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# Darwin

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# Introduction

'A Philosophical Naturalist'

## I. DIAL 'M' FOR 'METAPHYSICS'

This book is a philosophical introduction to Darwin. It explores and evaluates the relevance of Darwin's thinking for The Big Questions – traditional philosophical questions about the mind, ethics, knowledge, politics and science. How can there be such a book? Darwin was not a philosopher, he was a natural historian. His published works are about coral reefs, climbing plants, barnacles, earthworms and orchids – they are not works of philosophy. Indeed, Darwin sometimes portrays himself as a philosophical airhead: 'My power to follow a long and purely abstract train of thought is very limited; I should, moreover, never have succeeded with metaphysics or mathematics' (*Autobiography*: 85).

As a teenager, while staying at his uncle Josiah's house, Darwin met Sir James Mackintosh. Mackintosh's works are rarely read today, but he was a prominent philosopher of the time. Darwin was impressed by Mackintosh, and Mackintosh was impressed by Darwin. Darwin later tried to explain Mackintosh's good opinion: 'This must have been chiefly due to his perceiving that I listened with much interest to everything which he said, for I was as ignorant as a pig about his subjects of history, politics and moral philosophy' (*Autobiography*: 27).

Darwin eventually lifted his mind from the sty by reading several works of philosophy, albeit selectively. He came to Kant late in life, and the experience seems to have left him cold. But in the years immediately after the *Beagle* voyage, when he was still a young man, Darwin read David Hume and Adam Smith; he made

## 2 Dial 'M' for 'Metaphysics'

extensive notes on works by Mackintosh, and other philosophers better known in Victorian times than they are now; and he studied the arguments of the leading contemporary theorists of scientific method, people like John Herschel and William Whewell. He formulated his theory as he read these philosophers. Their works affected his thinking, and sensitised him to the potential philosophical impact of his own ideas. Scribbling in a notebook while in his early thirties, Darwin could barely contain his excitement at the promise of his nascent evolutionary views: 'Origin of man now proved.—Metaphysic must flourish.—He who understands baboon would do more towards metaphysics than Locke' (*Notebook M*, in Barrett *et al.* 1987: 539).

Darwin's reference to 'metaphysics' might mislead modern philosophical readers. These days, 'metaphysics' is usually used to label the philosophical study of such things as causation, space or time – it is the study of fundamental questions about the nature of the universe. Back then, 'metaphysics' referred primarily to the study of the mind. The notebook which Darwin labelled 'M' is largely dedicated to philosophical and psychological reflections on the emotions, mental illness, language, ethics, knowledge and such like.

Darwin aspired to the status of, as he put it, a 'philosophical naturalist' (Sloan 2003). This label is also liable to mislead. As Darwin understood the phrase, it did not mean a naturalist who is interested in philosophy, but a naturalist who seeks a scientific explanation for the patterns observed in nature. A philosophical naturalist would not be content merely to describe and catalogue the species that populate the Earth, but would feel it necessary to say why there should be just those species, with just those properties, rather than some other set of species, differently arranged. Darwin answered these questions by appealing to two ideas, not one. He argued that different species – our own included – are descended from common ancestors to form a great 'Tree of Life'. This is the hypothesis of evolution. Darwin also argued that natural selection was the agent primarily responsible for the shape of this tree. This combination of evolution and natural selection is what makes Darwin's natural history 'philosophical'.

We will see that Darwin was also a 'philosophical naturalist' in the historically incorrect sense of that phrase. He made efforts to relate what he referred to as 'my theory' to questions regarding politics, ethics and psychology. His notebooks feature frequent philosophical speculations and his published writings, which are far more cautious, nonetheless show considerable philosophical sensibility and engagement. We can see this sensibility manifested in Darwin's desire to ensure that the *Origin of Species* was structured in such a way that its argument met the highest standards of evidential rigour. We see it more directly in Darwin's choices of subject matter. Although the *Origin* remains largely silent regarding our own species, and merely hints at the promise Darwin sees in his view of life, ethics and politics come to the foreground in *The Descent of Man*. Here Darwin puts forward an evolutionary explanation of our ability to sense the difference between right and wrong, he suggests ways in which his natural historical approach recommends revisions to the abstract pronouncements of moral philosophers, and he considers the likely social consequences of the contemporary selection regime to which Victorian humans were subjected. As its title indicates, *Descent's* successor volume – *The Expression of the Emotions in Man and Animals* – shines an evolutionary light on human and animal minds.

While Darwin rarely suggests that his natural historical reflections should wholly replace philosophical approaches to ethics, or the emotions, he does believe that philosophy is blind unless it is guided by evolutionary insights. As he explains in *Notebook N* (*M's* successor):

To study Metaphysic, as they have always been studied, appears to me to be like puzzling at Astronomy without Mechanics.— Experience shows the problem of the mind cannot be solved by attacking the citadel itself.—the mind is a function of body.—we must bring some *stable* foundation to argue from.—

(*Notebook N*, quoted in Barrett *et al.* 1987: 564)

Darwin's hope is that an evolutionary perspective – the perspective that recognises that species are modified versions of common

## 4 Darwin and Darwinism

ancestors – will provide us with some fixed points that can anchor and discipline philosophical speculations regarding human nature, and the human condition. These hopes are widely shared today. In 2006, Darwin's face is on £10 notes and evolution is everywhere. The past thirty years have seen an explosion of work applying evolutionary thinking to the emotions, ethics, culture, knowledge and many other topics that have traditionally fallen within the domain of philosophy. This book examines this evolutionary philosophical work.

### 2. DARWIN AND DARWINISM

A philosophical introduction to Darwin must be *philosophical*. My goal is not to explain how Darwin formulated his ideas, nor is it to set those ideas in the context of the time, nor is it to study how those ideas were received by Darwin's contemporaries. These are all interesting and important projects, but they are not mine. My goal is to examine the light which Darwin's ideas can shed on topics of philosophical importance. This means asking, for example, what difference a knowledge of our evolutionary history should make to how we understand human nature. Questions like these are evaluative: in blunt terms, we need to ask not merely how Darwin proposed that his ideas might influence philosophy, but whether these ideas can carry the philosophical weight that Darwin and others have placed on them.

This way of expressing things suggests a very sharp division between the job of the historian and the job of the philosopher. The philosopher asks whether Darwin's ideas (and the ideas of those who have built philosophically on Darwin's work) are any good; the historian asks how those ideas were formulated and received. In reality, the project of historical interpretation and the project of philosophical evaluation are not entirely independent of each other. Good philosophy is not the same as good history, but when philosophy is historically naive, it is likely to miss many opportunities. The risk that historical ignorance holds for philosophical evaluation is not so much that one ends up assessing a view that is not truly Darwin's (although one may well do that), it



is that one ends up assessing a view that is unnecessarily weak. It is a good rule of philosophical method that if one is to investigate, for example, the linkage between evolution and ethics, one should pick the strongest, most plausible set of views for evaluation, rather than ideas that are obviously absurd or indefensible. The philosopher risks working with an inferior caricature of the views of those who are now dead if he or she is unable to interpret their words correctly. Accurate interpretation requires historical knowledge and historical sympathy.

Although this is a philosophical book about Darwin, I will not be claiming that Darwin was a philosopher on a par with the likes of Hume or Aristotle. He was, to repeat, a natural historian. Yet Darwin's philosophical interests and sensibilities led him to explore the broader significance of the evolutionary view of life. Darwin's writings are not unalloyed works of science that have subsequently been put to work by philosophers. Rather, Darwin presented his scientific ideas in a philosophically engaged manner, in a way which demanded, and continues to demand, further philosophical elaboration and exploration.

Darwin's ongoing influence can be measured by the extremely unusual role he plays among modern scientists. Many biologists have read Darwin's works. The works of Einstein, by contrast, although undoubtedly of enormous importance for modern physics, are rarely read by physicists working today. Modern biologists often refer to themselves as 'Darwinians'; one does not hear modern physicists describe themselves as 'Einsteinians'. When biologists differ over issues in modern science, they often try to claim Darwin for their team. Darwin is still regarded as a quotable biological authority, and struggles go on between biologists over how his views should be interpreted. Darwin is still a part of modern Darwinian biology in a way that Einstein is not a part of modern physics.

The story that will be told here is not, however, one of increasingly sophisticated philosophical engagement with an evolutionary theory that has remained static. Darwin's ongoing role as an authority figure might suggest that as far as science is concerned the basics of evolutionary biology have remained more

## 6 Darwin and Darwinism

or less the same since 1859, when the *Origin of Species* was published. In fact, we will see that there are significant differences between Darwin's views and those of modern evolutionary biologists. Darwin must consequently be distinguished from modern Darwinism. One of the primary justifications for examining Darwin's own views is precisely to expose the frequent mismatches between the Darwin who is invoked by today's biologists eager to defend their corner, and the Darwin who wrote the *Origin of Species* and the *Descent of Man*. Yet in spite of these differences, modern Darwinians regularly apply the concepts of modern evolutionary theory to the same issues – human nature, politics, the mind, knowledge, ethical judgement – that Darwin did. Our philosophical approach demands that in addition to examining Darwin's own writings on these issues, we ask whether more recent work has offered refinements or correctives to his arguments. This book does not aim to cover every philosophical problem in modern biology. Many of these modern problems, such as conceptual issues about the nature of genes, and their role in inheritance, can hardly be said to feature in Darwin's own work. But we will take account of modern evolutionary views when they relate to philosophical topics that Darwin discusses directly. This book is, therefore, a philosophical introduction to Darwinism, as well as a philosophical introduction to Darwin.

One might worry that this effort to compare modern views with those of a dead Victorian turns the book into an instance of so-called 'Whig' history of science – the kind of progressive history routinely maligned these days, which focuses selectively on those elements of the past that are important from the perspective of today's best science, as though the past were an engine for producing the textbooks of the present. This book is shamelessly evaluative, but many of its arguments are the opposite of Whiggish; perhaps they count as 'Tory' history of science. In some cases I will argue that Darwin's views are considerably more subtle, and more persuasive, than the stances adopted by modern-day philosophical naturalists. Darwin's philosophical views are of more than historical interest.

### 3. DARWIN UNFOLDING

A philosophical introduction to Darwin must be introductory. Philosophy strives for rigour and clarity, and it is inevitable that these standards must be compromised in a book that tries to cover as much ground as this one. Even inattentive readers will notice plenty of dotless 'i's and uncrossed 't's, and so I have given guides to further reading at the end of each chapter which list likely sources of dots and crosses.

Here is how the book is organised. The first chapter takes a brief look at Darwin's life. The remaining chapters are organised by topic. I have endeavoured to say something informative, and with luck something challenging and interesting, too, about the relevance of Darwin's work for the study of the mind, ethics, knowledge, and politics. These four topics are addressed in the core of the book – chapters five to eight respectively. But Darwin's discussion of these topics, and mine, too, relies on a prior understanding of the two ideas that lie at the foundation of his theorising. First is natural selection, which I discuss in chapter two. Second is Darwin's conception of species as genealogically related to form a giant family tree. This view is discussed in chapter three. Chapter four forms a kind of bridge between the early biological chapters and the later philosophical ones. It addresses Darwin's views about what makes a scientific theory a good one, and it is in this chapter that the relationship of Darwin's theory to various creationist views – including modern 'Intelligent Design Theory' – is discussed. The very last chapter concludes with some general reflections on Darwin's impact on philosophy as a whole. There is no one chapter that addresses the relevance of evolution for our conception of human nature. That theme runs right through the book, as it runs right through Darwin's work.

#### FURTHER READING

Readers seeking additional introductory material might turn to this recent collection of essays by leading philosophers and historians of biology. The contributions

## 8 Further Reading

focus on, among other things, the formation of Darwin's theory, the relationship between Darwin's thinking and religion, and the philosophical influence of Darwin's work:

Hodge, J. and Radick, G. (eds) (2003) *The Cambridge Companion to Darwin*, Cambridge: Cambridge University Press.

A comprehensive single-author overview of Darwin's work and achievement, and a book whose ambitions are similar to this one, is:

Ghiselin, M. (1969) *The Triumph of the Darwinian Method*, Berkeley, CA: University of California Press.

# One

Life

## I. PEDIGREE

The philosophical spirit of broad-ranging and ambitious enquiry had a strong tradition in the Darwin family. Charles's paternal grandfather, Erasmus Darwin (1731–1802), was not only a successful medical doctor and investor, but also a member of the celebrated 'Lunar Society', a group of engineers, manufacturers, philosophers and others participant in the enlightenment project of improvement and investigation. The society included James Watt, Joseph Priestley and Josiah Wedgwood. Erasmus was the author of poems, works of science and commentaries on cultural progress: his poetic treatises on technological advancement usually rolled all three genres into one. His book *Zoonomia* defended an early evolutionary theory according to which all of plant and animal life originated from primitive 'filaments', endowed with a tendency to self-improvement over time. Erasmus' theory has little in common with the evolutionary views later defended by his grandson, and more in common with those of the French naturalist Jean-Baptiste de Lamarck (1744–1829), whose ideas we will meet in a moment. Charles came to distance himself from the ideas of both men. While he may have been drawn to daring theorising by works such as *Zoonomia*, he eschewed his grandfather's scientific method on the grounds that it lacked empirical discipline. Recalling his student days he says:

I had previously read the *Zoonomia* of my grandfather, in which similar views [to Lamarck's] are maintained, but without producing

## 10 Pedigree

any effect on me. Nevertheless it is probable that the hearing rather early in life such views maintained and praised may have favoured my upholding them under a different form in my *Origin of Species*. At this time I admired greatly the *Zoonomia*; but on reading it a second time after an interval of ten or fifteen years, I was much disappointed, the proportion of speculation being so large to the facts given.

(*Autobiography*: 24)

Two other currents that ran strong in the Darwin family were medicine and money. Charles's father, Robert Waring Darwin (born in 1766), was a physician like Erasmus. He inspired great confidence in his patients, and his practice enjoyed success as a result. But the bulk of Robert Darwin's income came not from medicine, but from stocks, bonds, rents and mortgages. He had interests in roads, canals, agricultural land and a large part of the Wedgwood china factory. (His weight was formidable, as well as his bank balance; Charles remembered him as 'very corpulent . . . the largest man whom I ever saw' [ibid.: 11]). Politically, Robert Darwin was a Whig, strongly anti-Tory, a believer in industry and progress, a materialist, probably an atheist and a critic of aristocratic privilege. Even so, as Charles's biographer Janet Browne explains, he was no revolutionary: 'He put his faith in the idea of reform through legislation, and strong private opinions did not stop him encouraging professional relations with local Tory peers and churchgoing squires' (Browne 2003a: 9).

Charles Darwin was born in Shrewsbury on the 12th February 1809. Not until the beginning of his time at university did the good fortune of his birth dawn on him. As he recalled much later:

I became convinced from various small circumstances that my father would leave me property enough to subsist on with some comfort, though I never imagined that I should be so rich a man as I am; but my belief was sufficient to check any strenuous effort to learn medicine.

(*Autobiography*: 22)

He had surmised, quite correctly, that he would never need to earn a living. There was no financial imperative that he should follow in his father's professional footsteps.

Charles's mother, Susannah Darwin, was the daughter of Josiah Wedgwood, Erasmus's Lunar colleague and founder of the famous pottery at Etruria. She died in July 1817 when Charles was only eight years old. He remembered 'hardly anything about her except her death-bed, her black velvet gown, and her curiously constructed work-table' (ibid.: 6).

When his mother died Charles had already spent a few months at a local school run by a Unitarian minister the Reverend Case, and at the age of nine he began at Shrewsbury School, where, although very close to home, he boarded. The headmaster was one Samuel Butler, and Darwin was not impressed by his pedagogy:

Nothing could have been worse for the development of my mind than Dr Butler's school, as it was strictly classical, nothing else being taught except a little ancient geography and history. The school as a means of education to me was simply a blank . . . .

(ibid.: 10)

Charles himself was no child prodigy:

When I left the school I was for my age neither high nor low in it; and I believe that I was considered by all my masters and by my Father as a very ordinary boy, rather below the common standard in intellect. To my deep mortification my father once said to me, 'You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family.'

(Ibid.)

This love of country sports brought Darwin into the open air and gave him contact with nature, but when he left Shrewsbury School in 1825 there was little to suggest that he would become a naturalist. He tells us rather impiously that his main interest at this time was killing things:

## 12 From Sport to Science

In the latter part of my school life I became passionately fond of shooting, and I do not believe that anyone could have shown more zeal for the most holy cause than I did for shooting birds. How well I remember killing my first snipe, and my excitement was so great that I had much difficulty in reloading my gun from the trembling of my hands. This taste long continued and I became a very good shot.

(Ibid.: 21)

### 2. FROM SPORT TO SCIENCE

Darwin first sought to follow the family tradition by becoming a doctor, and tradition dictated he should train in Edinburgh, where he duly began his medical studies in October 1825 at the age of sixteen. His heart was not in it: 'Dr Duncan's lectures on *Materia Medica* at 8 o'clock on a winter's morning are something fearful to remember. Dr Munro made his lectures on human anatomy as dull, as he was himself, and the subject disgusted me' (ibid.: 22). Darwin was squeamish. His disgust was provoked by dissection, and surgery was also an intolerable strain to the sympathies he felt for its victims:

I also attended on two occasions the operating theatre in the hospital at Edinburgh, and saw two very bad operations, one on a child, but I rushed away before they were complete. Nor did I ever attend again, for hardly any inducement would have been strong enough to make me do so; this being long before the blessed days of chloroform. The two cases fairly haunted me for many a long year.

(Ibid.: 23)

Walking, riding, botanising and zoologising around Edinburgh offered a welcome escape as he turned away from the trials of medicine, but still Darwin was a long way from travelling the straight road to becoming a man of science. Even geology, the subject in which he would first make his name, held little interest for him:



During my second year at Edinburgh I attended Jameson's lectures on Geology and Zoology, but they were incredibly dull. The sole effect they produced on me was the determination never as long as I lived to read a book on Geology or in any way to study the science.

(Ibid.: 25–26)

Edinburgh was not all bad. Darwin became a member of the Plinian Society, a small student-run group which 'met in an underground room in the university for the sake of reading papers on natural science and discussing them' (ibid.: 24). One of the most important friendships Darwin made there was with Robert Grant, a lecturer at Edinburgh, and a follower of Lamarck. Grant had been exposed to Lamarck's views during the time he had spent in Paris, and Darwin remembered that: 'He one day, when we were walking together burst forth in high admiration of Lamarck and his views on evolution. I listened in silent astonishment, and as far as I can judge, without any effect on my mind' (ibid.).

Darwin's astonishment at this praise for Lamarck owes itself to the poor light in which Lamarck's theory was viewed around that time, primarily in Britain, but also in France. Lamarck's ideas, which were largely ignored until much later in the century, were dismissed as speculative, with little evidential basis. He had argued in favour of the potentially unlimited mutability of species over time – the view known in France as *transformisme*, and in Britain as *transmutationism*.

The caricature of Lamarck's position that we have inherited today tends to stress two further themes: first is the view that species adapt to their environments by conscious willing; second is the so-called 'inheritance of acquired characteristics'. The overall Lamarckian package has it that, for example, giraffes 'will' themselves to reach leaves at the tops of trees, and as a result their necks get longer. Their offspring are then born with longer necks. This is, as I say, a distortion of Lamarck's view (Bowler 1984: 81). He believed that as changing environments impose new requirements on species, the organisms in question are forced to

acquire new habits in response to these altered demands. Conscious willing was not a part of Lamarck's theory; the view that it was can be traced to a hostile discussion of Lamarck by Charles Lyell, a British geologist who influenced Darwin deeply. Lamarck held that organisms have a kind of inner drive to adapt to their conditions. Lamarck did indeed believe that if a faculty was used during the life of an individual, then the alterations brought about by increased use would be inherited in future generations. So Lamarck held that adaptable habits, coupled with this mechanism of inheritance (called 'use-inheritance' in Britain), could lead to the limitless transformation of species in such a way that they would track the demands of their environments as those environments changed over time.

As this book unfolds we will see that Darwin, like Lamarck, came to believe that species were mutable, and he also believed (as did most of his contemporaries) in the importance of use-inheritance. Even so, there is one particular feature of Lamarck's view that is worth stressing, for it is quite different to any view Darwin came to hold. Today, when we think of 'evolution', we probably think of evolutionary trees that depict genealogical relationships between species, and which show how today's species are descended from a small number of common ancestors. That is an image of evolution that we owe primarily to Darwin. Lamarck, in contrast, believed that the simplest forms of life had been (and were still being) generated spontaneously from the coming-together of inert matter. According to Lamarck, once a simple life form is generated its descendants then undergo a series of transformations to become more complex as time goes by. But the species we see today do not have ancestors in common in the way that a Darwinian tree demands; instead, species' differing degrees of complexity reflect (as Lamarck saw it) the different periods of time that have elapsed since the spontaneous formation of those species' unrelated ancestors. If we find an organism today that is quite simple, this indicates that it must be descended from a spontaneously generated ancestor that appeared recently. More complex organisms are the descendants of organisms that were spontaneously formed far longer ago (*ibid.*: 79–81). Other important differences between Lamarck

and Darwin will become apparent in later chapters, specifically regarding the *mechanism* by which organisms become adapted to their environments; for now it is important to note that they are also at odds over the historical *pattern* of evolutionary change.

By the end of Darwin's second year in Edinburgh it was clear that medicine was not for him. Robert encouraged his son to follow a career in the clergy, and although Charles had some doubts they were not enough to scupper the plan:

I asked him to consider, as from what little I had heard and thought on the subject I had scruples about declaring my belief in all the dogmas of the Church of England; though otherwise I liked the thought of becoming a country clergyman.

(*Autobiography*: 29)

It was a requirement that any Anglican priest should have a degree from one of the English universities, and so Darwin arrived in Cambridge, in January 1828, as a student of Christ's College. Darwin's comments on his Cambridge experiences make for mixed advertising. He claimed to have profited from its formal instruction no more than he did from that of Dr Butler: 'During the three years which I spent at Cambridge my time was wasted, as far as the academical studies were concerned, as completely as at Edinburgh and at school' (*ibid.*: 30). But, as at Edinburgh, there were good experiences as well as bad, including some of an intellectual kind. He profited especially from the works of William Paley. Paley had been a fellow of Christ's, and he is now best known for a canonical defence of the 'Argument from Design' in his lively book *Natural Theology*. This is the argument which uses the elegant design of organic nature – the eye that is so well-suited to sight, the wing to flight – as evidence for the existence of an intelligent creator competent to produce such workmanship. In later years Darwin concluded that his own views dealt the death blow to the design argument. At Cambridge, however, Darwin explains that:

In order to pass the B.A. examination, it was, also, necessary to get up Paley's *Evidences of Christianity*, and his *Moral Philosophy*.

## 16 From Sport to Science

This was done in a thorough manner, and I am convinced that I could have written out the whole of his *Evidences* with perfect correctness, but not of course in the clear language of Paley. The logic of this book and as I may add of his *Natural Theology* gave me as much delight as did Euclid. The careful study of these works . . . was the only part of the Academical Course which was of the least use to me in the education of my mind. I did not at that time trouble myself with Paley's premises; and taking these on trust I was charmed and convinced by the long line of argumentation.

(Ibid.: 30–31)

*Natural Theology* was not, in fact, one of the texts on which Darwin was examined, but Darwin gained a good enough knowledge of Paley's other works to pass his ordinary degree (the BA) and gain 'a good place among the *hoi polloi*, or crowd of men who do not go in for honours' (ibid.).

The contacts which Darwin made at Cambridge were vital contributors to his subsequent successes. Edinburgh's unpleasant geological experiences had so turned him off the subject that he still could not bring himself to attend geology lectures (given by Adam Sedgwick). But he did befriend John Henslow, a young Anglican priest and Professor of Botany. Darwin attended Henslow's lectures, he accompanied him on long botanising walks, and frequently went to his house for dinner. This friendship, he later wrote, 'influenced my whole career more than any other' (ibid.: 34). At these dinners, Darwin met William Whewell (pronounced to rhyme with 'jewel'), one of the leading intellectual lights of Victorian society, an influential writer on scientific method, and a man who would eventually become Master of Trinity College:

Dr Whewell was one of the older and distinguished men who sometimes visited Henslow, and on several occasions I walked home with him at night. Next to Sir J. Mackintosh he was the best converser on grave subjects to whom I ever listened.

(Ibid.: 35)

Compared with his negative assessment of Cambridge's impact on his intellect, Darwin's verdict on the non-academic part of his life there is more likely to be used as a soundbite by University fundraisers: 'Upon the whole the three years which I spent at Cambridge were the most joyful in my happy life; for I was then in excellent health, and almost always in high spirits' (ibid.: 36). He developed a taste for painting ('that of Sebastian del Piombo exciting in me a sense of sublimity' [ibid.]) and music, although he was 'utterly destitute of an ear' (ibid.). Sport remained a significant interest, as well as the predictable pleasures of student life:

Although . . . there were some redeeming features in my life at Cambridge, my time was sadly wasted there and worse than wasted. From my passion for shooting and for hunting and when this failed for riding across country I got into a sporting set, including some dissipated low-minded young men.

(ibid.: 31)

But in spite of this, natural history, and more specifically entomology, was beginning to command his attention: '. . . no pursuit at Cambridge was followed with nearly so much eagerness or gave me so much pleasure as collecting beetles' (ibid.: 32).

Darwin got his degree at the beginning of 1831, but University regulations demanded that he remain in residence in Cambridge for two more terms. He must have got over his loathing of geology during this period, for in August 1831, at Henslow's suggestion, Adam Sedgwick allowed Darwin to accompany him on a geological expedition to North Wales. This was clearly a stimulating trip, confirming Darwin's excitement at the possibilities offered by science and instructing him in method in the field. Even then, the conversion from sportsman to scientist was not complete. He left Sedgwick before the end of the expedition, going first to Barmouth and then to Maer (his uncle's home) 'for shooting; for at that time I should have thought myself mad to give up the first days of partridge shooting for geology or any other science' (ibid.: 36–37).

## 18 **The *Beagle* Voyage**

When he got back to Shrewsbury he found a letter from Henslow telling him of a Captain FitzRoy, who was willing to share his own cabin with 'any young man who would volunteer to go with him without pay as naturalist to the Voyage of the *Beagle*.' Robert Darwin was initially opposed to the idea (a sea-voyage was dangerous, and it would disrupt the progression of his son's clerical career), but Charles's uncle Jo (Josiah Wedgwood II) persuaded Robert to consent. A few days later Darwin went to Cambridge to see Henslow, then to London for an interview with FitzRoy. The matter was settled: Darwin made a brief visit to Plymouth on 11th September 1831, he went home again for a few weeks to say his farewells, and then returned to Plymouth on 24th October, to await the *Beagle*'s departure.

### **3. THE *BEAGLE* VOYAGE**

The *Beagle* finally set sail on 27th December 1831, after two previous attempts to leave port were foiled by bad weather. It was a surveying ship, charged with charting the South American coast. The voyage was initially scheduled to last three years; in the end it lasted nearly five. Only twenty-two when he left England, it was over the first months of the voyage that Darwin turned decisively to science, coming to the realisation, 'though unconsciously and insensibly, that the pleasure of observing and reasoning was a much higher one than that of skill and sport' (ibid.: 43). He would regard this long adventure as the foundation of his successes as a naturalist, writing near the end of his life that:

The voyage of the *Beagle* has been by far the most important event in my life and has determined my whole career . . . I have always felt that I owe to the voyage the first real training or education of my mind. I was led to attend closely to several branches of natural history, and thus my powers of observation were improved, though they were already fairly developed.

(ibid.: 42)

Aside from providing cultivated company to the ship's troubled captain Robert FitzRoy, Darwin's primary goal for the *Beagle* voyage was not to observe finches and giant tortoises, but to work on geology and invertebrates. He took with him the first of Charles Lyell's three-volume *Principles of Geology*, and the combination of close study of this work together with direct observation of varied geological phenomena soon converted Darwin to a Lyellian view of things. Unlike Sedgwick, Lyell was an advocate of *uniformitarianism*, the view that all geological phenomena could be explained by reference to the slow action of causes of the same type as we can observe acting around us now, compounded over vast stretches of time to produce such large scale features as mountains or oceans. This view was opposed to the *catastrophism* of Sedgwick and others – the view that the Earth's history had been punctuated by a series of swift and violent catastrophes of a character not experienced by men alive today.

Lyell was certainly no evolutionist: he had criticised Lamarck's transmutationism, arguing that species could vary, but were forever held within fixed boundaries. Even so, Darwin's conversion to uniformitarianism convinced him, in Janet Browne's words, 'that the majestic story of nature could be explained by the accumulation of little things' (Browne 2003a: 294). This gradualist theme would run through his career's work.

The story of the *Beagle* voyage is a long and fascinating one, and what is told here will focus only on highlights. The ship sailed south from Plymouth, arriving in the Cape Verde Islands (off the West African coast) in mid-January. From there they sailed to Bahia (Salvador) in Brazil, where Darwin experienced both slavery and a tropical rainforest for the first time. He argued with FitzRoy about slavery, a practice which Darwin 'abominated' (*Autobiography*: 40). The rainforest, on the other hand, was inspiring:

Delight . . . is a weak term to express the feelings of a naturalist who, for the first time, has wandered by himself in a Brazilian forest. . . . To a person fond of natural history, such

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a day as this, brings with it a deeper pleasure than he ever can hope to experience again.

(Darwin 1913: 10–11)

The ship moved further down the coast, arriving in Rio de Janeiro in April 1832, and Montevideo in July. It was at this time that the *Beagle*'s surveying business began, sailing down the east coast of South America and up the west coast, not departing for the Galapagos Islands until September 1835. Darwin made several long trips inland during this time. Janet Browne paints a picture of a young man revelling in a vigorous outdoor life, which poor health would deny him almost as soon as he returned home. In a letter to his sister Caroline he describes the sport in Patagonia:

In this line I never enjoyed anything so much as Ostrich hunting with the wild soldiers, who are more than half Indian. They catch them by throwing two balls which are attached to the ends of a thong so as to entangle their legs: it was a fine animated chase.

(Quoted in Browne 2003a: 220)

One incident that perhaps coloured Darwin's view of race is worth recounting. The *Beagle* was carrying three natives of Tierra del Fuego, the group of islands at the southern point of South America. These three (whom the British named Fuegia Basket, York Minster and Jemmy Button) had been taken by FitzRoy and transported to England on an earlier voyage. They had learned English, been presented to the King and Queen, and their heads had been examined as the craze for phrenology – the study of character as revealed in cranial bumps – demanded. FitzRoy was now returning them home to Tierra del Fuego, where he intended to help found a mission. The three newly civilised Fuegians would assist in its running.

As the voyage drew on, Darwin warmed especially to Jemmy Button:

Jemmy Button was a universal favourite, but likewise passionate; the expression of his face at once showed his nice disposition.



He was merry and often laughed, and was remarkably sympathetic with any one in pain: when the water was rough, I was often a little sea-sick, and he used to come to me and say in a plaintive voice, 'Poor, poor fellow!' but the notion, after his aquatic life, of a man being sea-sick, was too ludicrous, and he was generally obliged to turn on one side to hide a smile or laugh, and then he would repeat his 'Poor, poor fellow!' He was of a patriotic disposition; and he liked to praise his own tribe and country, in which he truly said there were 'plenty of trees,' and he abused all the other tribes: he stoutly declared that there was no Devil in his land.

(Darwin 1913: 217–18)

Darwin's experiences with Jemmy did nothing to prepare him for the welcome which a band of unimproved Fuegians gave the *Beagle* as it neared land in December 1832:

I shall never forget how savage & wild one group was.—Four or five men suddenly appeared on a cliff near to us,—they were absolutely naked & with long streaming hair; springing forth from the ground & waving their arms around their heads, they sent forth most hideous yells. Their appearance was so strange, that it was scarcely like that of earthly inhabitants.

(From Darwin's *Beagle* diary, quoted in Browne 2003a: 240)

Darwin found it hard to imagine that Jemmy was of the same race as these Fuegians. The processes that had lifted Jemmy from such a low state suggested great possibilities for the bettering of man: 'What a scale of improvement is comprehended between the faculties of a Fuegian savage & a Sir Isaac Newton', Darwin wrote in his diary (quoted in *ibid.*: 248). It was therefore a shock to see that what goes up can also come down. The *Beagle* left Jemmy, York and Fuegia at the beginning of 1833. When it returned to Tierra del Fuego in March 1834, Darwin initially did not recognise Jemmy Button canoeing to meet them, apparently a 'savage' once more:

It was quite painful to behold him; thin, pale, & without a remnant of clothes, excepting a bit of blanket round his waist: his hair,

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hanging over his shoulders; & so ashamed of himself, he turned his back to the ship as the canoe approached. When he left us he was very fat, & so particular about his clothes, that he was always afraid of even dirtying his shoes; scarcely ever without gloves & his hair neatly cut.—I never saw so complete & grievous a change.

(Quoted in *ibid.*: 268–69)

Jemmy refused repeated offers to return to England with the *Beagle*. FitzRoy's mission station was abandoned.

Not until September 1835, four-fifths of the way through the *Beagle*'s voyage, did Darwin arrive in the Galapagos Islands. Today one sometimes has the impression that Darwin stepped off the boat, surveyed the different species of finch – all very similar, but each differently adapted to its own island – and intuited the truth of the theory of evolution by natural selection. This is not what happened. The principle of natural selection would not come to Darwin for several years, and it was not until he returned to London that he concluded that the different species of the Galapagos were formed by modification from common ancestors. When the local Vice-Governor told Darwin that tortoises of different forms were peculiar to different islands, he 'did not for some time pay sufficient attention to this statement, and I had already partially mingled together the collections from two of the islands' (Darwin 1913: 418). He classified what he later recognised as different species of finch in entirely different families, calling one a 'wren'. As he later put it: 'I never dreamed that islands, about fifty or sixty miles apart, and most of them in sight of one another, formed of precisely the same rocks, placed under a quite similar climate, would have been differently tenanted' (*ibid.*).

Darwin eventually noted that mockingbirds from two of the Galapagos islands tended to differ, and this made him look again at the birds he had seen earlier on a third island, James Island. He remarked in his field notes:

This bird which is so closely allied to the *Thenca* of Chili (*Callandra* of B. Ayres) is singular from existing as varieties or

distinct species in the different Isds.—I have four specimens from as many Isds.—There will be found to be 2 or 3 varieties.—Each variety is constant in its own Island.—This is a parallel fact to the one mentioned about the Tortoises.

(Quoted in Browne 2003a: 304–5)

Darwin had realised that the different islands, although they had almost identical environments, contained distinct species of bird. He had also realised that these birds were similar to species found in the nearest area of continental mainland. Logically speaking, these observations point strongly to transmutation: the similarities between these island species and those of the mainland can be explained by the hypothesis that they are modified forms of an earlier ancestor which existed in that geographical region. Arguments like this would eventually appear in the *Origin of Species*. But Darwin did not, in fact, become a convert to transmutationism until well after the *Beagle* left the Galapagos.

The *Beagle* sailed next to Tahiti, where a sober Darwin thought it unbecoming that the Tahitian women should wear little save for a flower in their hair. In December 1835 the ship arrived in New Zealand. Perhaps through fatigue at a voyage that had lasted for four years, and lacking any priming from Peter Jackson's films, Darwin wrote:

I believe we were all glad to leave New Zealand; it is not a pleasant place. Amongst the natives there is absent that charming simplicity which is found in Tahiti; and the greater part of the English are the very refuse of society. Neither is the country itself attractive.

(Darwin 1913: 456–57)

He thought much better of Australia and prosperous Sydney, which he reached in January 1836: 'My first feeling was to congratulate myself that I was born an Englishman' (ibid.: 459). In the spring they crossed the Indian Ocean by way of the Keeling Islands and Mauritius, arriving at Cape Town at the end of May. It was around this period – as late as this – that Darwin seems to have

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abandoned the prospect of a country parsonage. In Cape Town Darwin dined with the astronomer Sir John Herschel, who was there to make various observations, including watching Halley's Comet. Darwin had a great respect for Herschel's philosophical works, perhaps because Herschel was of one mind regarding scientific method with Charles Lyell:

I felt a high reverence for Sir J. Herschel, and was delighted to dine with him at his charming house at the C. of Good Hope and afterwards at his London house. I saw him, also, on a few other occasions. He never talked much, but every word which he uttered was worth listening to.

(*Autobiography*: 62)

In July, when the *Beagle* arrived at Ascension Island, Darwin received news telling him that Henslow had edited some of his letters on scientific topics, which had then been read to considerable acclaim in London. Darwin was, it turned out, already well known to the minds whose thoughts he cared about: even Lyell, whom he had never met, looked forward to picking his brain.

From Ascension the *Beagle* returned once more to Bahia in Brazil, then travelled north to the Azores and the final run of the voyage. Darwin never found his sea-legs, even at the end of the journey. He was ill, off and on, over the whole five years, writing to his family: 'I loathe, I abhor the sea and all ships which sail on it. Not even the thrill of geology makes up for the misery and vexation of spirit that comes with sea-sickness' (quoted in Browne 2003a: 178).

### 4. LONDON, MARRIAGE AND THE NOTEBOOKS

The *Beagle* arrived in Falmouth on 2nd October 1836. Darwin initially went back to Shrewsbury, where his father greeted him by insinuating that the learning he had acquired in his five-year absence had caused his head to change shape. Charles decided that London was the place to build a scientific career and so moved there in March 1837, taking lodgings at Great Marlborough Street.

The period spent in London is now viewed as one of the most important for the formation of all Darwin's later evolutionary views (Hodge 2003). He gave numerous talks to the Geological Society, and began to publish regularly. One of his first publications was a personal narrative of his round-the-world trip entitled *Journal of Researches*, now more usually known under the title *The Voyage of the Beagle*. It was also in London that he transformed the *Beagle's* mass of observations and experiences on matters geological, botanical, geographical, zoological, philosophical, anthropological and embryological into a coherent picture of life's unfolding. His reading, which was extensive at this time, included works of the philosophers David Hume and Adam Smith, as well as philosophical books less well known today such as Herbert Mayo's *Philosophy of Living*, John Abercrombie's *Inquiries Concerning the Intellectual Powers and the Investigation of Truth* and James Mackintosh's *Dissertation on the Progress of Ethical Philosophy*.

It was during the London period that Darwin began to speculate about the possibility of a transmutationist view of natural history, which he did in notebooks, opening one dedicated exclusively to an assessment of evidence for such a view a few months after arriving in the capital. Eight years later he had completed five books marked with letters 'A' to 'E', as well as the 'M' and 'N' notebooks, on metaphysics.

Darwin would later claim that transmutationist views had appeared plausible to him during his *Beagle* voyage. He had been, he said:

Deeply impressed . . . by the South American character of most of the productions of the Galapagos archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of these islands appearing to be very ancient in a geological sense . . . It was evident that such facts as these, as well as many others, could be explained on the supposition that species gradually became modified; and the subject haunted me.

*(Autobiography: 71–72)*

Even so, he was not satisfied by a case of this sort, for it gave no indication of how species became so wonderfully adapted to their

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environments. Darwin could not account for the phenomena which Paley had taught him to admire: 'I had always been much struck by such adaptations, and until these could be explained it seemed to me almost useless to endeavour to prove by indirect evidence that species have been modified' (ibid.). In a side-swipe at Lamarck, Darwin says he thought it 'evident that neither the action of the surrounding conditions, nor the will of the organisms (especially in the case of plants)' could explain this good design (ibid.: 72).

On 28th September 1838, Darwin began reading Thomas Malthus's *Essay on the Principle of Population*. Malthus argued that populations have a tendency to expand over time, which outstrips the increase in the supply of food. The result, unless population growth is voluntarily held in check, is scarcity of resources, famine and an inevitable pruning of the population. Darwin would come to regard the reading of this book, which he completed on 3rd October, as an extended 'Eureka!' moment in the formulation of his views:

In October 1838, that is, fifteen months after I had begun my systematic enquiry, I happened to read for amusement 'Malthus on *Population*', and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed. The result of this would be the formation of new species.

(Ibid.: 72–73)

Although Darwin presents the principle of natural selection as largely worked out upon reading Malthus, he did not rush into print; indeed, until the publication of the *Origin of Species* some twenty years later he did not publish his theory of natural selection at all:

Here, then, I had at last got a theory by which to work; but I was so anxious to avoid prejudice, that I determined not for some time

to write even the briefest sketch of it. In June 1842 I first allowed myself the satisfaction of writing a very brief abstract of my theory in pencil in 35 pages; and this was enlarged during the summer of 1844 into one of 230 pages, which I had fairly copied out and still possess.

(Ibid.)

Darwin's return from his travels also turned his mind to marriage, and here, too, he cautiously evaluated the pros and cons of such a transmutation in a series of notes. On the plus side, a wife promised 'female chit-chat', as well as someone 'who would feel interested in one'. A wife would be 'better than a dog anyhow'. (This is high praise – Darwin was extremely fond of dogs.) He expressed the negative points of marriage considerably more forcefully. A wife and family would be expensive, and they would consume time: 'Fatness & idleness—anxiety & responsibility—less money for books &c. If many children forced to gain one's bread'. Many doors would be closed to him, too: 'Eheu!! I should never know French,—or see the continent—or go to America, or go up in a Balloon, or take solitary trip in Wales—poor slave—you will be worse than a negro'. Even so, he remarks uncharacteristically that 'there is many a happy slave'. His romantic vision of a future as a ballooning bachelor needed bringing down to earth: 'Only picture to yourself a nice soft wife on the sofa with good fire, & books & music perhaps—Compare this vision with the dingy reality of Grt. Marlbro' St'. The matter was decided, 'Marry—Marry—Marry. QED' (all notes quoted in Browne 2003a: 379).

In the end it was Emma Wedgwood whom he targeted, the youngest daughter of his uncle Jo. They married on 29th January 1839, five days after Darwin was made a Fellow of the Royal Society, the elite association of men of science. Emma was genuinely fond of Charles, writing to her aunt that:

He is the most open, transparent man I ever saw, and every word expresses his real thoughts. He is particularly affectionate and very nice to his father and sisters, and perfectly sweet tempered, and possesses some minor qualities that add particularly to

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one's happiness, such as not being fastidious, and being humane to animals

(Quoted in *ibid.*: 393)

And although Darwin's initial decision to marry was calculated, near the end of his life he wrote movingly of their relationship:

She has been my greatest blessing, and I can declare that in my whole life I have never heard her utter one word which I had rather have been unsaid. She has never failed in the kindest sympathy towards me, and has borne with the utmost patience my frequent complaints from ill-health and discomfort. I do not believe she has ever missed an opportunity of doing a kind action to anyone near her. I marvel at my good fortune that she, so infinitely my superior in every single moral quality, consented to be my wife. She has been my wise adviser and cheerful comforter throughout my life, which without her would have been during a very long period a miserable one from ill-health. She has earned the love and admiration of every soul near her.

(*Autobiography*: 56)

Charles and Emma stayed in London at first, going to live on Upper Gower Street, close to University College. His health declined markedly during the London period, although there was a temporary improvement in 1842 which allowed him to go once again to Wales on a geological expedition, 'the last time I was ever strong enough to climb mountains or to take long walks, such as are necessary for geological work' (*ibid.*: 58). He remained strong enough, however, 'to go into general society' (*ibid.*), where he became well-acquainted with many of the leading men of science. He saw Herschel again, and he got to know Charles Lyell, his geological hero: 'I saw more of Lyell than of any other man both before and after my marriage. His mind was characterised, as it appeared to me, by clearness, caution, sound judgement and a good deal of originality' (*ibid.*). He met others, too, such as Herbert Spencer and Thomas Carlyle, neither of whom he had much time for. Looking back he wrote that:



Herbert Spencer's conversation seemed to me very interesting, but I did not like him particularly, and did not feel that I could easily have become intimate with him. I think that he was extremely egoistical. After reading any of his books, I generally feel enthusiastic admiration for his transcendent talents, and have often wondered whether in the distant future he would rank with such great men as Descartes, Leibnitz, etc., about whom, however, I know very little.

(Ibid.: 63)

Darwin makes it clear that the absence of good empirical evidence left him unimpressed by much of Spencer's work:

His deductive manner of treating every subject is wholly opposed to my frame of mind. His conclusions never convince me: and over and over again I have said to myself, after reading one of his discussions,—'Here would be a fine subject for half-a-dozen years' work.'

(Ibid.: 64)

As always, Darwin continued to work, completing an important work on coral reefs soon after he and Emma were married. Their first child was born in December 1839, and Charles's ill health together with a growing family and the grime and noise of the city persuaded them to seek a home out of London. Charles and Emma hit on Down House in the Kent village of Down (now spelled 'Downe'), not far from London. They moved there in September 1842, and they stayed there for the rest of their lives.

## 5. DOWN . . .

Although he was only thirty-three when he settled in Kent, Darwin's later autobiographical reminiscences (never intended for publication) effectively end with the move to Down.

During the first part of our residence we went a little into society, and received a few friends here; but my health almost always suffered

from the excitement, violent shivering and vomiting attacks being thus brought on. I have therefore been compelled for many years to give up all dinner-parties; and this has been somewhat of a deprivation to me, as such parties always put me into high spirits. From the same cause I have been able to invite here very few scientific acquaintances.

*(Autobiography: 68)*

His health would not permit him to do anything lively, and so he has nothing of interest in his life to describe after 1842 except for a formidable series of what academics now call ‘research outputs’:

My chief enjoyment and sole employment throughout life has been scientific work; and the excitement from such work makes me for the time forget, or drives quite away, my daily discomfort. I have therefore nothing to record during the rest of my life, except the publication of my several books.

*(Ibid.: 69)*

Thanks to Darwin’s son Francis, we know of Charles’s daily routine in some detail. He woke early and went for a short walk before breakfast, which he took alone at about seven forty-five. His best working hours were between eight and half-past nine, after which he read letters, and often had a portion of a novel read aloud to him. Work would begin again at half-past ten, and conclude at noon. According to Francis, ‘By this time he considered his day’s work over, and would often say, in a satisfied voice, “I’ve done a good day’s work”’ (Darwin 1905: 91). Whatever the weather, he would then go for another walk, often beginning by checking on the experimental plants in his greenhouse. After lunch he lay on the sofa reading the newspaper, and then progressed to writing letters. At around three he took another rest, and smoked a cigarette while listening to Emma reading from a novel. Then at four he took another walk. He would put an hour’s work in between half-past four and half-past five, followed by another rest and more reading from a novel. Then after dinner he would play two games of backgammon with Emma, and read

from a scientific book, or listen to her playing the piano. Francis concludes his description of his father's daily life:

He became much tired in the evenings, especially of late years, when he left the drawing-room about ten, going to bed at half-past ten. His nights were generally bad, and he often lay awake or sat up in bed for hours, suffering much discomfort. He was troubled at night by the activity of his thoughts, and would become exhausted by his mind working at some problem which he would willingly have dismissed.

(Ibid.: 102)

Darwin saw few people, and whether his illness was always the cause of this or sometimes a pretext, his isolation enabled him to work exceptionally hard. Yet one should not infer from this that he was a lone genius, single-handedly revolutionising biology from the sequestered comfort of Down. Darwin's scientific insights were far from solo efforts. He was a prolific correspondent, sending letters to all parts of the world. These letters did not merely ask questions; they regularly sought to persuade others to conduct small experiments, make observations, or oversee surveys on his behalf.

As we have seen, Darwin wrote a substantial essay on natural selection in 1844, which he chose not to make public. His illness seems to have alarmed him so much that he arranged with Emma that she should have this sketch published if he should die. He was indeed very ill, so much so that when his father died in 1848 he was unable to attend the funeral in Shrewsbury. But if Darwin had put together the primary outline of his theory by 1844, why did he not go public with it until 1859, when he wrote the *Origin of Species*? Why did he instead spend eight years, from 1846 to 1854, working on a series of anatomical studies of barnacles?

The question of why Darwin delayed is of considerable interest to historians (e.g. R. Richards 1983). Rather than give a decisive answer here, let me instead canvas some of the rationales that have been put forward. First, there are scientific reasons. Darwin's barnacle work was important for helping him to appreciate the

range of variation in nature, even among the most important anatomical structures. His knowledge of barnacles led to him making significant changes to the evolutionary theory described in the essay of 1844. Second, there are personal reasons. Emma was a traditional Anglican, unlike Charles who already had doubts about many of the doctrines of the Church of England. Charles was no atheist, but perhaps he did not wish to hurt her by a public proclamation of his views, which undermined literalist readings of the Bible and any view of God as the immediate creator of species. Robert Darwin had warned him against any expression of religious doubt to his spouse:

Nothing is more remarkable than the spread of scepticism or rationalism during the latter half of my life. Before I was engaged to be married, my father advised me to conceal carefully my doubts, for he said that he had known extreme misery this caused with married persons.

*(Autobiography: 55)*

Third, there are reasons associated with reputation and rhetoric. It is likely that Darwin was moved by the hostile reactions which transmutationist views were receiving from those whom Darwin admired most. Lyell, as we have seen, had dismantled Lamarck's theory piece by piece. Then, in October 1844, the book *Vestiges of the Natural History of Creation* was anonymously published, a popular success and a public sensation. This book also argued for a transmutationist position, albeit one far more ambitious, and far more speculative, than anything Darwin would ever avow. It covered not only the development of plants and animals, but of men and women, and of the universe itself. It was dismissed by Whewell, Herschel and Sedgwick. Sedgwick was particularly hostile, writing in a review that it showed 'the glitter of gold-leaf without the solidity of precious metal'. It was shoddy work, and irresponsible, too: Sedgwick wrote to Lyell that 'If the book be true, the labours of sober induction are in vain; religion is a lie; human law a mass of folly and a base injustice; morality is moonshine; our labours for the black people of Africa were works

of madmen; and men and women are only better beasts!' (quoted in Browne 2003a: 468). If Darwin took his time, he might wait for a calmer sea on which to sail his own transmutationist theory; he might amass enough sober evidence and marshal it in such a way as to pre-empt any doubt of the purity of his metal; and he might find a way to judiciously avoid discussion of man and morality. Darwin would aim to produce a work of pure gold that was not so brightly buffed as to draw too much attention to its implications. Perhaps he should cut his teeth on barnacles.

Not until 1854, when the barnacle project was done, did Darwin begin to work on a defence of his transmutationist views. He assembled notes, discussed his views with friends and colleagues, performed small experiments, and finally decided in May 1856 (on Lyell's advice) to write a book, which he planned to call *Natural Selection*. Had he completed it, this book would have been three or four times the size of the *Origin of Species*. But Darwin was pushed into hasty publication of his theory in a wholly different format by the arrival, in June 1858, of a letter from Alfred Russel Wallace, a young naturalist who was working in the Dutch East Indies. Wallace had sent him an essay which, Darwin judged, 'contained exactly the same theory as mine' (*Autobiography*: 73). Wallace had hit on a principle that was similar to Darwin's natural selection, and like Darwin he claimed inspiration from Malthus. Lyell and Joseph Hooker (a botanist friend, who would eventually become Director of the Royal Botanical Gardens at Kew) persuaded Darwin that his views and Wallace's should be presented jointly, at a scientific meeting which would take place on 1st July at the Linnaean Society in London. Neither Darwin nor Wallace was present at the meeting. Extracts from Darwin's 1844 essay were read first, then a letter he wrote in 1857 to Asa Gray (Harvard's professor of Botany), and finally Wallace's essay of February 1858. Wallace, who was still travelling, knew nothing of the plotting of Darwin's friends, and had no opportunity to express a view about their plan.

Once outed as a transmutationist, there was no sense in Darwin hiding his views any longer, and everything to be gained from

publishing a substantial work that might cement his claim to priority over Wallace. In August of 1858 Darwin began composing what he described as an ‘abstract’ of his theory. The manuscript was completed in May 1859. John Murray agreed to publish the work, and once proof-reading was done the abstract appeared on 24th November 1859 under the title *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. Unlike *Vestiges of Creation*, the work included nothing about the origins of life itself, nothing about the origins of the Universe, and nothing, save for a small hint, about man. Darwin limited himself to the promise that:

In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. Light will be thrown on the origin of man and his history.

*(Origin: 458)*

Darwin followed the *Origin* with a work on orchids, and a large book on variation in plants and animals, in which he sketched the theory of inheritance that had been missing from his earlier books. Public debate over evolution was fierce in the 1860s, and Darwin became famous as a result of it. Light was eventually thrown on our own species, but Darwin waited until 1871 to do it when he published, aged 62, *The Descent of Man*. The book was a commercial success, bringing a good profit to Darwin and to John Murray. As Janet Browne notes, most reviewers expressed considerable discomfort at the assertion that man was descended from animals, but they were respectful of the book’s author. The debate over evolution had moved on from the vitriolic years immediately following the *Origin*’s publication.

## 6. . . . AND OUT

Darwin continued to work, to experiment, to correspond and to publish throughout the 1870s, producing works on climbing

plants, on emotions in humans and animals, and his last book (in 1881) on earthworms. In 1876, in his late sixties, he began to put on paper some autobiographical remarks, primarily intended, it seems, for the edification and instruction of his children. In them, Darwin laments what seemed to him a slow decline into philistinism. Back in his twenties he had taken pleasure in poetry, music and art. None of these, and not even the contemplation of a landscape, brought him pleasure any more. Instead he 'blesses all novelists', and the escape they bring him. Having written so much of a scientific nature, he reflects sadly that:

My mind seems to have become a machine for grinding general laws out of large collections of facts, but why this should have caused the atrophy of that part of the brain alone, on which the higher tastes depend, I cannot conceive.

(*Autobiography*: 85)

In these last years he describes himself as an 'agnostic'; in earlier times he had been a believer. On the *Beagle* voyage he was 'quite orthodox', but his faith waned with time:

In my Journal I wrote that whilst standing in the midst of the grandeur of the Brazilian forest, 'it is not possible to give an adequate idea of the higher feelings of wonder, admiration, and devotion which fill and elevate the mind.' I well remember my conviction that there is more in man than the mere breath of his body. But now the grandest scenes would not cause any such convictions and feelings to arise in my mind.

(ibid.: 52–53)

Soon after returning from his voyage, Darwin became sceptical of such things as the truth of the Old Testament ('no more to be trusted than the sacred books of the Hindoos, or the beliefs of any barbarian' [ibid.]), and the New Testament miracles. As the years passed he gradually gave up on Christianity altogether, for simple lack of evidence in favour of its claims. In his *Autobiography*, he assesses this religion frankly and with bitterness:

Thus disbelief crept over me at a very slow rate, but was at last complete. The rate was so slow that I felt no distress, and have never since doubted even for a single second that my conclusion was correct. I can hardly see how anyone ought to wish Christianity to be true; for if so the plain language of the text seems to show that the men who do not believe, and this would include my Father, Brother and almost all my best friends, will be everlastingly punished.

And this is a damnable doctrine.

(Ibid.: 50)

In spite of his rejection of Christianity in the years between the *Beagle's* return and the *Origin's* publication, and in spite of his persistent view that 'Everything in nature is the result of fixed laws' (ibid.), Darwin recollects that he retained a belief in God over this period:

Another source of conviction in the existence of God, connected with the reason and not with the feelings, impresses me as having much more weight. This follows from the extreme difficulty or rather impossibility of conceiving this immense and wonderful universe, including man with his capacity of looking far backwards and far into futurity, as the result of blind chance or necessity. When thus reflecting I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a Theist.

This conclusion was strong in my mind about the time, as far as I can remember, when I wrote the *Origin of Species*; and it is since that time that it has gradually with many fluctuations become weaker.

(Ibid.: 53)

The author of the *Origin* was not an atheist; he was instead swayed by an appeal to God as one who first sets the lawful Universe in motion. But after the *Origin's* publication he became sceptical of



this theism, asking (in a way reminiscent of the philosopher David Hume): ‘. . . can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animal, be trusted when it draws such grand conclusions?’ (ibid.: 54). He summarises his stance: ‘The mystery of the beginning of all things is insoluble by us; and I for one must be content to remain an Agnostic’ (ibid.). The tone of Darwin’s discussion suggests that ‘atheist’ might be a better label after all, for he assaults every reason one might claim for belief in God, coming to rest on the view that it is useless to speculate on what, if anything, sets the great machine in motion.

Darwin died on the 19th April 1882. He was seventy-three years old. He is said to have whispered to Emma, ‘I am not in the least afraid to die. Remember what a good wife you have been’. His scientific friends asked the president of the Royal Society to request that he be buried in Westminster Abbey, and the funeral was held there one week after his death.

## SUMMARY

As a young man, Charles Darwin was primarily interested in field sports. He was no great scholar, and first set himself on a career in medicine, then the clergy. The *Beagle* voyage made him as a natural historian. It cemented his passion for science, and it provided him with a fund of observations relating to geology, botany, zoology, embryology, anthropology and other branches of learning, which he continued to draw upon for the rest of his life. Darwin’s broad approach to natural history was influenced by the geologist Charles Lyell, and his evolutionary views owe a great deal to Lyell’s belief in the slow accumulation of minor causes to produce major effects. The *Origin of Species* – Darwin’s defence of transmutation – did not appear until Darwin was fifty years old, and already well-regarded in the scientific establishment. It said almost nothing about the topic of man, and although his notebooks are full of speculation regarding evolution and the human species, Darwin did not speak out on these issues until *The Descent of Man*. From his early thirties until his death at the age of seventy-three Darwin led a secluded

## 38 Further Reading

but busy life at Down House in Kent. His chronic illness prevented him from frequent socialising, and he passed his time writing scientific works, performing experiments in his house and garden, and gleaning information and opinion from a vast number of correspondents spread around the world.

### FURTHER READING

Darwin's own somewhat unreliable reminiscences (including the memories put onto paper in 1876, which are widely quoted in this chapter, as well a much earlier autobiographical fragment written in August 1838) are collected in:

Darwin, C. (2002) *Autobiographies*, M. Neve and S. Messenger (eds) London: Penguin Classics.

Darwin's account of the Beagle voyage is also widely available, and the Penguin edition has a useful introduction:

Darwin, C. (1989) *The Voyage of the Beagle*, J. Browne and M. Neve (eds) London: Penguin Classics.

There are two outstanding and comprehensive biographies of Darwin. This chapter draws very heavily on Janet Browne's two-volume masterpiece. The first volume (*Voyaging*) was originally published in 1995, the second (*The Power of Place*) was originally published in 2002. Readers are more likely to get hold of the new Pimlico edition:

Browne, J. (2003) *Charles Darwin*, London: Pimlico.

The other leading biography, which puts more stress on the topics of class and religion, is:

Desmond, A. and Moore, J. (1992) *Darwin*, London: Penguin.

For a detailed account of Darwin's experiences in the Galapagos, readers should turn to the work of historian Frank Sulloway. His work on Darwin's interpretation of the Galapagos finches is especially well-known:

Sulloway, F. (1982) 'Charles Darwin's Finches: The Evolution of a Legend', *Journal of the History of Biology*, 15: 1–53.