erasmus Darwin reasoned in *The Temple of Nature*, “so it is reasonable to conclude, that the sexual progenies of animals may be less liable to hereditary diseases, if the marriages are into different families, than if into the same family. . . .” This, interestingly, is a leading theory of the origins of sex today.

Moreover, once differentiated into male and female sexes, Erasmus Darwin saw yet another mechanism for biological diversity: competition for mates. Antlers, tusks, showy plumage and the like all served to attract females and ward off competing males – what we now call “sexual selection.” We call it that because Erasmus’s grandson called it that almost three-quarters of a century later in the book *The Descent of Man; and Selection in Relation to Sex*, published in 1871 .

Erasmus Darwin even anticipated what Charles Darwin would write in the book that followed a year after the *Descent of Man*, entitled *The Expression of the Emotions in Man and Animals*. To those who objected that far more complex behaviors – language, for instance, or tool use – could not be a result of evolution, Dr. Darwin responded by highlighting how animals imitate sounds and behaviors of each other just like humans. Of course, our sound and behavior imitations are, to us anyway, more faithful, more nuanced, more sophisticated. But that basic process of learning by observation, trial, and error, much like evolution itself, Dr. Darwin suggested, can be best described as imitation with small deviations – a kind of common descent with modification visible in psychology as well as biology.

I think it’s fair to say many ideas that would reappear in the works of Erasmus’s better-known grandson Charles already hovered in Darwin family literature and thought. It’s difficult to ascertain, however, how directly these traits passed down to grandson Charles Robert Darwin. Given the relationship

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between Erasmus and his fourth child, Robert Waring Darwin (1766–1848), perhaps not all that much. Accounting is inexact, but Erasmus Darwin fathered as many as fifteen children with as many as four women. After his first wife, Mary “Polly” Howard (1740–70) died when fourth-child Robert was only four years old, Erasmus hired a governess, seventeen-year-old Mary Parker (1753–?), to care for Robert. From 1771 to 1774, Erasmus fathered three more daughters, two with Mary Parker (1772 and 1774), and a third supposedly with a woman named Lucy Swift in 1771, before marrying again, this time to the newly widowed and quite wealthy Elizabeth Pole (1747–1832). Erasmus and Elizabeth bore seven additional offspring, including Frances Ann Violetta Darwin (1783–1874), the mother of Francis Galton (1822–1911); after attacking his cousin Charles Darwin’s concept of inheritance in the 1860s and 1870s, a concept borrowed in part from Erasmus Darwin’s works, Galton went on to coin the word “eugenics” in 1883. Convinced by Galton and his followers, German and American eugenicists would sterilize hundreds of thousands of men and women in the name of eugenics in the years leading up to the Holocaust, though *that* event had nothing to do with a Darwin, as we will see later.

Josiah Wedgwood had promised Erasmus that his daughter, Susannah “Sukey” Wedgwood (1767–1817), would marry Robert Waring Darwin as soon as Robert had made something of himself. By 1787, 21-year-old Robert had completed medical training both at the prestigious University of Edinburgh and then at Leiden University in the Netherlands. A year later, he was elected Fellow of the Royal Society on the basis of a medical dissertation some historians suspect Erasmus helped research. Robert, now a physician, returned to the ancestral home in Shropshire to take patients. Rather than biology or medicine like his father, however, Robert loved financial investing. He dumped capital into canals and a highway, and they paid off. So, by 1795, Josiah Wedgwood gave the nod to a well-funded Robert Darwin and Sukey Wedgwood engagement. When the old potter unexpectedly gave up the ghost soon after, £25,000 (roughly £2.3 million today) went to Sukey. In other words, the newlywed Darwin-Wedgwoods began married life quite comfortably.

Grandfather Erasmus died in 1802. Robert Waring continued to practice medicine for the well-to-do. The Darwins built a large, three-storey brick