

**Evolution, Games, and God**  
**The Principle of Cooperation**



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I

“Ready to Aid One Another”

*Darwin on Nature, God, and Cooperation*

JOHN HEDLEY BROOKE

There can be no doubt that a tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good would be victorious over most other tribes; and this would be natural selection.

(Darwin [1879] 2004, 157–58)<sup>1</sup>

In this well-known passage from Darwin's *Descent of Man* lies an invitation to consider his understanding of cooperation and its place in his naturalistic theory of human evolution. How did it feature in his account of the moral sense and its development—a development that Darwin believed had been reinforced by religion? In this introductory chapter my aim is to explore some of the principal reasons why Darwin came to believe that a naturalistic account should be given of what he called our social instincts and their transmission. Central to his analysis was a concept of “sympathy” that allowed him to say that, in the early history of human tribes, a decisive role had been played by an instinctive need for the approbation of others and a strong desire to avoid their disapproval. In order to place Darwin's contribution

A whole confusion around the word "natural".  
It seems that the term is understood in a way far smaller & narrower than reality

JOHN HEDLEY BROOKE

in perspective, it is, however, necessary to show that there was nothing essentially "natural" about his naturalism. This can best be done—despite its back-to-front appearance—by examining a few theological responses to Darwin's science and by identifying the reasons why he had abandoned a theology of nature that might have motivated him more strongly to see in the creative aspects of evolution the detailed fulfillment of a providential plan.

References to the naturalness, or otherwise, of naturalism immediately raise definitional problems. A distinction is routinely drawn between the search for natural causes as a principle of method in scientific inquiry and naturalism in the much stronger sense of a view of all reality in which there is nothing other than nature, no supernatural being of any kind. As a methodological assumption, naturalism had long proved its fruitfulness, notably by Darwin's mentor, Charles Lyell, in his reconstruction of Earth's physical history in his *Principles of Geology* (1830–1833). Lyell had also expressed the view that the origin of species, while under the control of Providence, might itself prove explicable in terms of natural, or what were often called secondary, causes. Darwin's application of naturalism in this sense to the evolutionary development of human attributes would prove highly controversial. It did not, however, necessitate a naturalistic worldview in the stronger sense of prescribing an ontology in which what could be known of "nature" defined all that is. Not all forms of naturalism have been as extreme as this, since there are both theistic and deistic variants in which a divine being is understood to be working *through* natural causes. In this connection, theological disputes have frequently revolved around the question of whether such a deity need be supposed to have done anything more than establish and possibly sustain the "laws of nature." Darwin would be caught in such debates because his central concept, that of natural selection, was unashamedly naturalistic in that it accorded agency to "nature," not to divine interventions, in the production of new species. What this meant for his contemporaries, however, was a largely cultural matter because the meaning of "nature" was not a given but itself shaped by different presuppositions—whether, for example, it was understood to be an autonomous system of matter in motion, a carefully designed work of art, or a theater of redemption. Because a "naturalistic" explanation did not have to be atheistic, but could also be associated with theism, deism, or agnosticism, it can be simplistic to describe any one of these associations as "natural"! The significance of these distinc-

tions will become clearer as we investigate Darwin's naturalism, which at the time he wrote his *On the Origin of Species* still involved a deity in the design of nature's laws but not in the day-to-day running of the universe.

Let us begin at Harvard, where this present book was conceived, but in the Harvard of the mid nineteenth century when the great Swiss naturalist Louis Agassiz had just been appointed Professor of Geology and Zoology. Why was Agassiz given such a generous and resounding welcome? Part of the answer lies in the interpretation he gave to living forms. His Platonist philosophy of nature struck a chord with the religious ideals of many in the College (Nartonis 2005). Agassiz had no time for theories of evolution that involved material connections between species. Rather, in the fossil record he saw evidence of progressive creation as epoch succeeded epoch. Living things were the instantiation of ideas in the mind of the Creator. As he once put it: "There will be no scientific evidence of God's working in nature until naturalists have shown that the whole creation is the expression of thought and not the product of physical agents" (Roberts 1988, 34).

Agassiz was not alone in that view. In England, Richard Owen also ascribed the common bone structures of the vertebrates to an archetypal idea in the mind of God. Owen had risen to fame through his expertise in anatomy and paleontology, and it was he who coined the word "dinosaur." Owen was willing to see the emergence of new species as the result of natural causes but, at the same time, the whole process was the unfolding of a divine plan. The many different vertebrates looked to him to be instantiations of a common skeletal structure—an archetypal idea in the mind of the Creator. There was a sense in which "creation" was continuous (Owen 1846).

During Agassiz's tenure at Harvard, Darwin published his *On the Origin of Species* (1859). Here was a quite different account of the unity of form. For Darwin it was the consequence of a historical process in which species were related by common descent. The clash was transparent. Whereas Agassiz (Roberts 1988, 34) affirmed that "the intervention of a Creator is displayed in the most striking manner, in every stage of the history of the world," Darwin's mechanism of natural selection required no such intervention. Agassiz communicated his verdict to Asa Gray, who had been Harvard's Professor

\* Until one considers the quantum level.



of Botany since 1842: Darwin's work was "poor—very poor" (Roberts 1988, 35).

A few years later, a scientific meeting was held in Boston at which both Agassiz and the British physicist John Tyndall were present. Tyndall (1879, 182) left a poignant account of a scene that marks the passing of an age:

Rising from luncheon, we all halted as if by common consent, in front of a window, and continued there a discussion which had been started at table. The maple was in its autumn glory, and the exquisite beauty of the scene outside seemed, in my case, to interpenetrate without disturbance the intellectual action. Earnestly, almost sadly, Agassiz turned, and said to the gentlemen standing round, "I confess that I was not prepared to see [Darwin's] theory received as it has been by the best intellects of our time. Its success is greater than I could have thought possible."

To speak of the passing of an age captures something of the Darwinian impact, but it also misses a vital element. This is the remarkable diversity of the religious response. No interpretation of Darwin's science, whether theistic or atheistic can be singled out as the only "natural" one. Asa Gray, to whom Agassiz confided his poor opinion of Darwin, took a very different view. Gray positively promoted the theory of natural selection, claiming that it had theological advantages (Gray 1963). It underlined the unity of the human races in a way that Agassiz's science did not, and it even helped theologians with their most difficult problem: that of suffering. If competition in a struggle for existence was the motor of evolution, there was perhaps a sense in which the concomitant suffering was a precondition of the very possibility of our existence. Gray even proposed to Darwin that since the cause of the variations on which natural selection worked was, at the time, unknown, there was nothing to say they could not be under the control of Providence.

### The Diversity of Reception

Agassiz and Gray represent two poles in the response to Darwin, who had, of course, wondered, and worried, how his theory might be received: "God

Asa  
Gray  
understood

\*Not all are convinced of Darwin's theory.

knows what the public will think," he mused to one correspondent (Darwin 1991, 375). To admit the mutability of species, he once remarked, had been like confessing a murder, so great was the possible stigma. He knew his book was likely to have a polarizing effect, as it often did in public settings. When the politician Benjamin Disraeli suggested that a choice had to be made between apes and angels for the template of human beings, he was depicted in the press as having sprouted large angelic wings (Desmond and Moore 1991, 460-61). The threat to human dignity that so worried Samuel Wilberforce, the Bishop of Oxford, was often captured in cartoons. There were monkeys impatient to have their tails clipped in order to take their true place in society (Brooke 1991, 291). Bruising attacks from some clergymen made Darwin almost say that those who opposed his theory by snarling and baring their teeth merely confirmed their animal origins.

The responses of three women reveal additional problems and other layers of diversity. An elderly Mary Somerville observed with nostalgic regret that the beauty of a bird's plumage and song could no longer be enjoyed as having been designed for our delight. It was their utility to the birds themselves that mattered now (Somerville 1873, 358). For a feminist leader, such as Elizabeth Cady Stanton, Darwinism offered the bright prospect of emancipation. "The real difficulty in woman's case," she wrote, "is that the whole foundation of Christian religion rests on her temptation and man's fall." By accepting the Darwinian theory that "the race has been a gradual growth from the lower to a higher form of life, and the story of the fall is a myth, we can exonerate the snake, emancipate the woman, and reconstruct a more rational religion for the nineteenth century" (Larson 2005, 52). Late in life, and poignantly, Darwin's wife Emma admitted that some aspects of his writing had been painful to her—particularly the view that "all morality has grown up by evolution" (Darwin 1958, 93). For so many Victorians, belief in the transcendental significance of moral values could be a way back to an otherwise fractured faith—a route seemingly blocked by a science that had no need of the transcendent. To this question of the moral sense we shall return because, although Darwin's account was naturalistic, it was not relativistic. Nor did it devalue the virtue of cooperation.

There was an even greater variety of religious reaction (Brooke 2003). Geographical parameters played a key role in shaping receptivity to Darwinian ideas, making them seem less natural in some constituencies than

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one depiction of Christ in a coat  
\* \* \*  
Q  
work with this

An contraire,  
Science uses the transcendent to reveal hidden patterns.  
Jakob Bronowski

others. As David Livingstone (2003, 117–23) has shown, Presbyterians in Princeton reacted very differently from those in Northern Ireland and differently again from those in Scotland. The reasons were often local and related to high-profile public events. In Belfast, the same John Tyndall who recorded the autumnal melancholy of Agassiz, delivered a provocative address in 1874 (1879, 137–203) that associated Darwin's theory with a more forceful naturalism than Darwin's own. Whereas Darwin himself was willing to use theological language when discussing the appearance of the first few living forms (Peckham 2006, 759), Tyndall brooked no compromise. His aggression toward theology in the context of educational priorities sparked an intensity of reaction that had no equivalent in Princeton. It meant that in Belfast Darwin's theory would unequivocally be seen as a vehicle for materialism and atheism.

Many such contrasts could be drawn to indicate the importance of local parameters. On the question of race, for example, geographical location mattered: the reception of Darwin's theory in New Zealand, where it was invoked to justify extermination of the Maori (Stenhouse 1999), was quite different from perceptions in the southern states of America (Stephens 2000). For complex social and political reasons the public spectacle of the "monkey trials" (famously that of the biology teacher John Scopes in Dayton Tennessee in 1925) has been largely confined to North America (Larson 1997). There has been no equivalent in England, where a future archbishop of Canterbury, Frederick Temple, was already speaking in favor of evolution and against a God of the gaps as early as 1860. Because of the prevalent form of naturalism according to which the deity worked through "natural laws" (Kohn 1989; Brooke 2008), the more agnostic forms, such as that to which Darwin eventually tended, require explanation—and all the more so when, as in Darwin's trajectory, there was the loss of an original intention to become an Anglican clergyman.

In Britain, by the close of the nineteenth century, there were, however, Anglican clergy willing to embrace the Darwinian theory for its supposed theological advantages. The Oxford theologian Aubrey Moore declared that under the guise of a foe Darwin had done the work of a friend, protecting Christianity from a deistic travesty in which God was active only when interfering in the natural order (Peacocke 1985, 111; England 2001). By explaining naturalistically the origin of new species, Darwin had sharpened the

choice between a God active in everything or in nothing. In speaking of Darwin and God we are not therefore dealing with "science versus religion" in any straightforward sense (Moore 1979), tempting though it may be to impose that cliché on the post-Darwinian debates. Contrary to modern creationist rhetoric, Darwin was, in his own words (1887, Volume 1, 304), "never an atheist in the sense of denying the existence of a God." He continued to refer to a Creator, but one who created "by laws" (Brooke 1985, 46). Because Darwin himself anticipated some of the more sophisticated theological moves, his reflections on religion repay closer study. They also help us to understand the metaphysical framework that regulated his explanatory ambitions.

### Preliminary Problems

There is, however, a preliminary problem that arises whenever questions are asked about the religious beliefs of scientists from the past. There is no simple answer to the question "What did Darwin believe about God?" There are several reasons why this is so. Most significantly his views changed over time (Brown 1986). Having studied for the Christian ministry during his Cambridge years, he became a deist during the 1850s and increasingly agnostic later in life. Even during one and the same period, it would be difficult to categorize him because he admitted that his beliefs often fluctuated. When referring to himself as an agnostic in May 1879, he would add the caveat "but not always" (1887, Volume 1, 304). At other times he would imply that he deserved to be called a theist (1887, Volume 1, 313). If we try to compress a complex matter into sound bites, we shall certainly get it wrong. Darwin sometimes said that he could not believe that this wonderful universe is the result of chance alone. Such remarks have lent themselves to apologetic exploitation. But to appropriate them in that way misses the nuance that Darwin so often inserted. He could not believe that the universe was the result of chance, but nor could he look at the structures of living organisms and see in them the product of design. As he disarmingly wrote to Asa Gray, he found himself in an "utterly hopeless muddle" (Darwin 1993, 496).

Finally there is the complication that stems from the privacy of belief. Darwin once reproached an enquirer by saying that he could not see why

his beliefs should be of concern to anyone but himself (1887, Volume 1, 304). His public remarks were sometimes deliberately calculated to give minimal offence. In contrast to some of his modern disciples he did not believe that religious beliefs, however distasteful, should be confronted head-on. But the consequence is a frustrating degree of ambiguity in Darwin's references to the deity (Kohn 1989). Fortunately, this does not prevent the identification of particular experiences and considerations that weighed heavily with him and paved the way for his mature account of morality, religion, and cooperation.

### Formative Experiences

The story of how Darwin's biology was shaped by his experiences on the five-year voyage of *HMS Beagle* has been so brilliantly told (Desmond and Moore 1991; Browne 1995) that I shall not repeat it here. But I would like to abstract a series of encounters that left a permanent mark on his *religious* outlook. One was an encounter with the beauty of a virginal nature. Having been enchanted by the travelogues of Alexander von Humboldt, the young Darwin found the lure of the Brazilian rainforest irresistible. The experience, when it became real rather than vicarious, was to cast a seductive spell on a romantic sensibility. It was during the voyage that Darwin gradually gave up the idea of being a clergyman and one hears the stirrings of a surrogate religion. When he finally arrived in the Brazilian jungle he recorded the experience in almost ecstatic language: "Twiners entwining twiners, tresses like hair, beautiful lepidoptera, Silence, hosannah" (Desmond and Moore 1991, 122).

A second encounter was with what we might call nature in the raw—with various manifestations of a struggle for existence that was to play such a crucial role in his theory of natural selection. The world Darwin encountered in South America was not the happy world of the vicarage garden described by William Paley in his *Natural Theology* (1802). It was, rather, nature in tooth and claw and writ large, as giant condors menaced their prey. In Argentina Darwin witnessed a human struggle—a colonial struggle in which native Indians were being massacred by the forces of General Rosas. Even Earth itself was turbulent: Arriving in Concepcion, Darwin found the cathedral in ruins, destroyed by a recent earthquake. This prompted him to



speculate how the entire condition of England would have been changed had such subterranean forces still been active there. It would have been a tale of famine, pestilence, and death. A struggle to survive in one of the most inhospitable regions on earth was indelibly stamped on his mind when he encountered the "savages" of the Tierra del Fuego.

This particular encounter deserves special consideration. Darwin would eventually ask whether our progenitors had been primitive men like these. His interest in them stemmed in part from an evangelical experiment that he was able to witness. On board ship were three Fuegians who had earlier been taken to England by Robert Fitzroy, captain of the *Beagle*, with a view to their being refined and educated in the gospel. The plan was to return them to their own people in the company of a missionary in the hope they

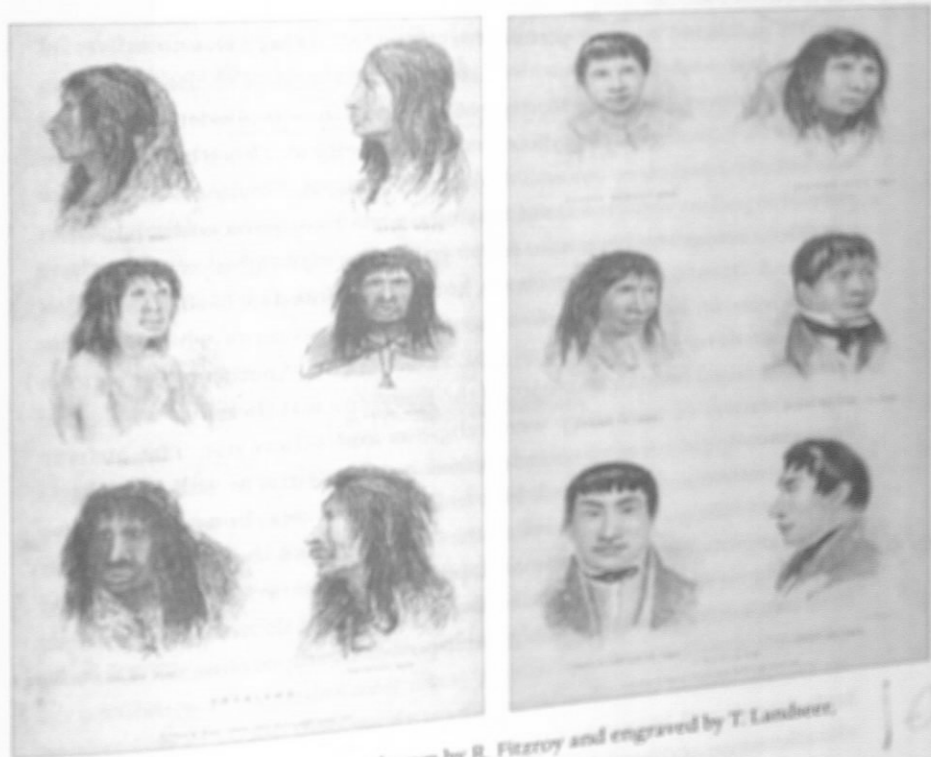


Figure 1.1 Copper engravings, drawn by R. Fitzroy and engraved by T. Landseer, in King, Fitzroy, and Darwin 1838, 2: 141, 324.

would exert an edifying influence. Darwin was intrigued to see how the experiment would work. In fact it ended in failure, and the missionary had to flee for his life. What was to be made of this? There was clearly an enormous difference between "savage" and civilized humans, but might the veneer of civilization, in general, be thinner than was usually imagined? More crucially perhaps, Darwin found himself asking whether there is a clear line of demarcation between humans and animals. His cousin Hensleigh Wedgwood had proposed that there certainly is: only humans have an innate sense of God. After observing the Fuegians (and the natives of Australia) Darwin recorded his doubts. He would do so again, years later, when writing on religion in his *Descent of Man* (1871): "There is ample evidence ... from men who have long resided with savages, that numerous races have existed, and still exist, who have no idea of one or more gods, and who have no words in their languages to express such an idea" (Darwin [1879] 2004, 116). He had had to come to terms with the fact that there was no universal sense of God.

In an important paper Matthew Day (2008) has reminded us that to speak of the "discovery" of godless savages is simplistic. This is because there was already a prevalent colonial discourse in which to refer to indigenous peoples as godless was a means of denying their full humanity, which in turn provided a convenient license for denying them human rights—even to their own land. Darwin's reflections were, however, colored by his firm belief in the ultimate unity of the human races, one expression of which was his aversion to slavery (Darwin [1879] 2004, xxvii–xxviii). Another of the serious questions raised by his experience of the Fuegians was therefore why some representatives of humanity were religious and others not. The answer he eventually gave was to include reference to cultural as well as biological determinants. What struck him in December 1832, however, was the enormity of the gulf that separated the "savage" from the "civilized." The native Fuegians "seemed the troubled spirits of another world" (Darwin 1985, 307). The gulf was "greater than between a wild and domesticated animal, in as much as in man there is a greater power of improvement" (Darwin 1987, 109).

Darwin would continue to reflect on those differences in the case of both animals and humans. The fundamental thrust of his work would be the affirmation of continuity between the species *Homo sapiens* and its ani-

# The Asymmetry

"READY TO AID ONE ANOTHER" of Power

mal ancestors. In seeking an answer to the question why some humans were religious and others not, he looked to what he considered incipient religious characteristics in the behavior of animals, not least in that of his own dog. As Day (2008) has succinctly put it, Darwin solved the problem of intra-species variation by appealing to interspecies continuity. When his dog growled at a parasol moved by the breeze, Darwin concluded that "he must, I think, have reasoned to himself in a rapid and unconscious manner, that movement without any apparent cause indicated the presence of some strange living agent, and no stranger had a right to his territory" (Darwin [1879] 2004, 118). There could then be a suggestive continuity between dogs and superstitious "savages" whose world was inhabited by invisible spirits. In both cases a primitive, instinctive notion of causality was evident. In reducing the cognitive gap separating humans and animals, Darwin gained some purchase on how religious beliefs had originated and been sustained. In Day's insightful analysis (2008), "the relationships between savages and the British empire, gods and their followers, and dogs and their masters all share one straightforward trait: they were all established on the asymmetry of power."

We shall return later to Darwin's reflections on religion and to what, in some of its manifestations, he believed had been its ennobling role. But the naturalism that structured his explanatory project deserves further consideration. It can be brought into focus by considering his response to a theological question that actually sprang directly from his theory of natural selection.

## A Theological Question

Darwin's study of variation and his conception of natural selection were products of the two years that followed his return to England in October 1836. As with Alfred Russel Wallace later, the reading in September 1838 of Malthus' *Essay on Population* triggered the realization that, in a fiercely competitive struggle for resources, favorable variations would tend to be preserved while unfavorable ones would be destroyed. The transmission and accumulation of variation over many generations would lead to the emergence of new species. Darwin's use of the phrase "natural selection" to capture this process raised a specific theological question. The metaphor of selection was substantiated by reference to the role of human breeders in



selecting for the characteristics they wished to enhance in cattle, dogs, or pigeons. If domestic breeders could effect such changes in a short span of time, how much more might not nature achieve given eons of time?

Pigeons in particular gave a boost to Darwin's rhetoric in the *On the Origin of Species*. Unless he knew that all the varieties produced by the pigeon fanciers were derived from the common rock pigeon, even a well-trained ornithologist, Darwin declared, would be inclined to categorize them as separate species. But here is the question: If human intelligence intervenes in the practices of the domestic breeder, might there not, by analogy, be a Selector, with a capital S, working intimately through natural processes? For some of Darwin's contemporaries this seemed a reasonable enough inference and, for them, it took the sting out of the theory. But it was not Darwin's view. To postulate a Selector other than the course of nature was to miss the point, conjuring up the image of God as micromanager of the evolutionary process. This was an image that Darwin steadfastly resisted. In doing so he was obliged to suspend one of the natural (in the sense of seemingly plausible) readings of the analogy that featured so prominently in his rhetoric. He could not deny the part played by human consciousness in the selective role of the breeder: "A man preserves and breeds from an individual with some slight deviation of structure, or takes more care than usual in matching his best animals and thus improves them" (Peckham 2006, 114). But as if to pre-empt the possibility of a theological projection from natural selection, Darwin also deletes the teleology from the production of fancy pigeons: "The man who first selected a pigeon with a slightly larger tail, never dreamed what the descendants of that pigeon would become through long-continued, partly unconscious and partly methodical selection" (Peckham 2006, 113). Despite the fact that breeders did have goals in view in their selective breeding, Darwin finds a way of stressing the *unconsciousness* of their role in relation to the longer-term consequences of their activity. Clearly there was elasticity in the analogy between natural and artificial selection and Darwin himself found it difficult to stabilize a privileged interpretation. Indeed in the preliminary essay he prepared some fifteen years before the publication of his *On the Origin of Species* he had found the invocation of a transcendent being a useful heuristic device to explicate what he meant by natural selection: "Let us now suppose a Being with penetration sufficient to perceive differences in the outer and innermost organization quite imperceptible to man,

and with forethought extending over future centuries to watch with unerring care and select for any object the offspring of an organism produced under the foregoing circumstances; I can see no conceivable reason why he could not form a new race . . . adapted to new ends" (Brooke 1985, 55). Nevertheless Darwin could not bring himself to identify this hypothetical being with a providential, continually active God. And so we must ask why.

It seems obvious that his resistance had something to do with the loss of his Christian faith. But then a further question arises. What precisely was the relationship between the gains he made in science and his loss of faith? At this point we often find in the literature one of two extreme positions. Either it is simply assumed that it was his science that destroyed his faith. Or, in complete contrast, it is asserted that it was his loss of faith that made possible his radical science. In a contribution to *Harvard Magazine*, E. O. Wilson (2005, 33) has presented the choice in precisely these stark terms. He writes: "The great naturalist did not abandon Abrahamic and other religious dogmas because of his discovery of evolution by natural selection, as one might reasonably suppose. The reverse occurred. The shedding of blind faith gave him the intellectual fearlessness to explore human evolution wherever logic and evidence took him." But are these the only alternatives? My own view is that a more subtle analysis is necessary. While it is largely true that Darwin's loss of faith was not occasioned by his science, there were, at the very least, indirect connections. Even before their marriage Emma worried that the critical, skeptical mentality necessary for constructive science would corrode his faith: "May not the habit in scientific pursuits of believing nothing till it is proved, influence your mind too much in other things which cannot be proved in the same way" (Darwin 1986, 172). And the second option, preferred by Wilson, cannot be entirely correct because Darwin had not definitively renounced Christianity in the early 1840s when the first substantial draft of his theory was entrusted to Emma for publication in the event of his death (Moore 1989, 195-9).

Another problem with this structuring of alternatives is that some of Darwin's deepest reflections involved both scientific and religious considerations simultaneously. For example, his science highlighted the theological problem of pain and suffering. He once wrote that the existence of so much pain and suffering in the world seemed to him one of the strongest arguments against belief in a beneficent deity, but, he continued, it "agrees well with

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the view that all organic beings have been developed through variation and natural selection" (Darwin 1887, Volume 1, 311). And he would sometimes reflect on features of nature that needed neither sophisticated science nor sophisticated theology to read them. These were the gruesome features that deeply offended his aesthetic sensibilities. How could the ichneumon wasp be the product of benevolent design when it laid its eggs in the bodies of caterpillars that were then devoured by the hatching grubs? Was there not something devilish in such a phenomenon? (Darwin 1993, 224).

### Darwin's Loss of Faith

I would argue that Darwin's science did to a degree corrode his faith, and for several reasons. The quality of the historical evidence, commonly adduced for the miracles and divinity of Christ, Darwin considered poor compared with the stringent evidential support required of a scientific theory. Moreover, reports of miracles had been rendered increasingly suspect because of advances in scientific understanding to which he was himself contributing. As he put it in his *Autobiography* (1958, 86), "the more we know of the fixed laws of nature the more incredible do miracles become." Considerations drawn from science featured again because, although he was ignorant of the causes of variation, he was convinced that the variations themselves appeared randomly. Many were deleterious and even those that turned out to be advantageous could hardly be said to have been produced with their prospective use in mind. It was on this point that Darwin and Asa Gray eventually parted company. Gray's advice to Darwin was that, until such time as the cause of variation was understood, it would be wise to ascribe it to Providence. This was one reason why Gray felt no dissonance between natural selection and natural theology. He could interpret the variations as having been led in propitious directions. Darwin dissented, arguing that because a builder happened to use a pile of available stones to build a house, it in no way followed that the stones had come into being *in order* that he could build the house. Purposiveness was read out of the story and Gray had to concede that he had no answer—except to say (and there is surely a lesson here for some) that the perception of design is ultimately a matter of faith (Moore 1979, 275–6).

Is the converse  
Q now true?

Darwin's science did contribute to his agnosticism in one further respect. It bears on his conviction that the universe as a whole could not be the product of chance. In another of his captivating nuances, he would add that there were reasons why he should not trust even his own convictions. If the human mind was the product of evolution, what guarantees were there that it was equipped to deal with such metaphysical and theological niceties? (Darwin 1958, 93) Having identified these corrosive aspects of his science, I would still want to say that some of the more interesting reasons for his agnosticism had nothing to do with his theory and could have been shared by many of his contemporaries. To that extent I certainly agree with Wilson.

### Existential Grounds of Religious Doubt

Darwin was a participant in a well-documented moral revolt against certain Christian teachings, notably the doctrine of eternal damnation for the unredeemed. It was a pressing matter because members of his family were beyond the pale of Christian orthodoxy. His grandfather Erasmus Darwin had been a freethinker; his father took the view that religion was only for women, and his brother Erasmus was an avowed atheist. Emma Darwin later suggested that her husband had reacted against a caricature of Christian doctrine, but there is no doubting the intensity of his reaction. It was in the context of recoil against this "damnable doctrine" that Darwin (1958, 87) let slip his fiercest remarks on Christianity, declaring that he could not see how anyone could even wish it to be true. We have already seen how he was affected by the realization that an innate sense of God was not universal. This militated against arguments for an intelligent deity based on inward convictions and feelings. It was simply not true that "all men of all races had the same inward conviction of the existence of one God" (Darwin 1958, 91). As he had experienced and studied other cultures, he also found it impossible to accept the idea of a unique revelation. The ignorance of the biblical writers was transparent to him and the relationship of New to Old Testament he found incongruous (1958, 85-6). Q

Furthermore, as James Moore has brilliantly shown, Darwin was deeply affected by the death early in 1851 of his ten-year-old daughter, Annie (Moore 1989). The letters that passed between Charles and Emma as Annie gradually lost her private battle for existence are deeply moving. Even as late as

1851, in distress and under duress, Darwin still invoked the name of God in his most intimate correspondence (Darwin 1989, 13–24). But the loss of so innocent a child (and his favorite) left a terrible scar. Was this not the problem of pain and suffering, justice even, experienced with piercing intimacy? In one of Darwin's letters to Asa Gray we find yet another consideration that could scarcely be counted as scientific. Darwin (1993, 275) in July 1860 asked Gray whether, if a man standing under a tree were struck by lightning, he really believed that the accident had happened designedly. Many people, Darwin supposed, did believe this, but he could not. When, on a summer night, a swallow caught a gnat, did Gray really believe that it had been predetermined that that particular swallow should swallow that particular gnat at that particular moment? For Darwin, the particularities, the contingencies, the accidents of both human and nonhuman life—the absence of any intelligible pattern—made belief in a caring Providence extremely difficult, if not impossible.

Chaos Theory

#### Nature, God, and Cooperation

Enough has now been said of Darwin's spiritual and intellectual biography to explain why he would seek a naturalistic account of human morality and its development—naturalistic in the sense of appealing to natural instincts and rejecting the intervention of a supernatural Being. It was, nevertheless, an account that still allowed the possibility that the evolutionary process rested on laws that had been prescribed by a prescient deity. Indeed, in successive editions of *On the Origin of Species*, a Creator who had “impressed laws on matter” and even breathed life into the first living things was deliberately retained (Peckham 2006, 757–9). Darwin genuinely hoped there could still be common ground between his deistic metaphysics and the natural theology of Christian theists who were so prone to criticize him (Brooke 2008). He even glimpsed a possible means of rapprochement in a view expressed by his cousin Hensleigh Wedgwood whom Darwin described as a “very strong theist.” Darwin asked him whether he thought that each time a fly was snapped up by a swallow, its death was designed—the same question he put to Gray. Wedgwood replied that he did not believe so. It was rather that God ordered general laws and left the result to “what may be so far called chance” (Darwin 1993, 350). This was the formula that Darwin tried on Gray



when divulging his own take on evolution and design: "I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call chance" (1993, 224); not, he added, that he was at all satisfied by it.

The secularizing force of Darwin's brand of naturalism, particularly as applied to mental evolution and the study of what came to be called the emotions, has been discussed in depth by Thomas Dixon (2001; 2003). The question to which I return here concerns the interplay between his understanding of religion, morality, and that cooperation within a tribe which, in *The Descent of Man*, he supposed would have survival value. Those tribes whose members were ready to aid each other stood the better chance of survival. Contemporary advocates of group selection, such as David Sloan Wilson (2002), have no difficulty in achieving an integrated vision. A spirituality in which there is concern for others can be "understood from a purely evolutionary and naturalistic perspective, as a strategy designed to generate societal benefits, often at an individual cost" (Wilson 2008, 42). Was Darwin's understanding similar? How did he address the issue of cooperation?

To ask whether Darwin understood cooperation in the sense commended in this book is not a straightforward question. There are discontinuities as well as continuities between Darwin's understanding of biological and cultural evolution and that of contemporary analysts—not least because a genetic calculus of fitness was some way in the future. Nor should we forget that when Mendelian genetics first featured in evolutionary theory in the early years of the twentieth century, it initially tended to displace natural selection by promoting mutation as an almost sufficient mechanism for change—a mechanism that would have alienated Darwin, who consistently favored the gradual accumulation of variation. Mathematical models constructed around the dilemmas of game theory would certainly have intrigued him but, when describing selfless behavior, Darwin's first port of call was the role of deep-seated social instincts in inducing an *unhesitating*, rather than a *calculating*, response. And because Darwin found himself balancing many different forces at work in human evolution, conceding in his *Descent of Man* that he had probably given too much weight to natural selection in the first edition of *On the Origin of Species*, his admiration for those attempting to quantify the various parameters with precision would probably have been tempered with caution. Darwin himself never ceased to emphasize the massive

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number of contingencies in the production of evolutionary change, complicating the picture even while balancing the respective contributions of natural and sexual selection. As he charmingly put it ([1879] 2004, 263), "the power to charm the female has sometimes been more important than the power to conquer other males in battle."

Rather than pursue counterfactual questions, it is, however, perfectly possible to recognize in *The Descent of Man* an account of morality in which the theme of cooperation is conspicuous. A concern for the welfare of others constitutes for Darwin the highest form of morality. Cooperation is an expression of a social instinct that he chooses to illustrate with an example of self-sacrifice. In this respect he does conform to a concept of cooperation defined as a "form of working together in which one individual pays a cost . . . and another gains a benefit." Darwin's example ([1879] 2004, 145) also challenges a purely utilitarian ethics:

Under circumstances of extreme peril, as during a fire, when a man endeavours to save a fellow-creature without a moment's hesitation, he can hardly feel pleasure; and still less has he time to reflect on the dissatisfaction which he might subsequently experience if he did not make the attempt. Should he afterwards reflect over his own conduct, he would feel that there lies within him an impulsive power widely different from a search after pleasure or happiness; and this seems to be the deeply planted social instinct.

Darwin was in part responding to the reproach that he had laid the foundation of the noblest part of our nature in the "base principle of selfishness." On the contrary, he points out, his argument hinges on a willingness to risk one's life on the principle that, at an early period in human history, the expressed wishes of the community will have influenced to a large extent the conduct of each member. A very particular feature of this relationship between the individual and the community is given prominence when Darwin charts the evolution of conscience. This is the fundamental feeling of sympathy that would compel a person to have regard for the approbation and disapprobation of his fellows. Obedience to the wishes of the community would be strengthened by habit so that an act of theft, for example, would

the drive for approbation

"READY TO AID ONE ANOTHER"

induce feelings of dissatisfaction with oneself. And it was the fundamental feeling of sympathy that would have been intensified by natural selection, since "those communities, which included the greatest number of the most sympathetic members, would flourish best, and rear the greatest number of offspring" ([1879] 2004, 163). In statements such as these one sees very clearly an interdependence between his science and ethical values that does have modern equivalents. It is, however, worth re-emphasizing that the ultimate axiom on which his explanation rests concerns the drive for approbation, cooperative behavior being catalyzed by it.

In discussing moral improvement Darwin assumed that virtuous tendencies could be inherited. Advocating a "principle of the transmission of moral tendencies" ([1879] 2004, 148), he regarded a disinterested love for all living creatures as the most noble and distinctive attribute of humankind. Because he believed so firmly in the inheritance of moral feelings, he took issue with John Stuart Mill who had described them as acquired rather than innate. In a courteous but censorious footnote, Darwin opined that "the ignoring of all transmitted mental qualities will . . . be hereafter judged as a most serious blemish in the works of Mr. Mill" ([1879] 2004, 121).

How had the feeling of sympathy been strengthened in primitive societies? Darwin's answer was through the habit of performing benevolent actions. Whence the primal motivation for these? In a few lines that do perhaps presage later discussions of reciprocal altruism, Darwin recognized the part played by a "low motive;" for "each man would soon learn that if he aided his fellow-men, he would commonly receive aid in return" ([1879] 2004, 196). This was emphatically not, however, the stimulus Darwin wished to accentuate. He immediately referred to "another and much more powerful stimulus to the development of the social virtues." This was afforded by the "praise and blame of our fellow-men."<sup>1</sup> One reason perhaps why Darwin gave so much weight to this characteristic was that it re-established continuity with the animal kingdom. His protoreligious dog made another appearance: "It appears that even dogs appreciate encouragement, praise, and blame." Because the foundation-stone of morality was that one should "do unto others as ye would they should do unto you," Darwin considered it "hardly possible to exaggerate the importance during rude times of the love of praise and the dread of blame." In this respect, self-interest had played a crucial role in the emergence of cooperative beings. Hence we find Darwin's



summary of a complex matter: "Ultimately our moral sense or conscience becomes a highly complex sentiment—originating in the social instincts, largely guided by the approbation of our fellow-men, ruled by reason, self-interest, and in later times by deep religious feelings, and confirmed by instruction and habit" ([1879] 2004, 157).

Darwin's reference here to "deep religious feelings" shows that he could not exclude them from his story. Reverence or fear of gods or spirits had intensified feelings of acceptance or rejection, making possible higher degrees of remorse and repentance. Religious beliefs themselves he traced back to three human capacities that had been crucial for survival: a basic concept of causality, a capacity for reason, and a curiosity about the world. One might observe that these could equally be seen as the preconditions of the possibility of a science of nature and it is perhaps not surprising that, for the comprehension of religion, he added emotional parameters. In *The Expression of the Emotions in Man and Animals* ([1872] 1965, 217), he wrote of religious devotion as, in some degree, "related to affection, though mainly consisting of reverence, often combined with fear."

Reading Darwin's account of religion and its role in reinforcing a moral sense deeply rooted in a social instinct of cooperation, it would be easy to conclude that he had explained it away. Certainly he had no compunction in describing many religious beliefs as absurd. There are those who would like to find in Darwin a blanket denunciation, but, unlike some of his modern disciples, he showed discrimination. There was always what Darwin called the "higher" question—namely, "whether there exists a Creator and Ruler of the universe." This question, he noted, "has been answered in the affirmative by some of the highest intellects that have existed" ([1879] 2004, 116). If the laws governing human development, which had made religious beliefs possible, were ultimately derived from such a ruler, then the higher question was not necessarily vacuous. Darwin repeatedly described belief in a universal and beneficent God as "ennobling" and springing from a long and elevating culture ([1879] 2004, 116, 151, and 682). Darwin's account of the moral sense was often judged to be relativistic and his own wife was deeply troubled by it. But though it could be disturbing, Darwin did not intend it to be seen as relativizing. He explicitly wished to privilege the golden rule as the foundation and highest expression of morality: "As ye would that men should do to you, do ye to them likewise." His avowed object had not been to ex-

plain this principle away, but to show how it had been engendered naturally ([1879] 2004, 151).

One consequence of his evolutionary account was that it was possible to see a trajectory of moral improvement. Whereas many have seen grounds for pessimism in Darwin's dethronement of the human, his vision was full of optimism: "There is no cause to fear that the social instincts will grow weaker, and we may expect that virtuous habits will grow stronger, becoming perhaps fixed by inheritance. In this case the struggle between our higher and lower impulses will be less severe, and virtue will be triumphant" ([1879] 2004, 150).

For all his prescience, Darwin remains a Victorian.

#### Notes

1. References to Darwin's *The Descent of Man* are to the second edition, published in 1874 but corrected in the 1879 printing, on which Adrian Desmond and James Moore have based their recent (2004) edition.
2. Or, for modern game theorists, "reputation."

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