Darwin's World of Pain and Wonder

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No other thinker's mere name stirs an argument the way that of Charles Darwin does. It has been always thus. In the *Proceedings of the Royal Society* of London, Darwin's obituary noted the supreme achievement of *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1859), where he introduced what is commonly known as the theory of evolution; the obituary also remarked the intensity with which the theory's champions and detractors alike reacted to it: "It is doubtful if any single book, except the 'Principia,' ever worked so great and so rapid a revolution in science, or made so deep an impression on the general mind. It aroused a tempest of opposition and met with equally vehement support." One hundred fifty years have passed since the publication of *Origin*, and while those who carry Darwin's banner proclaim that there is nothing more true than evolution, multitudes remain who refuse to believe it. Some of the unbelievers are credulous to the point of insensibility, choosing to put their faith instead in Biblical literalism, while others are exceedingly subtle and learned, promoting the contrarian ideas of irreducible complexity and intelligent design.

Darwin's modern defenders protest that intelligent design is precisely the outmoded belief that their hero expelled from the precincts of respectable science. As Satan travels under other diabolical monikers, so intelligent design is but an alias for natural theology, the teaching that thrived especially in the Anglican tradition from Richard Hooker in the sixteenth century to William Paley in the early nineteenth, and that held that God can be known in His wisdom and beneficence through an understanding of the works of nature. To Darwinists, natural theology confounds the study proper to nature, which is scientific, with that proper to divinity, which has no place in science. Thus intelligent design, certain Darwinists insist,

particularly those who disbelieve in God in the first place, is a means of sneaking Christian piety into science by the back door.

The antipathy between Darwinists and anti-Darwinists is so fierce because the stakes are so high: one might even say that everything is at stake. The goodness, the power, the nature, indeed the very existence of God, and the origin, the place, the purpose, indeed the very soul of man are the matters in dispute. Some people come to atheism by way of Darwin, while others gravitate toward Darwin because they are

Books By and About Charles Darwin:

I. Collections of Darwin's Major Writings

[Comprising *The Voyage of the Beagle*, *On the Origin of Species*, *The Descent of Man*, and *The Expression of the Emotions in Man and Animals*]

From So Simple a Beginning: Darwin's Four Great Books
Edited by Edward O. Wilson
W. W. Norton ~ 2005 ~ 1706 pp.
$39.95 (cloth)

Darwin: The Indelible Stamp: The Evolution of an Idea
Edited by James D. Watson
Running Press ~ 2005 ~ 1260 pp.
$29.95 (cloth) $21.95 (paper)

II. Collections of Letters

[Published by Cambridge in 2008]

Origins: Selected Letters of Charles Darwin 1822-1859
Edited by Frederick Burkhardt
253 pp. ~ $28 (cloth)

Charles Darwin: The Beagle *Letters*
Edited by Frederick Burkhardt
470 pp. ~ $32 (cloth)

Evolution: Selected Letters of Charles Darwin 1860-1870
Edited by Frederick Burkhardt, Alison M. Pearn, and Samantha Evans
308 pp. ~ $28 (cloth)

atheists; some anti-Darwinists believe in God because they see truth in design, while others believe in design because they believe in God (as the Victorian Roman Catholic thinker John Henry Cardinal Newman said of himself). Yet as most every serious commentator on Darwin will tell you, Darwin himself was not in fact an atheist, and there have been staunch Darwinists of high intellectual caliber who found a place in his thought for design and Christian piety. The distinguished writer Harriet Martineau, whom Darwin knew quite well—she was a romantic

III. Biography, History, Argument

Charles Darwin: A Biography
By Janet Browne

Volume I: Voyaging
Princeton ~ 1995 ~ 605 pp.
$25.95 (paper)

Volume II: The Power of Place
Princeton ~ 2002 ~ 591 pp.
$25.95 (paper)

Darwin and Design: Does Evolution Have a Purpose?
By Michael Ruse
Harvard ~ 2003 ~ 371 pp.
$20.50 (paper)

Angels and Ages: A Short Book about Darwin, Lincoln, and Modern Life
By Adam Gopnik
Knopf ~ 2009 ~ 211 pp.
$24.95 (cloth)

Darwin's Sacred Cause: How a Hatred of Slavery Shaped Darwin's Views on Human Evolution
By Adrian Desmond and James Moore
Houghton Mifflin Harcourt
2009 ~ 485 pp. ~ $30 (cloth)

The Reluctant Mr. Darwin: An Intimate Portrait of Charles Darwin and the Making of His Theory of Evolution
By David Quammen
W. W. Norton ~ 2006 ~ 304 pp.
$14.95 (paper)

Banquet at Delmonico's: Great Minds, the Gilded Age, and the Triumph of Evolution in America
By Barry Werth
Random House ~ 2009 ~ 362 pp.
$27 (cloth)

IV. Related Reading

Natural Theology
By William Paley
[Originally published in 1802]
Oxford ~ 2008 ~ 342 pp.
$15.95 (paper)

friend of his brother, Erasmus, though the romance likely went unconsummated—remarked that there was altogether too much of God in the *Origin* to suit a thoroughgoing atheist like herself. On the other hand, many passionate Christian readers have become incensed because natural selection seems to crop God from the picture.

And thus to portray nature as an abattoir with some fiendish sadistic touches, a welter of meaningless slaughter. Tennyson of course wrote of "Nature red in tooth and claw" in his monumental elegy *In Memoriam*, but the poem's ultimate effect is of theodicy, justifying the ways of God to men, mitigating if not quite explaining the world's pain. With Darwin as with Tennyson, does the undeniable savagery of nature have a saving purpose? Is one correct to see in Darwin's nature an incalculable pointless horror, or does all come right in the end? The famous closing sentences of *Origin* suggest that Darwin found not merely consolation but elevation in the process he discovered:

> Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

(A subsequent edition specified that life's several powers had been breathed "by the Creator" into their forms.)

The war of nature, the struggle for existence, survival of the fittest are among the best-known terms for the essential Darwinian conceptions: that the earth produces a superabundance of life, some of which is bound to die out while its competition flourishes, thanks to inherited variations of form and function that favor certain individuals and, over the immense length of time, the species. Darwin could not say what caused the variations, which sometimes led to the development of new species; he was inclined at times to call it the work of chance, but he admitted that chance is just a name for something we don't understand. There is a profound connection, then, between nature's wanton indifference to—or at least vast carelessness with—the life it brings forth and the suspicion that life is an inexplicable accident. One way of describing that connection—and this is the way that post-Darwinian science frequently employs—settles the immemorial problem of evil, the bleeding question why living beings have to suffer, with a single swift, hard stroke. The

natural world operates with no sense of kindness or fairness or decency, according to implacable laws apparently promulgated in and by the void. The hardness of nature is not the work of an evil Demiurge or of a benevolent God. There is no world behind the world, no shaping agency to direct the course of nature. Nature just is what it is. To live reasonably you must purge yourself of comforting fantasies about a supernatural order beyond this life whose justice and mercy will make you forget all the agonies of the earth. These agonies are sovereign and unredeemed. If you are fortunate, there will be pleasures in your life to offset them, or at least to soften their grip on your mind and heart. But even the most fortunate life knows a terrible measure of cruelty. Better then to develop a callus on what used to be called one's soul. Although to become a perfect Stoic is an impossible feat—no one can harden himself to such marmoreal nobility—a fair touch of stoicism is likely called for. Severe pagan virtue rather than Christian tender-heartedness best serves the human being set down in the Darwinian wild with only his modern mind to help him.

Yet was Darwin himself this kind of man, the kind of man the triumph of his theory might be said to have produced? Today the world knows Darwin principally as an intelligence, the very type of the theorizing scientist, consumed by thought that he could not let go of, or that would not let go of him. Who else he happened to be, what his life was like, might appear trivial beside the titanic achievement of his golden mind. However, to regard him as a disembodied intellect, cogitating away in a moral and emotional vacuum, risks not only overlooking his full humanity but also understanding too quickly the full import of his thinking.

For Darwin devoted his thinking life to penetrating the mystery of nature's cruelty because he felt the world's pain so acutely, and so persistently. Nietzsche, racked with syphilis and lonesome beyond words, famously said that one does not trouble to inquire about the cause of one's pleasure; it is the cause of one's pain that must be hunted down. Darwin's was another such undertaking to capture alive the cause of suffering. His investigation was truly comprehensive: he brought all his powers, not just of observation and analysis and synthesis but of astonishment and empathy and intimacy with torment, to bear on the questions he set. A complicated sort of curiosity moved him. The scientist's characteristic awestruck joy in *knowing* could not overcome his horror at some of the answers with which nature provided him. Even as he announced his momentous discoveries to the public, he could barely resist the impulse to put his hand over his mouth. It was not just respectable Victorian householders that he wanted to spare.

In some of the essentials, Darwin's was a most fortunate life. He was born to the landed gentry of Shropshire, and with a distinguished intellectual and artistic pedigree. (He shared his birthday, February 12, 1809, with Abraham Lincoln.) His grandfather Erasmus Darwin was a physician, poet, and philosopher sympathetic to the French Revolution, concocting proto-evolutionary notions that pointed toward the earthly fulfillment of human excellence. His mother's father was the innovative and fabulously successful pottery manufacturer Josiah Wedgwood; Wedgwood's social conscience was manifest in his most famous production, a jasperware bas-relief medallion of a black slave in chains, with the inscription "Am I not a man and a brother?" Darwin's father was a respected country doctor whose foremost accomplishments lay in real estate investment and the construction of roads and canals: he was an infrastructure mogul who reinvested his winnings shrewdly and made a handsome pile that ensured Charles would not have to worry about earning his living. Darwin's mother died when Charles was eight; he remembered almost nothing of her last days, which were brutal. Three sisters who loved young Charles a great deal did what they could to take her place.

He attended the public school (in the British sense) in nearby Shrewsbury, and hated it, unable to see the point of relentless drill in dead languages; pleasure came in collecting stones and minerals and birds' eggs, and in beginning to acquire the fundamentals of botany. As his hobbies grew more serious and ambitious, alongside his brother, Erasmus, he dabbled passionately with a home laboratory, conducting schoolboy research into mineral composition and the classification of crystals. Their father wanted both his sons to follow him into a medical career, and at sixteen Charles headed off to Edinburgh University, then the place to go for aspiring doctors. He found medicine no more to his taste than ancient Greek. Indeed, he was downright sickened and terrified when he witnessed his first surgeries, which in those days were performed without benefit of anesthesia; the operation on a young girl who screamed and screamed drove him out of the surgical theater, knowing he had to look for another profession. To see—indeed, to inflict—pain of this order, even for the good of the patient, was not for such as him. Skinless sensitivity was his nature, and this reflexive compassion would always mark him for a very rough time. The historian of science Janet Browne writes in *Voyaging*, the first volume of her wise and beautiful Darwin biography, that all his life afterward the sight of blood scared him; a scratch on one of his children would send him up the wall, though the kids thought his squeamishness was laughable. Medicinal leeches revolted him, childbirth was

a vicarious ordeal, and getting a tooth pulled tested all his powers of endurance. The world he had been set down into, where human suffering was ordinary as hair growing, often proved more than he could take. "His sympathetic, affectionate heart was stretched to the utmost."

What better vocation for a sympathetic, affectionate heart than to proclaim the goodness of the Lord, even if many of the Lord's everyday workings made that heart race and flutter with sheer fright? So Darwin fled Edinburgh and the bloody scalpel for Christ's College, Cambridge, and the study of divinity, in preparation for the Anglican priesthood. His father's anger at Charles's abandoning medicine had much to do with the youth's quick rebound in the direction of the Church. "You care for nothing but shooting, dogs, and ratcatching, and you will be a disgrace to yourself and all your family," Dr. Darwin fumed at his ne'er-do-well sporting son. Holy Orders seemed a sound palliative for paternal wrath: "As I did not then in the least doubt the strict and literal truth of every word in the Bible, I soon persuaded myself that our Creed must be fully accepted. It never struck me how illogical it was to say I believed in what I could not understand and is in fact unintelligible."

Darwin moved into rooms in college that had once been occupied by William Paley, whose *Natural Theology* was on the student's examination syllabus. Darwin loved this book to the point of reverence. At the time of the *Origin*'s publication, he would write to a scientist friend and neighbor, "I do not think I hardly ever admired a book more than Paley's 'Natural Theology.' I could almost formerly have said it by heart." In his *Autobiography*, he declared that Paley "gave me as much delight as did Euclid." The *Origin* would effectively demolish Paley's wonderful structure in which the commonplace but extraordinarily complex works of nature were the most artful contrivances of a perfect Creator. Yet Darwin would never free himself entirely from Paley's influence.

Apart from his fascination with Paley, Darwin did as little work for his appointed course at Cambridge as he could get away with, although he crammed mightily at the end and finished well up among the men in his year taking an ordinary degree, as opposed to the more demanding honors degree. Other things than schoolwork occupied Darwin. The sporting life his father had flayed him for still had its intoxication (although in time Darwin would renounce fox hunting and shooting, disgusted with taking life for his wicked amusement). Music he came to adore, and he frequented the Cambridge college chapels, with their splendid choirs; yet he confessed that he had no ear and could not hum a tune. He did have an eye for pictures, though, and began to collect engravings.

But what really carried him away was entomology: collecting beetles, which he did in the company of like-minded friends, launched him over the moon. The earnest pursuit of unusual specimens presented hazards that would put off the less intrepid:

> One day on tearing off some old bark, I saw two rare beetles and seized one in each hand; then I saw a third and new kind, which I could not bear to lose, so that I popped the one that I held in my right hand into my mouth. Alas it ejected some intensely acrid fluid, which burnt my tongue so that I was forced to spit the beetle out, which was lost, as well as the third one.

The zealous amateur natural historian was the erudite professional scientist in embryo.

Many shared young Darwin's dilettantish enthusiasms, Janet Browne writes:

> He and his entomological friends stood on the threshold of the great explosion in popular natural history that characterized the early Victorian period: the period when seashells, ferns, minerals, insects, flowering plants, seaweeds, fossils, birds, and all conceivable natural curiosities were collected for pleasure and lovingly arranged in private cabinets or used for decorating an astonishing range of household objects, and when amateurs and experts operated on a single scale as yet barely subdivided by professional qualifications.

Darwin would write to be understood by laymen who read works of natural history as they did serious novels. Avid amateurs would join established experts in reading and discussing Darwin's writings as they appeared, and the popular audience as well as the professional one was prepared to attend and comprehend. In *Angels and Ages*, the journalist Adam Gopnik describes Darwin as one of the innovators of a new democratic rhetoric, which convinces not with pompous orotundity but with clear, rational argument based on a novel-like richness of observation.

Bugs were not the only scientific interest which Cambridge fostered in Darwin. Outside the purview of his divinity course, Darwin faithfully attended the botany lectures of Professor John Stevens Henslow, meeting whom, Darwin would say, was the predominant influence on his career. Although these lectures were the extent of Darwin's formal natural science education at Cambridge, his relationship with Henslow, who became his mentor and friend, introduced him to some of the leading scientific minds in Cambridge, which is to say in England—men such as the geologist Adam Sedgwick and the polymath William Whewell, Anglican divines contentedly following the

natural theology tradition, if in a slight divagation from Paley, too utilitarian for their taste. For them, Janet Browne says, "there was no apparent disharmony between science and religion. Science, in a sense, *was* religion." Sedgwick in his eighties would summarize his ideally unified career, which joined rock-solid fact to spiritual bliss: "I am thankful that I have spent so much of my life in direct communion with nature, which is the reflection of the power, wisdom and goodness of God." Darwin took in geology at Sedgwick's feet, listening intently, reading whatever the master prescribed, and after graduation accompanying him for a week on a walking tour of Wales, with its alluring rock formations.

When Darwin returned home from Wales, a note from Henslow awaited him: Henslow was recommending Darwin for a position as naturalist, and gentleman companion to the captain, aboard *H.M.S. Beagle*, a surveying ship bound for a voyage around the world that was expected to take two years. Despite Dr. Darwin's preliminary objections—he feared his wayward son would never make a parson—and Captain FitzRoy's physiognomic misgivings—at first sight he found Darwin's nose too big, suggesting a weak character, but revised his opinion upon reflection—the novice sailor shipped out on December 7, 1831. He would not set foot in England again for almost five years.

His true calling soon became apparent. The priesthood would never be for him. He was a naturalist to the bone, and he would record his observations in letters home and in meticulous diaries, which he would edit on his return into the well-received and popular book *Journal of Researches*, now known as *The Voyage of the Beagle*. On St. Jago in the Cape Verde Islands, he shouted hosannas at such unexampled beauties of nature: "Here I first saw the glory of tropical vegetation. Tamarinds, Bananas & Palms were flourishing at my feet.—I expected a good deal, for I had read Humboldt's descriptions & I was afraid of disappointments: how utterly vain such fear is, none can tell but those who have experienced what I to day have." Speculating about the island's formation by volcanic eruption and subsequent subsidence turned his thoughts into "a perfect *hurricane* of delight & astonishment." Charles Lyell's 1830 *Principles of Geology*, which Darwin had brought along with him, furnished the theoretical basis for his observations and meditations. Lyell insisted that geological changes had always taken place gradually, at the same pace they were occurring today; his line of thought, which Whewell would call "uniformitarianism," flagrantly contradicted the "catastrophism" held dear by Sedgwick and Henslow, which saw the history of the earth and its creatures punctuated by tremendous, divinely ordained

upheavals and cataclysms, such as the Biblical Flood. Every Darwin commentator sees Lyell's importance for Darwin; Janet Browne encapsulates it with aphoristic force: "Without Lyell there would have been no Darwin: no intellectual journey, no voyage of the *Beagle* as commonly understood."

Sensual, intellectual, and spiritual joys were of a piece when Darwin encountered the awesome plenum of the Brazilian forest.

> The delight one experiences in such times bewilders the mind.—if the eye attempts to follow the flight of a gaudy butter-fly, it is arrested by some strange tree or fruit; if watching an insect one forgets it in the stranger flower it is crawling over.—if turning to admire the splendour of the scenery, the individual character of the foreground fixes the attention. The mind is a chaos of delight, out of which a world of future & more quiet pleasure will arise.

The riot of sensation is overwhelming, and Darwin anticipates the time when, removed from these scenes, he will enjoy serene memories of them. He sounds like a Romantic poet here—like Wordsworth declaring in the Preface to *Lyrical Ballads* that the origin of poetry is "emotion recollected in tranquility."

Aldous Huxley in his 1929 essay "Wordsworth in the Tropics" writes that jungle monstrosity, the choking superfluity of life, "an unconquered, unconquerable, ceaselessly active enemy" to man, does not evoke the sublime as European nature at its most magnificent does, much less the sanctuary peacefulness of the garden that was Wordsworth's rural England. To Darwin, however, the tropical jungle, with its strange and measureless profusion of inhuman life, makes him aware of the human soul at its richest and most ecstatic. "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." The awakened soul feels at home in the midst of all this pullulating animal and vegetable existence, which may be exotic but is not ultimately alien. Sounding like a natural theologian, Darwin describes the jungle as "temples filled with the various productions of the God of Nature," but this is natural theology with a couple of twists: God did not fashion this paradise with man in mind, yet no earthly power is better fitted to appreciate it than the mind of man. "It creates a feeling of wonder that so much beauty should be apparently created for such little purpose." The forest creatures live for ends of their own, and evidently for God's pleasure. Darwin just happens to have found his way there, but nevertheless it is he who enjoys the peculiarly human sense of wonder, and who will communicate it to his

fellows in his ardent prose. When Janet Browne writes that Darwin's Brazilian experience made him "aware of his own insignificant place in nature," she gets it quite wrong. Awe in the face of nature's boundless and sometimes bizarre inventiveness still resounds with human privilege. Darwin's Cambridge upbringing in natural science and divinity remains in evidence here. He carries Paley with him into the rainforest.

To be thrilled, sometimes even horrified, beyond words by nature's most violent demonstrations of its power, yet to find the thoughts and words to describe and understand what one has witnessed—that is one of the great difficulties facing the passionate naturalist. Sometimes the thoughts and words, however, come with a surprising readiness. Volcanic eruption and earthquake in southern Chile in 1835 rouse Darwin's scientific curiosity more than they do his fellow feeling for the inhabitants of Concepcion, a city devastated by the quake. When Darwin considers the ruin there, figuring out the geological vectors at work is foremost in his mind. The spectacle of the very earth doing its amoral worst to puny humanity fascinates him.

> It is a bitter & humiliating thing to see works which have cost men so much time & labour overthrown in one minute; yet compassion for the inhabitants is almost instantly forgotten by the interest excited in finding that state of things produced at a moment of time which one is accustomed to attribute to a succession of ages.—To my mind since leaving England we have scarcely beheld any one other sight so deeply interesting.

As Nietzsche said, tender-heartedness in a man of knowledge is a striking anomaly, like delicate hands on a Cyclops. Interest can be a more potent motivator than love or compassion.

Yet Darwin also learned deep compassion on his journey, and it had a lasting effect on his scientific practice. Appalled by the barbaric treatment of black slaves in Brazil and the war of extermination against the Indians of Argentina, amazed by the savagery of the natives of Tierra del Fuego, who differed from civilized men more than wild animals did from domesticated ones, yet who were unquestionably human, Darwin saw feelingly for the first time in his life the true brotherhood, the common origin, of mankind. The liberal anti-slavery sympathies of his family circle and of his Cambridge mentors had begun to shape his thoughts and feelings on the matter; but it was the voyage of the *Beagle* that honed them to a fine edge. In the path-breaking new book *Darwin's Sacred Cause: How a Hatred of Slavery Shaped Darwin's Views on Human Evolution*, Adrian Desmond and James Moore, authors

of a much-admired 1991 Darwin biography, argue that Darwin's subsequent moral fire burned away the pseudo-scientific racist cant of his time—the so-called polygenist view that the different races of man were in fact separate species with no common ancestry. Polygenism justified slavery: blacks were sub-human, no better than beasts, fit to be chained and used as their natural superiors saw fit. In bold defiance Darwin demonstrated not only that all men shared their ancestry but indeed that they shared it with all other animals. "And this was *the* unique feature of Darwin's peculiar brand of evolution. Life itself was made up of countless trillions of sibling 'common descents,' not only black and white, but among all races, all species, through all time, all joined up in bloodlines back to a common ancestor." The theory of evolution, Desmond and Moore insist, originates not in the fastidious accumulation of irrefutable data or in the propulsion of a high-powered deductive engine but rather in a searing moral insight: decent men know that slavery is monstrous, and that there can be no grounds for it in nature. Darwin was not simply the disinterested investigator that a scientist supposedly ought to be, but a passionate man who followed his guiding ethical light as far as it would take him: to the ultimate oneness of all species. Contrary to "the fundamentalists' parody," his theorizing was anything but "anti-God, inhuman and immoral," and the authors undertake to "show the *humanitarian* roots that nourished Darwin's most controversial and contested work on human ancestry."

From these roots emerges what Adam Gopnik calls perhaps "the single most explosive sentence in English," which is found in the final chapter of *The Descent of Man, and Selection in Relation to Sex* (1871): "We thus learn that man is descended from a hairy quadruped, furnished with a tail and pointed ears, probably arboreal in its habits, and an inhabitant of the Old World." Shocking as that must have sounded to many, and still does sound to some, Darwin goes further still:

> As the class of fishes is the most lowly organised, and appeared before the others, we may conclude that all the members of the vertebrate kingdom are derived from some fish-like animal. The belief that animals so distinct as a monkey, an elephant, a humming-bird, a snake, a frog, and a fish, &c., could all have sprung from the same parents, will appear monstrous to those who have not attended to the recent progress of natural history.

And as though that were not enough to leave a permanent psychic scar, he proceeds to trace all vertebrate ancestry to invertebrate, hermaphrodite, sessile mollusks, the Ascidians, which "hardly appear like animals,

and consist of a simple, tough, leathery sac, with two small projecting orifices." This surely tops the list of severe affronts to human dignity. After such knowledge, a mere monkey in the family tree doesn't sound so awful.

It was only with *The Descent of Man* that Darwin would actually publish his thoughts on human ancestry. The *Origin* makes a titillating lunge in that direction, but then discreetly sidesteps the question, limiting itself instead to species whose transmutations are less likely to inflame the public—pigeons, ants, beetles, mice. From 1837 and his return to England, however, Darwin kept "evolution notebooks," in which his theory of the descent of man took recognizable shape over twenty years before *Origin*. Sometimes his pen seems to outrace his mind, as in this entry from February 1838, quoted by Desmond and Moore:

> We have no more reason to expect [to be able to find] the father of man kind. than [to find the father of the extinct South American llama-like] Macrauchenia yet he may be found [...] if we choose to let conjecture run wild then animals our fellow brethren in pain, disease death & suffering & famine; our slaves in the most laborious work, our companion in our amusements, they may partake, from our origin in one common ancestor we may all be netted together.

Thinking about even such decent persons as the Cambridge dons he most esteemed, who considered blacks to be men like any others, came to infuriate him, for despite their decency they displayed anthropocentric arrogance in erecting an impenetrable barrier between men and beasts, considering human beings "godlike" and lesser creatures infinitely beneath them. To distinguish between higher and lower animals is the boldest presumption, he writes: "It is absurd to talk of one animal being higher than another." "People often talk of the wonderful event of intellectual Man appearing.—the appearance of insects with other senses is more wonderful." Thus Darwin backs away from the ecstatic intimation of soulfulness he knew in Brazil, and professes a newfound radical humility about the nature of man, who needs no immortal soul to be a complete and morally upright being. The suffering body is what man has most in common with the other animals, and it is on this pity for all living creatures that Darwin elaborates his theory.

Darwin learned on his own body nature's stern lessons of debility and pain. From 1838 a mysterious affliction violently ate away at his strength. Weakness, depression, headaches, nausea, and fearsome bouts of vomiting would ravage Darwin for years, often limiting him to an hour or two of work a day, at worst leveling him altogether for

weeks at a time. No doctor or biographer of his has ever pinpointed the etiology of this illness. Speculations that the illness was at least in part psychosomatic are common today. In *The Reluctant Mr. Darwin*, the accomplished nature writer David Quammen lists several factors that may have caused Darwin to get sick at the thought of placing his heretical ideas before the public. Anxiety about offending the natural theologians who had taught him, wounding the pious Christian wife who feared for his soul, willy-nilly lending his voice to the radical political outpourings of the age, with which he had no sympathy: all this could well have contributed to his physical breakdown, "his body's way of excreting the queasiness in his mind." Janet Browne similarly believes that Darwin's bodily erosion was caused by "the complex, surging emotions arising out of his transmutation work—the secret notes, his shocked recognition of the full impact of what he was proposing." That his suffering increased in intensity as he struggled on with his work, Browne writes, seemed to goad Darwin to greater daring, if only, for a long time, in his clandestine notebooks. Perhaps the longer he was intimate with extreme pain, the less inclined he became to accept the salving orthodoxies of his time; his prolonged illness might well have helped free him definitively from beliefs he had already begun to reject. But that is not to say that his body ever quite accepted the findings of his mind.

Darwin knew as well the sharpest pangs of a fatherly heart. Three of his ten children died in childhood; and although he tried to bear the losses with reasoned equanimity—after all, many children died in Victorian England—the death in 1851 of his ten-year-old favorite, Annie, pierced him to the core. She died an agonizing death, of an illness that resembled his own, and he tortured himself with the thought that he might have passed down to her a familial susceptibility. This dreadful event, his biographers concur, certified him in his unbelief—at any rate, unbelief in what Browne calls "the traditional figure of God." If ever a man had good reason to hate the Power that deposited him in an earthly hell, it was Darwin; but by all accounts he did not curse the Christian God; he simply withdrew his heart once and for all. His intelligence, however, would continue to assent, with some reservations, to the deist conception of a God Who wound the universe up and let it spin on its own, according to the laws He had established: cold comfort to a sympathetic, affectionate heart, but the best Darwin could manage. His compassion would henceforth assert the decency of man at his finest, or what he believed to be his finest, in defense of an animal creation condemned to the unforgiving "war of nature" by an indifferent Creator.

This meant a rupture with natural theology. Paley celebrates a world whose creatures habitually disport themselves, take their ease, fulfill their natures in simple being. "It is a happy world after all. The air, the earth, the water, teem with delighted existence." Bees buzz, fish frolic, young shrimp bound into the air from sheer exuberance, kittens gambol, and old cats stretch their weary but contented selves in the sun.

> At this moment, in every given moment of time, how many myriads of animals are eating their food, gratifying their appetites, ruminating in their holes, accomplishing their wishes, pursuing their pleasures, taking their pastimes! In each individual how many things must go right for it to be at ease; yet how large a proportion out of every species is so in every assignable instant?

Of course, animal life is not all merriment, even Paley must admit: eating may be pleasurable, but being eaten is less so. All the same, Paley contends, God did a pretty good job of lubricating even the passage into death. A shot of venom makes the mouse go down the viper's gullet much more agreeably, for the mouse, than it would in the absence of poison.

Darwin's nature in *Origin* is mostly grimmer than Paley's. "The universal struggle for life" pits creatures against each other and all life against the non-living elements. "Two canine animals in a time of dearth, may truly be said to struggle with each other which shall get food and live. But a plant on the edge of a desert is said to struggle for life against the drought, though more properly it should be said to be dependent on the moisture." Reading *An Essay on the Principle of Population* (1798, revised 1803) by the Reverend Thomas Robert Malthus helped Darwin find purchase for his argument. Malthus laid down an economic iron law: human population grows geometrically while food supplies and other resources increase only arithmetically; thus "prudential restraint," which compels the poor to work even for low wages and discourages them from breeding, is the sole bulwark against social disaster. As the philosopher Michael Ruse puts it in his fascinating *Darwin and Design*, Darwin "turned Malthus's reasoning on its head" in applying it to non-human life. Here is Darwin:

> Hence, as more individuals are produced than can possibly survive, there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life. It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms; for in this case there can be no artificial increase of food, and no prudential restraint from marriage.

Paley also invokes Malthus, though without naming him, and upon Malthus's exemplary severity builds his case that earthly life for men is "a state of *probation*," in which souls are tried and must prove themselves worthy if they are to enjoy eternal bliss after death. But what if Malthus holds true not just for men but for all earthly life, as Darwin declares? Beings that have no souls to perfect are simply subject to purposeless misery: a round of perpetual need, and in many cases pervasive fear. Darwin does not come right out and say so, but he appears to place beasts and men here on pretty much an equal footing. All the same, Darwin cannot quite extricate himself from Paley's embrace: he does what he can to convince the reader, and himself, that nature is not as cruel as it seems.

> All that we can do, is to keep steadily in mind that each organic being is striving to increase at a geometrical ratio; that each at some period of its life, during some season of the year, during each generation or at intervals, has to struggle for life, and to suffer great destruction. When we reflect on this struggle, we may console ourselves with the full belief, that the war of nature is not incessant, that no fear is felt, that death is generally prompt, and that the vigorous, the healthy, and the happy survive and multiply.

But Darwin also plainly knew that animals can be gratuitous in their cruelty, that death can be terrifying and excruciating, and that beautiful and happy beings can die tragically young and without issue. In a letter of May 22, 1860, to the Harvard botanist Asa Gray, who saw the *Origin* as the subtlest vehicle of design, Darwin tries to explain why he cannot agree with his supporter: it is the problem of evil, in the subhuman world as well as in the human, that puts him off design and leaves him grasping for an answer; and that answer he believes is unavailable to human beings.

> With respect to the theological view of the question; this is always painful to me.—I am bewildered.—I had no intention to write atheistically. But I own that I cannot see, as plainly as others do, & as I shd. wish to do, evidence of design & beneficence on all sides of us. There seems to me too much misery in the world. I cannot persuade myself that a beneficent & omnipotent God would have designedly created the Ichneumonidae [wasp larvae] with the express intention of their feeding within the living bodies of caterpillars, or that a cat should play with mice. Not believing this, I see no necessity in the belief that the eye was expressly designed. On the other hand I cannot anyhow be contented to view this wonderful universe & especially the nature of man, & to conclude

> that everything is the result of brute force. 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. Not that this notion *at all* satisfies me. I feel most deeply that the whole subject is too profound for the human intellect. A dog might as well speculate on the mind of Newton.—Let each man hope & believe what he can.

This is Darwin's most revealing, and perhaps his most important, letter. (Michael Ruse quotes the passage cited above, and the letter is also available in *Evolution: Selected Letters of Charles Darwin 1860-1870*, one of the invaluable volumes of his correspondence published by the Cambridge University Press.) These sinuous reflections, in which a forceful argument is bent by scruple and reversal and humble resignation, display the ambivalence toward his signature idea that Darwin never managed entirely to shake. Much that he sees in the world repulses him. The pervasiveness of misery is enough to convince him that the most astonishing and beneficial works of nature, such as the eye, are flatly not the result of design. Paley singles out the human eye as a particular instance of benevolent divine genius, and in *Origin* Darwin says that if the human eye is in fact the product of design then his whole argument falls; of course he makes quite a powerful case that even such a marvel is the work of natural selection. He wants to believe in design, he confides to the believer Gray, but his sympathy for the world's pain prevents him. As with many unbelievers, his intellectual skepticism dovetails with his emotional refractoriness. There is potential danger in this combination. Compassion can be petulant to the point of blinding rage, sometimes directed against God Himself, but Darwin's quarrel with Creation runs deeper than petulance, and he is not raging here. What he expresses is more like sorrow.

Yet despite the broken-heartedness of a man who has seen and felt too much, his love for "this wonderful universe" is patent. And he does admit to tentative belief in a divinely appointed order that leaves room for so-called chance. He goes on in the letter to say that when a person is struck by lightning, the bolt does not come directly from a God bent on disposing of this particular victim at this particular time in this particular way. Nature is His blind agent, which operates without intention. Natural selection produces advantageous variations without an end in mind—indeed, without anything in mind, for it is not the work of mind. Darwin became convinced the phrase "natural selection" sounded too much like a considered process, and in later editions of *Origin* amended it to "survival of the fittest."

The Christian Darwinist Gray, America's foremost botanist, tried to assure Darwin that he did not

fully understand the implications of his own theory. As Barry Werth writes in his splendid book about the reception of Darwin's thought in the United States of his time, *Banquet at Delmonico's*, Gray held the position

> that Darwin in fact had reinjected teleology into natural history, rescuing it from godless materialism. Gray found natural selection itself a majestic, if not infallible, mode of design. It explained the utilitarian purpose of biological mechanisms that scientists had previously found unintelligible. Take a burr, he suggested. Classical botanists, examining form and structure without regard to function, defined a burr variously as a seed, a fruit, a part of a fruit, the outermost whorl of a flower, or something else. But one saw clearly in light of Darwin, and final causes, that it was an exquisite adaptation that enabled a plant to disseminate seeds far and wide by hitching rides on cattle and other animals. What a living form did in the struggle for survival determined its structure. Purpose implied intelligence.

Like Darwin, Gray acknowledged that the causes of variation seemed inscrutable, but unlike Darwin he held that because nature clearly operated according to law and order, design was the only reasonable explanation for natural selection. A world of aimlessness and accident was unthinkable to Gray. His words to an audience of Yale theological students in 1879 have the hortatory ring of a perfervid sermon in the name of divine order. Gray draws the fundamental distinction that serious people make to this day. "It must be reasonably clear to all who have taken pains to understand the matter that the true issue is not between Darwinism and direct Creationism, but between design and fortuity, between any intention or intellectual cause and no intention or no predictable first cause." To choose fortuity condemns one to meaninglessness and maybe to perdition. Gray's extended argument with his friend and intellectual master is perhaps an effort to save Darwin's immortal soul. But after *Origin* Darwin would only ever go so far toward recognizing a Designer—One Who sketches the master plan but does not concern Himself with details. The Christian God, of course, is out of the question.

Although Darwin conducted a voluminous correspondence, to say the least—he wrote or received some 14,000 letters during his lifetime—he avoided the cut and thrust of public disputation. He preferred to let his books speak for themselves insofar as possible, and when they were not enough, to let his more demonstrative friends speak for him. An indefatigable foursome—Asa Gray, Charles Lyell, the arch-botanist Joseph Hooker, and Thomas Henry Huxley, who became known

as "Darwin's bulldog"—wrote and lectured and debated as Darwin's anointed surrogates. Their efforts, Darwin himself acknowledged, were more effective than his own would ever have been. The public ruckus called for audacity and more audacity, and the four musketeers, as Janet Browne calls them, supplied it when their diffident hero could not. Huxley was supreme among them; his debate with Bishop Wilberforce at the 1860 Oxford meeting of the British Association for the Advancement of Science made him a name almost as grand as Darwin's. When Wilberforce inquired with extreme unction whether Huxley was related to an ape on his grandfather's side or his grandmother's, Huxley shot back that he would rather have an ape for an ancestor than a man who abuses his intellectual gifts to make a grave scientific discussion ridiculous. Darwin congratulated his friend for the riposte that he could never have pulled off himself: "How durst you attack a live Bishop in that fashion? I am quite ashamed of you! Have you no reverence for fine lawn sleeves! By Jove you seem to have done it well." In another letter, "I would as soon have died as tried to answer the Bishop in such an assembly." The musketeers' eagerness to mix it up with the opposition, Darwin wrote to Huxley, proved invaluable to his cause: "I see daily more & more plainly that my unaided book would have done *absolutely* nothing." "I shd have been utterly smashed had it not been for you & three others." From that redoubtable foursome there ramified a network of Darwinians who would bring about the triumph of evolution, as Janet Browne writes in the second and concluding volume of her biography:

> Together, these men would also control the scientific media of the day, especially the important journals, and channel their other writings through a series of carefully chosen publishers—Murray, Macmillan, Youmans, and Appleton. Towards the end they were everywhere, in the Houses of Parliament, the Anglican Church, the universities, government offices, colonial service, the aristocracy, the navy, the law, and medical practice; in Britain and overseas. As a group that worked as a group, they were impressive. Their ascendancy proved decisive, both for themselves and for Darwin.

But there were Darwinians and there were Darwinians, certain of whom decorated the master's theory with their own elaborations so that it became all but unrecognizable. The theological claims that Gray made for Darwinism pale beside those of the Harvard graduate and popular itinerant lecturer John Fiske, as Barry Werth shows. A taste for grandeur and even for grandiosity is a deep-bred American trait, and Fiske's 1882 oration at the ornate

and gluttonous feast in New York for Herbert Spencer, English father of Social Darwinism, soared miles above the professed or implied teachings of Darwin or his closest associates.

> The doctrine of evolution asserts, as the widest and deepest truth which the study of Nature can disclose to us, that there exists a Power to which no limit in time or space is conceivable, and that all the phenomena of the universe, whether they be what we call material, or what we call spiritual phenomena, are manifestations of this infinite and eternal Power.

For Fiske, evolution is both the means and the end of a moral and perfect universe: "For clearly, when you say of a moral belief or a moral sentiment that it is a product of evolution, you imply that it is something which the universe through untold ages has been laboring to bring forth, and you ascribe to it a value proportionate to the enormous effort that it has cost to produce it." Natural law meets the ineffable in Fiske's ode to spiritual glory. Religious doctrinal precepts, such as meatless Fridays, or even the threefold nature of the Christian God, are pettifoggery; the magnificence of evolution's God far transcends points of dogma.

Such talk was so much gush to Darwin. As he aged, he lost that wondrous sense of spiritual magnificence that he felt in the Brazilian rainforest. In his *Autobiography*, written in the late 1870s and never intended for publication (he just wanted to leave a record of his life for his children and theirs), he declares, "But now the grandest scenes would not cause any such [marvelous] convictions and feelings to rise in my mind." That former sense of sublimity "was intimately connected with a belief in God," but even though the rapture is gone, an intellectual apprehension of a designing God lingers. Amplifying what he wrote to Gray in 1860, Darwin cites "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." Here and elsewhere Darwin sounds more respectful of man's powers and place in nature than in the iconoclastic insect-loving bombast of his breakthrough evolution notebooks, and he even suggests that God and man might have more in common than he was usually willing to admit. However, Darwin also reflects otherwise than theistically, and he writes that this reverent impulse has weakened with time. Sometimes he finds convincing the "very old argument" that the existence of pain renders an intelligent and benevolent First Cause impossible. It is the unimaginable

"sufferings of millions of the lower animals throughout almost endless time" that rip at him; the agonies of man might serve his moral betterment, but not so those of poor beasts. His own theory of variation and natural selection, he notes, encounters no such impediments.

He reserves his particular opprobrium for Christianity, saying he can only hope its doctrine is untrue, for the unbelievers it condemns to hell include some of the finest men he has known, father, brother, friends. That irreverent scientific brain of his cannot resist the temptation to pillory religious faith in general: it would be as hard for children to "throw off" their belief in God, indoctrinated the way they are, as for a monkey to cure itself of its fear and hatred of snakes. Yet immediately he wheels about, admits his own mental impotence before the ultimate questions, and bows his head in awe. "I cannot pretend to throw the least light on such abstruse problems. The mystery of the beginning of all things is insoluble by us; and I for one must be content to remain an Agnostic."

To the end, Darwin believed above all in the Gospel of Work. During the eleven years left to him after the publication of *The Descent of Man*, he wrote such tomes as *The Expression of the Emotions in Man and Animals* (1872), *Insectivorous Plants* (1875), *The Effects of Cross- and Self-Fertilisation in the Vegetable Kingdom* (1876), *The Various Contrivances by Which Orchids Are Fertilised by Insects* (1877), *The Power of Movement in Plants* (1880), and *The Formation of Vegetable Mould, through the Action of Worms, with Observations on Their Habits* (1881). The volume on worms almost instantly became the biggest seller Darwin had during his lifetime. While Adam Gopnik acknowledges the towering mastery of *Origin* and *Descent*, he nevertheless contends that *Worms* best encapsulates

> what was great and rich in Charles Darwin, and in Victorian science and the Victorian mind more generally. . . . Darwin makes the first person address never feel odd or strange in this scientific text, because we understand that the author is in a personal relation with his subject, probing, testing, sympathizing, playing the bassoon while the earthworms listen and striking the piano while they cower, and trying in every way to see who they are and where they came from and what they're like—not where they stand in the great chain of being beneath us, but where they belong in the great web of being that surrounds us, and includes us.

At a time when science was becoming ever more professionalized and laboratories ever more sophisticated, Darwin spent innumerable hours contemplating a compost heap or playing musical instruments to gauge his worms' sensory responses. Some of the new scientific techno-wizards,

especially of the German persuasion, mocked Darwin's later books for their country-house amateurishness. He believed just the same that the way he had always done things was more than rigorous enough.

With the study of worms completed in October 1881, Darwin began to fail. Heart pains seized him. He could see the end approaching. Some botanic work provided a diversion of sorts, and so did the nightly games of backgammon with his wife; but, like Prospero's, his every third thought was the grave. His scientific reputation appeared not to concern him, perhaps because he believed it assured. He had never descended into the public controversy over evolution: he had been quite content to start the questioning and then withdraw to a height well above the clamor. The work he had done was satisfactory in his eyes. He had completed what he was supposed to. When death came, in April 1882, he was serenely resigned, quite certain that nothing awaited him after this life was done. "I am not in the least afraid to die," his wife recalled his saying on the way out.* Darwin's friends saw to it that he was buried in Westminster Abbey.

The Darwinian controversy continues, but some things should be clear. If Darwin gives comfort and even delight to atheists who claim him as a patron, they are mistaken in their choice of hero. He never even divested himself entirely of a certain qualified belief in a Master Designer, though he rejected the sweetest blandishments of natural theology. For all his brilliance, he was prone to confusion about the most serious matters, including the far-reaching ramifications of his own theory. It was a robust confusion, however, the conflict of an austere intellect, a sense of the marvelous, and a lacerated heart. Compassion guided him toward his theory, and an icy mind confirmed its truth. That truth remains dubious for many, whether simple religious believers trying to live righteous lives or scientists and philosophers viewing life through the lens of intelligent design. To try to settle the questions they raise is far beyond my powers, although the simple and righteous who maintain the literal truth of

* In some circles a Christian legend has accreted around Darwin's passing. In 1915 the English evangelist Lady Elizabeth Hope published a newspaper article claiming that she had seen Darwin on his deathbed, that he had made the sickroom ring with praise of his salvation in Christ Jesus, and that he had recanted his theory of evolution, which the credulous had turned into a false religion. Darwin's children denied that Elizabeth Hope had seen their father during his last illness, or any illness, and indeed doubted that she had ever met him. Their father, they averred, had maintained his scientific integrity and his religious disbelief to the last. Lady Hope has her believers nonetheless.

Genesis do not figure in a serious discussion. But in any case the wonder of Darwin endures, that of a man who searched the world's pain and tried to comprehend it, who like a great novelist truly bore in his mind and heart as much earthly life as they could hold. There is rich matter for all who seek it in his life and works.

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