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*The Cambridge Companion to*  
**DARWIN**

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SECOND EDITION

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### I HUMAN EVOLUTION THROUGH HUMBOLDTIAN EYES

From the beginning of his theorising about species, Darwin had human beings in view. In the initial pages of his first transmutation notebook (*Notebook B*), he observed that 'even mind & instinct become influenced' as the result of adaptation to new circumstances.<sup>1</sup> Considering matters as a Lyellian geologist, he supposed that such adaptations would require many generations of young, pliable minds being exposed to a changing environment. After all, Captain FitzRoy had attempted to 'civilise' the Fuegian Jemmy Button by bringing him to London and instructing him in the Christian religion, but back in South America, Button reverted to his old habits, demonstrating, in Darwin's words, that the 'child of savage not civilized man' – transmutation of mind was not the work of a day.<sup>2</sup> Darwin had nonetheless quickly become convinced that over long periods of time human mind, morals and emotions had progressively developed out of animal origins. As he bluntly expressed it in his first transmutation notebook: 'If all men were dead, monkeys make men. – Men make angels.'<sup>3</sup> Presumably the transmutation of human beings into those higher creatures remained far in the future.

From July 1837, when he jotted these remarks in the first few pages of his *Notebook B*, to the early 1870s, with the publication of his *Descent of Man* and *Expression of the Emotions in Man and Animals*, Darwin gradually worked out theories of the evolution of human mentality that, in the main, we still accept. In the case of

moral behaviour, he produced a theory of its evolution that stands as a most plausible empirical account, and displays the range and subtlety of his thought. These theories merit close examination in their own right. But a better understanding of them can also lead to a better understanding of Darwin himself. As we shall see, this Victorian gentleman's conception of human mind had roots traversing a large swath of native ground, with some, though, penetrating to quite foreign soil, namely, German romanticism.

Darwin's conception of nature, as well as his estimate of that smaller nature found in human beings, took definite shape during his five-year voyage on the *Beagle*. His experiences during the journey occurred within a framework already prepared by his enthusiastic reading of Alexander von Humboldt's *Personal Narrative of Travels to the Equinoctial Regions of the New Continent, 1799–1804*, a multi-volume work that originally sparked his desire to sail to exotic lands.<sup>4</sup> Indeed, while a student at Cambridge he took to copying out long passages from the *Personal Narrative* and reading them to his rather patient friends. When he got the opportunity to embark on the *Beagle*, he brought along Humboldt's volumes as his vade mecum. Humboldt, a protégé of Goethe and friend of Schelling, represented nature not as a stuttering, passionless machine that ground out products in a rough-hewn manner but as a cosmos of interacting organisms, a complex whose heart beat with law-like regularity, while yet expressing aesthetic and moral values. Darwin did not plunge far below the surface of Humboldt's thought, but he nonetheless felt the power of the German's representations. He even remarked in his diary during the voyage back to England: 'As the force of impression frequently depends on preconceived ideas, I may add that all mine were taken from the vivid descriptions in the *Personal Narrative* which far exceed in merit anything I have ever read on the subject.'<sup>5</sup>

Humboldt's name litters Darwin's diary and the book he made out of it, his *Journal of Researches* (1839). That adventurer's romantic conception of nature would lie at the foundation of all the Englishman's later work on species and especially on the human species.<sup>6</sup> The creative force of nature would often, in Darwin's estimate, work through that most mundane yet transcendent faculty – instinct.

II THEORIES OF INSTINCT, EMOTION  
AND REASON PRIOR TO THE ORIGIN

The phenomenon of animal instinct would serve Darwin as the ground for understanding its outgrowth in human reason and moral behaviour. He initially employed the conception of instinct, however, more generally in his explanation of species change. Prior to having read Malthus, he had formulated several theories to account for heritable modifications. The most prominent theory depended on the inherited effects of the use of organs, so-called 'use-inheritance'. Darwin assumed that in a changed environment, an animal might adopt habits that would accommodate it to the new conditions. Over many generations, these habits would, he believed, become instinctive, that is, expressed as innately determined behaviours. Such instincts, in time, would slowly alter anatomy, producing adaptive alterations, or so he supposed.

This 'view of particular instinct being memory transmitted without consciousness' had the advantage, he thought, of distinguishing his explanation of adaptive species change from Lamarck's, which he interpreted as appealing to a *conscious willing* - 'Lamarck's willing absurd', he told himself.<sup>7</sup> Even after Darwin adopted natural selection as the principal means for producing species change, he still retained use-inheritance in his explanatory repertoire: it would become one of those sources for variation on which natural selection might work, and in some instances, he would simply credit use-inheritance as the cause of an attribute that could not easily be explained by natural selection.

After he had returned from his voyage, Darwin often visited the Zoological Society, where he had deposited for analysis and classification many of the animal specimens he had brought back on the *Beagle*; he thus had frequent occasion to visit the Society's menageries. During April 1838, he spent some time watching the apes and monkeys at the gardens; and he reflected on their emotional outbursts, which seemed to him quite humanlike. He was especially interested in an orang-utan that 'kicked & cried, precisely like a naughty child' when teased by its keeper.<sup>8</sup> In his notebooks, he placed such typical reactions within the framework of his theory of instinct: 'Expression, is an hereditary habitual movement consequent on some action, which the progenitor did, when excited

or disturbed by the same cause, which «now» excites the expression.<sup>9</sup> So, for example, Darwin speculated that the emotional response of surprise - raised eyebrows, retracted eyelids and so on - had arisen by association with our ancestors' efforts to see objects in dim light; now when the analogously unexpected object or event confronted us, we would react in an instinctual way, even though the light was perfectly adequate.<sup>10</sup> In this construction, the expression of emotion thus had no particular usefulness; it was understood, rather, as a kind of accidental holdover from the customary behaviour of ancestors. Darwin would retain this basic notion about emotional display for the account he would later develop in the *Expression of the Emotions in Man and Animals* (1872). Emotional expression had its roots in instinct, and, in Darwin's view, reason did as well.

In August 1838, Darwin began reading David Hume's *Inquiry Concerning Human Understanding*.<sup>11</sup> Hume's representation of ideas as less vivid copies of sensations perfectly accorded with Darwin's intuitions about the continuity of animal and human mentality: for if ideas were but copies of sensuous impressions, then animals would be perfectly capable of thought. Darwin developed this sensationalist epistemology in his *Notebook N*, where he proposed that simple reasoning consisted in the comparison of sensory images and that the recollection of several such images producing a pleasant state was of the very nature of complex thought.<sup>12</sup> And just as Hume understood reason to be a kind of 'wonderful and unintelligible instinct in our souls',<sup>13</sup> so Darwin thought intellectual activity to be a 'modification of instinct - an unfolding & generalizing of the means by which an instinct is transmitted'.<sup>14</sup> Human intelligence was, then, not opposed to animal instinct but grew out of it in the course of ages.

In finding the antecedents of human rationality in animal sources, Darwin really opened no new epistemological ground. Carl Gustav Carus, Goethe's disciple and an author whom Darwin read in early 1838, asserted the decidedly romantic thesis that mind and matter ran together throughout nature. Adopting Carus' language, Darwin contemplated a nature alive with mind. He reflected that 'there is one living spirit, prevalent over this world . . . which assumes a multitude of forms according to subordinate laws'. And like Carus, he concluded that 'there is one thinking . . . principle

intimately allied to one kind of matter – brain' and that this thinking principle 'is modified into endless forms, bearing a close relation in degree and kind to the endless forms of the living beings'.<sup>15</sup> Darwin's assumption of cognitive continuity between men and animals would not even have offended the religiously minded among his own countrymen. Several natural theologians whom he read during the late 1830s and early 1840s – John Fleming, Algenon Wells and Henry Lord Brougham, for instance – did not blanch at finding some glimmer of reason exhibited even among the lower animals.<sup>16</sup> But no animal, in the estimation of these British writers, gave evidence of any hint of what was truly distinctive of human mind – namely, moral judgement. If Darwin were to solidify his case for the descent of man from lower animals, he would have to discover the roots of moral behaviour even among those creatures. And so he did.

## II MORAL THEORY PRIOR TO THE ORIGIN

Darwin's own moral sensitivities received considerable assault during his South American travels, especially from the Brazilian slave trade. His family cultivated strong abolitionist sentiments, which originated with both of his grandfathers; and his sisters kept him informed about the efforts in Parliament to emancipate the slaves in the British colonies.<sup>17</sup> Darwin had his convictions reinforced by the many observations Humboldt himself had made about the loathsome trade in human beings.<sup>18</sup>

Darwin's own fury could be barely suppressed when he witnessed African families being separated at slave auctions and slaves being beaten and degraded. When finally the *Beagle* left Brazil, he rejoiced that 'I shall never again visit a slave-country'. He perceived immediately that utilitarian motives would do little to restrain this kind of evil: 'It is argued that self-interest will prevent excessive cruelty; as if self-interest protected our domestic animals, which are far less likely than degraded slaves, to stir up the rage of their savage masters. It is an argument long since protested against with noble feelings, and strikingly exemplified, by the ever illustrious Humboldt.'<sup>19</sup> This last remark about the deficiencies of utilitarian considerations to adjudicate moral responsibility came in the revised edition (1845) of Darwin's *Journal of Researches*. Prior to this time, he did make an

effort to found an initial hypothesis about the evolution of morals on utilitarian grounds.

Darwin knew quite well William Paley's *Moral and Political Philosophy* (1785) from his undergraduate days at Cambridge. Now, while exploring the various branches of his developing theory in early September 1838, he momentarily adopted Paley's central rule of 'expediency'.<sup>20</sup> This rule grounded moral approbation in what, in the long run, would be useful, that is, beneficial either to an individual or a group and, as a consequence, would supply the pleasure God intended for mankind.<sup>21</sup> Darwin gave this rule a biological interpretation:

Sept 8th. I am tempted to say that those actions which have been found necessary for long generation, (as friendship to fellow animals in social animals) are those which are good & consequently give pleasure, & not as Paley's rule is those that on long run *will* do good. – alter *will* in all such cases to *have* & *origin* as well as *rule* will be given.<sup>22</sup>

Darwin here suggested that those habits that preserved animals – such as friendship and nurture of young – must have been practised over many generations and so became instinctive. What we call 'good', then, are those long-term, beneficial instincts that have proved necessary for social cohesion and development. Hence, Darwin supposed that what Paley took to be a forward-looking rule – act to achieve general utility in the *future* – might be transformed into one describing instincts that arose from social behaviours which had been beneficial over long periods in the *past*. But this biologised Paleyan ethics receded from Darwin's purview after he examined a volume containing a more penetrating analysis of morals – the Scottish philosopher James Mackintosh's *Dissertation on Progress of Ethical Philosophy* (1836).

In his *Dissertation*, Mackintosh – an admired relative of Darwin's – objected to Paley's notion that selfish pleasure ultimately motivated right action. Mackintosh rather sided with those who believed instead that human nature came outfitted with a deep sense of moral propriety. Human beings, he believed, acted spontaneously for the welfare of their fellows and immediately approved of such actions when displayed by others. Yet he did not deny the utility of moral conduct. In a cool hour we could assess moral behaviour and rationally calculate its advantages; but such calculation was not, he

thought, the immediate spring of action, which lay coiled in the human soul. Mackintosh thus distinguished the *criterion* for right conduct – utility – from the *motive* for such conduct – an innate disposition.

This analysis fitted rather smoothly into Darwin's developing conception of moral behaviour, a conception that both appreciated the utility of ethical behaviour and recognised its deep biological roots as well. Darwin's notes on Mackintosh's *Dissertation* reveal, however, that he discovered a jarring patch in the original theory, but one which he believed his own biological approach could pave over. The difficulty was this: What explained the harmony of the criterion for moral conduct and the motive for such behaviour? Why were we moved to act spontaneously in a way that we might later, in a moment of reflection, recognise to have social utility? Not impressed with Mackintosh's faint appeal to a divine harmoniser, Darwin suggested that the innate moral knowledge we harboured was really an instinct acquired by our ancestors. The instinct did, indeed, have social utility; but, like all instincts, it had an urgency not connected with any rational calculation of pleasures and pains. Such instincts, Darwin thought, would be sufficiently different from our other more abrupt and momentary instincts in that they would be persistent and firm and thus evoke a more reverential feeling.

Darwin moved with alacrity along this line of thought because in this instance, as in many others, he found that his theory of biological development solved a problem that remained loose and frayed in the humanistic literature. On 3 October 1838, a few days after Malthus furnished a key insight about adaptation of structure to changing conditions, the young naturalist reformulated his theory of moral conscience along the lines suggested by Mackintosh. Darwin assumed that habits of parental nurture, group cooperation, community defence, and so on, would be sustained over many generations, driving such habits into the heritable legacy of a species, so that they would be manifested in succeeding generations as instincts for moral conduct. These instincts would be distinguished from fleeting inclinations and less persistent impulses, which might occur in one generation and depart with the next. When an individual with sufficient intelligence recalled, well after the heat of the moment, a behaviour elicited by these deeply ingrained dispositions, he or she

would feel renewed satisfaction and also would be able to perceive on reflection the social utility of the behaviour. Darwin thus solved the problem of the coincidence of the moral motive and the moral criterion.

Darwin worked out the basic framework of his moral conception without the aid of the theory of natural selection. Moreover, when he later began to apply that theory to explain instincts, he stumbled at the brink of a yawning conceptual abyss, which threatened to swallow his entire theory of evolution by natural selection. The crucial difficulty was this: the social instincts most frequently gave advantage to the recipients of moral actions, not to their agents, but natural selection preserved individuals because of traits advantageous to themselves, not to others. Darwin first met this difficulty when studying the social insects in the 1840s, when the problem became even more complicated.

Soldier bees and ants displayed anatomical traits and instinctive behaviours that served the welfare of their colonies, not directly themselves. Indeed, a soldier bee might defend the hive at the cost of its own life. Moreover, these insects were neuters; consequently they could not in the first instance pass beneficial adaptations to succeeding generations. How then could their other-regarding traits be explained, and, more generally, how did the attributes of neuters arise? Darwin worried about this problem for some time, fearing it would allow the Creator a return to those provinces from which he had lately been banished.<sup>23</sup> Only during the first months of 1858, while labouring on the manuscript that would become, in its abridged form, the *Origin of Species*, did Darwin discover the solution to his problem. He concluded that 'natural selection might act on the parents & continually preserve those which produced more & more aberrant offspring, having any structures or instincts advantageous to the community'.<sup>24</sup> Thus the soldier bee which sacrificed its life for the hive would have had its instincts honed over generations, not by individual selection but by natural selection preserving those hives that had individuals with traits that profited the entire community. With this account, which he reiterated in the *Origin of Species*, Darwin had the key to the puzzle of human moral action: as he would argue in the *Descent of Man*, altruistic impulses would give tribal clans advantages over other clans, and thus such instincts would become characteristic of evolving human communities.

IV THE MORAL CHARACTER OF NATURE  
IN THE ORIGIN

Darwin is usually taken to have introduced into biology a thoroughgoing mechanism. In the words of one set of scholars: 'Natural selection theory and physiological reductionism were explosive and powerful enough statements of a research program to occasion the replacement of one ideology – of God – by another: a mechanical, materialistic science.'<sup>25</sup> This sort of cold-blooded Darwinism, it appears, left man morally naked to the world, since nature, bereft of the divine stamp, became 'morally meaningless' – or so it is commonly believed.<sup>26</sup> But did Darwin believe it?

A straightforward reading of the *Origin of Species* indicates that Darwin hardly had a machine in mind as the model for nature. Rather, he articulated nature so as to display its moral spine. This should not be surprising if one recalls that Darwin had looked upon wild nature during the *Beagle* voyage through Humboldtian eyes – eyes that had a romantic glint. Even the surface of the *Origin's* conceptions ripples with moral suggestion. Consider Darwin's presentation of the very idea of natural selection. He compares it with man's selection, to the moral advantage of the former. Where man 'selects only for his own good', nature selects 'only for that of the being which she tends'. Nature is a model not only of selflessness, but of care and industry. Natural selection 'is daily and hourly scrutinizing, throughout the world, every variation, even the slightest, rejecting that which is bad, preserving and adding up all that is good, silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life.'<sup>27</sup> Can it be any wonder, then, that the productions of nature are 'far "truer" in character than man's productions'? They plainly manifest, in Darwin's resonant phrase, 'the stamp of far higher workmanship'.<sup>28</sup>

The lilting poetry of these phrases might be taken as merely decorative metaphor, not harbouring argumentative substance. But a look back at the predecessors to these phrases in Darwin's earlier manuscripts suggests otherwise. In a passage from his essay of 1844, Darwin strove to make clear to himself, through images and metaphors, the conception of a selecting nature towards which he was groping. Suppose, he wrote, that a being with powers of

perception far superior to man, and with 'forethought extending over future centuries', were, with 'unerring care', 'to do the selecting. Then there would be 'no conceivable reason why he should not form a new race', adapted 'to new ends'. Furthermore, his superior art and 'steadiness of object' would produce organisms far more different from the original stock, with far greater 'beauty and complications' in their adaptations, than comparable organisms 'produced by man's agency'.<sup>29</sup>

The being that Darwin here imagines has those qualities characteristic of the recently departed Deity. Acting with preternatural intelligence, it sees into the future, cares for the welfare of its creatures and selects them for their beauty and progressive adaptations. This being, in more muted colours, continues to operate in the *Origin of Species*, where the guarantee is issued that since 'natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection'.<sup>30</sup> Despite having become a more reserved individual, Darwin yet portrayed nature in the *Origin of Species* in the manner that he had absorbed from his Humboldtian experiences during his youthful voyage of adventure, namely, nature as having a moral and aesthetic intelligence. It is, then, not surprising that when he turned specifically to consider the distinctive character of human beings, he did not leave them bereft of those traits he accorded nature.

## V THE DEBATES OVER HUMAN EVOLUTION, 1859–71

In the late 1860s, Darwin initially approached the problem of human evolution quite modestly. He had originally intended to consider human beings only from the point of view of sexual selection, which he thought could explain the different attributes of males and females of the many races of mankind. He engorged the second part of *The Descent of Man, and Selection in Relation to Sex* (1871) with detailed discussions of sexual selection throughout the animal kingdom, with only the last two substantive chapters devoted to human sexual dimorphism and racial differences. He argued that male combat for females among our ancestors would have contributed to the male's larger size, pugnacity, strength and intelligence. In his view, the particular features of female beauty in the different races – generally

hairless bodies, cast of skin, shape of nose, form of buttocks and so on – arose from male choice. Women generally displayed the tender virtues, but their intellectual attainments were largely due, Darwin thought, to inheritance from the male parent. In a letter to a young American female college student, he did venture that if women went to university and were schooled over generations as the sons of the gentry were, then they would, via use-inheritance, become as intelligent as men. But were this to happen, 'we may suspect that the early education of our children, not to mention the happiness of our homes, would in this case greatly suffer'.<sup>31</sup>

Several events occurred during the 1860s that caused Darwin to alter the limited intentions he had for his book on human descent. Early in the decade, his great friend Charles Lyell waded into the undulating opinions forming about human evolution in the wake of the *Origin*. But the hedging argument of his *Antiquity of Man* (1863), which displayed a style familiar at the Old Bailey, drove Darwin to distraction. Though Lyell admitted the physical similarity of human beings to other primates, he yet argued that the mental and moral constitution of humans placed them far above any other animals in the scale of being. Linguistic ability in particular demonstrated the wide gulf separating the mind of man from that of animals. 'This was no chasm that could be bridged in 'the usual course of nature'. The move from animals to man, Lyell intimated, had to be carried on the wings of a divine spirit.<sup>32</sup>

Alfred Russel Wallace initially stood ready to combat Lyell's theological construction of human mind and morals. In a lecture delivered to the Anthropological Society of London in 1864, he produced an ingenious defence of the naturalistic position. He argued that natural selection, operating on our animal forebears, produced the various races of men, though not yet their distinctive mental and moral characters. Only after these races appeared would natural selection operate on the various clans and tribes, preserving those groups in which individuals displayed sympathy, cooperation and 'the sense of right which checks depredation upon our fellows'.<sup>33</sup>

Three features of Wallace's account of the evolution of human mind and morals stand out. First, he conceived the selective environment to be other proto-human groups – which would have an accelerating effect on the evolutionary process, since social environments would rapidly change through responsive competition.

Second, he proposed that selection worked on the group, rather than the individual – which allowed him to explain the rise of altruistic behaviour, that is, behaviour perhaps harmful to the individual but beneficial to the group. In his original essay on the transmutation of species (1858), Wallace conceived of the struggle for existence as occurring among *varieties* instead of individuals.<sup>34</sup> He continued to think in such group terms when considering the evolution of moral behaviour. Finally, in a note to the published version of his talk to the Anthropological Society, he mentioned that he was inspired to develop his thesis by reading Herbert Spencer's *Social Statics*.<sup>35</sup> Spencer's own early brand of socialism had pulled Wallace to his side. In *Social Statics* (1851), Spencer had envisioned a gradual and continual adjustment of human beings to the requirements of civil society, with individuals accommodating themselves to the needs of their fellows, so that eventually a classless society would emerge in which the greatest happiness for the greatest number would be realised.<sup>36</sup> Spencer assumed that the inheritance of useful habits would be the means by which such evolutionary progress would occur, while Wallace believed natural selection to be the agent of that progress.

Darwin welcomed Wallace's solution to the evolution of human morality, since he himself had developed certain views about community selection in social insects congenial to his friend's position. Darwin would emphasise, however, that the members of small tribes, of the sort Wallace envisioned, would probably be related, and so a disadvantage to a given individual practising altruism would yet be outweighed by the advantage of the practice to recipient relatives. Ultimately, however, Darwin would drop this qualification, and simply embrace group selection as operative in human (and animal) societies.<sup>37</sup>

Wallace's faith in a naturalistic account of human evolutionary progress nevertheless succumbed to the evidence of higher powers at work in the land. Though raised as a materialist and agnostic, Wallace had chanced to attend a séance, which piqued his empiricist inclinations. Shortly thereafter, in 1866, he hired a medium in order to investigate the phenomena usually attendant on the invocation of the spirit world. Wallace, gentle soul that he was, became a true believer (unlike Darwin, who regarded spiritualism as rubbish). Wallace's new conviction focused his attention on certain human



traits – naked skin, language, mathematical ability, ideas of justice and abstract reasoning generally – which would confer no biological advantage on individuals in a low state of civilisation. Indeed, Wallace believed that, for sheer survival, human beings need a brain no larger than that of an orang-utan, or perhaps one comparable to that of the average member of a London gentleman's club. Such traits as abstract reasoning and moral sensitivity, therefore, could not be explained by natural selection. Yet in both aboriginal and advanced societies, individuals displayed these qualities. While his friend Herbert Spencer regarded such properties as explicable only through use-inheritance,<sup>38</sup> Wallace found a unique explanatory mode of selection that his new faith could provide.<sup>39</sup> In his estimation, distinctively human traits had been artificially selected for us: 'a superior intelligence', he proposed, 'has guided the development of man in a definite direction, and for a special purpose, just as man guides the development of many animal and vegetable forms'.<sup>40</sup> Humans were thus like domestic animals in the hands of higher spiritual powers. Their superintendence of the selection process had ensured that distinctively human traits, for human advantage, had won out in the long struggle for existence.

When Darwin learned of Wallace's turnabout, he was dumbfounded: 'But I groan over Man – you write like a metamorphosed (in the retrograde direction) naturalist, and you the author of the best paper that ever appeared in the *Anthropological Review*'.<sup>41</sup> Though Wallace's flight to other powers than nature was fuelled by his new faith, the crux of his argument had force: since natural selection operated only on traits that provided some immediate biological advantage, how might one explain human traits that seemed not particularly useful at all?

Another writer, though friendly to the Darwinian cause, yet spied a comparable problem in the assumption of human evolutionary progress. William Rathbone Greg, Scots moralist and political writer, discovered that a keen moral sense might spread seeds of wicked growth. A highly civilised society, he remarked, would be inclined to protect not only the physically weak from the winnowing hand of natural selection but the intellectually and morally degenerate as well. So protected, the inferior types would have the opportunity to outbreed their betters. Greg, a Scots gentleman of refined sensibility, regarded the case of the Irish as cautionary. While the

'careless, squahid, unaspiring Irishman' sired offspring early and often, the 'frugal, foreseeing, self-respecting, ambitious Scot' delayed marriage and had few children. The profligate and degenerate Irish yet seemed to be winning the evolutionary race in the trait that counted – reproduction. 'In the eternal "struggle for existence"', Greg concluded, 'it would be the inferior and less favoured race that had prevailed – and prevailed by virtue not of its good qualities but of its faults'.<sup>42</sup> The considerations of Lyell, Wallace and Greg spurred Darwin to expand his intended volume on sexual selection to tackle these apparent barriers to a naturalistic understanding of human evolution.

In the face of Greg's argument, Darwin collected in the *Descent* considerable evidence about the fortunes of the reprobate. On the basis of this evidence, he maintained that many natural checks to the less fit would ultimately forestall their advance: the debauched would suffer higher mortality, criminals would sire fewer offspring, and the bad would likely die young.<sup>43</sup> Yet it could be that the likes of the Irish, though decidedly less able, would simply crowd out the British. After all, though evolutionary progress was general, it was 'no invariable rule'.<sup>44</sup>

#### VI MIND IN THE DESCENT

Lyell's and Wallace's objections to the application of natural selection in the case of man proved more difficult to counter than Greg's, but they brought Darwin to several ingenious solutions to the problems posed. Linguistic ability stood chief among the features of intelligence that had to be considered. In dealing with this problem, Darwin reverted to a theory he had initially entertained in his *Notebook N*, which he kept in 1838 and 1839. There he sought to develop a naturalistic account of the origin of language. He supposed that our aboriginal ancestors began imitating sounds of nature (e.g., 'crack', 'roar', 'crash') and that language developed from these simple beginnings.<sup>45</sup> In the late 1860s, while working on the *Descent*, Darwin made frequent enquiries of his cousin, the linguist Hensleigh Wedgwood, about the origin of languages. Wedgwood had allowed that it was part of God's plan to have man instructed, as it were, by the natural development of speech. He argued that language began from an instinct for imitation of sounds of animals and natural

events, which under 'pressure of social wants' developed into a system of signs.<sup>46</sup> Darwin embraced this confirmation of his original ideas, though, of course, dispensing with the theological interpretation.

Darwin also relied on another book in formulating his thesis about the function of language in human evolution. This was by a German linguist, August Schleicher, a friend and colleague of the morphologist Ernst Haeckel and a new convert to Darwinian theory. In his *Die Darwinische Theorie und die Sprachwissenschaft* (*Darwinian theory and the science of language*, 1863), Schleicher maintained that contemporary languages had gone through a process in which simpler *Ursprachen* had given rise to descendent languages that obeyed natural laws of development.<sup>47</sup> He argued that Darwin's theory was thus perfectly applicable to languages and, indeed, that evolutionary theory itself was confirmed by the facts of language descent. In a subsequent pamphlet, Schleicher himself constructed the kind of argument that Darwin would employ in the *Descent*, that is: 'the formation of language is for us comparable to the evolution of the brain and the organs of speech'.<sup>48</sup> Schleicher maintained that the several languages of mankind produced the various types of mind displayed by the different races. Ernst Haeckel took up this argument in his *Naturliche Schöpfungsgeschichte* (*The Natural History of Creation*, 1868), which Darwin read while composing the *Descent*. Darwin wrote to a friend after reading Haeckel's work that it was 'one of the most remarkable books of our time'.<sup>49</sup> Darwin's notes and underlining in the book are quite extensive. He was particularly interested, as shown by his scorings and marginalia, in Haeckel's account of Schleicher's thesis that the evolution of language was the material side of the evolution of mind.<sup>50</sup> Here then Darwin had a counter-argument to Wallace's, one by which he could solidify an evolutionary naturalism.

Darwin conceded that Wallace had been correct: for sheer survival, our animal ancestors had sufficient brain power. But he could now blunt the further implication of his friend's argument. Citing Schleicher, he argued in the *Descent* that developing language would rebound on the brain, producing more complex trains of ideas; and constant exercise of intricate thought would gradually alter brain structures, causing a hereditary transformation and, consequently, a progressive enlargement of human intellect beyond that necessary for mere survival.<sup>51</sup>

Darwin's general theory of the rise of human intellect thus depended on the inheritance of acquired characteristics, or at least that is one of the strands of argument he employed. Yet it was not the only strand. Darwin's explanations in the *Origin* and the *Descent* were rhetorically robust – if the reader did not like one line of consideration, the author was ready with another line. His second strand of argument relied on community selection. In the *Descent*, Darwin contended that if a tribe of our aboriginal ancestors contained among its members some mute, inglorious Newton, an individual who through inventiveness and intellectual prowess benefited his tribe in competition with other tribes, then he and his relatives would survive and reproduce.<sup>52</sup> Darwin enunciated here an idea that bears strong affinities to what is now known as 'inclusive fitness'. A heritable trait that confers little or no benefit on an individual but sufficiently advances the cause of relatives will be preserved and spread along with the group. Darwin first developed this theory of community selection to solve the problem of the evolution of the social insects; it now became the key to understanding the evolution of social human beings.

#### VII MORALS IN THE DESCENT

In the first volume of the *Descent*, the question of human moral judgement occupied the greatest measure of Darwin's attention. Moral sense was by common consent that attribute most distinctive of human beings. Both Lyell and Wallace could not conceive that a refined moral sense might have arisen naturally from animal stock. After all, moral behaviour did not prove particularly beneficial to those exercising it – hence natural selection could not account for it. In explaining the rise of moral behaviour, Darwin again moved from the individual as the object of selection to the community. While 'a high standard of morality' indeed conferred small or no advantages to individuals, tribes of individuals endowed with 'patriotism, fidelity, obedience, courage, and sympathy', and the readiness 'to give aid to each other and to sacrifice themselves for the common good', would be 'victorious over most other tribes; and this would be natural selection'. Furthermore, as the victorious, moral tribes supplanted the defeated, immoral ones throughout the world, 'the standard of morality and the number of well-endowed men will thus everywhere tend to rise and increase'.<sup>53</sup>

Community selection proved an ingenious way to understand the evolution of human altruism. It yet had its own difficulty: How do these moral traits arise *within* one tribe in the first place? After all, as Darwin noted, it is not likely that parents of an altruistic temper would raise more children than those of a selfish attitude. Moreover, those who were inclined to self-sacrifice might leave no offspring at all.<sup>54</sup> Darwin employed his theory of use-inheritance to explain the origin of such social behaviours within a given tribe. He proposed two related sources for such behaviours. The first is the prototype of contemporary theories of reciprocal altruism. Darwin observed that, as the reasoning powers of members of a tribe improved, each would come to learn from experience 'that if he aided his fellow-men, he would commonly receive aid in return'. From this 'low motive', as he regarded it, each might develop the habit of performing benevolent actions, which habit might be inherited and thus furnish suitable material on which community selection might operate. The second source relied on the assumption that 'praise and blame' of certain social behaviours would feed our animal need to enjoy the admiration of others and to avoid feelings of shame and reproach. This kind of social control would also lead to heritable habits.<sup>55</sup>

One salient objection to any theory of the biological evolution of moral conduct points to the often very different standards of acceptable behaviour in various cultures. Darwin recognised that what might be approved as moral in one age and society might be execrated at a different time and place. The Fuegians might steal from other tribes without the slightest remorse of conscience, while an English gentleman would regard such behaviour with contempt. But members of these vastly different cultures would, nonetheless, commonly endorse the obligation to deal sympathetically and benevolently with members of their own particular group. The English gentleman and lady – or, perhaps, their descendants – with more advanced intellects would have learned that tribal and national differences were superficial, and thus they would have perceived a universal humanity underlying inessential traits. Their own instinctive sympathies would thus have been trained to respond to all human beings as members of a common tribe. In Darwin's conception, then, evolution would have moulded the most primitive human beings to react altruistically to brothers and sisters, but over the ages, cultural learning,

coupled with increased intelligence, would reveal just who those brothers and sisters might be.<sup>56</sup>

'Philosophers of the derivative school of morals' (e.g., Bentham and Mill), Darwin observed, 'formerly assumed that the foundations of morality lay in a form of Selfishness; but more recently in the "Greatest Happiness principle"'.<sup>57</sup> Virtually all scientists and philosophers who have considered the matter have located these utilitarian principles at the foundation of an evolutionary construction of ethics. Michael Ghiselin provides the prototypical example. He has argued that, according to Darwin's theory, since an altruistic act furthers the competitive ability of self and family, that act is 'really a form of ultimate self-interest'.<sup>58</sup> Richard Dawkins, a defender of Darwin, yet warned 'that if you wish, as I do, to build a society in which individuals cooperate generously and unselfishly towards a common good, you can expect little help from biological nature'.<sup>59</sup> These sentiments, quite obviously, do not reflect Darwin's own view. Our moral instincts, he believed, would urge us to act for the benefit of others without calculating pleasures and pains for self. And since such altruistic impulses, at least in advanced societies, would not be confined to family, tribe or nation, he confidently concluded that his theory removed 'the reproach of laying the foundation of the most noble part of our nature in the base principle of selfishness'.<sup>60</sup>

#### VIII THE EXPRESSION OF THE EMOTIONS

Though Darwin believed that human intelligence and moral responses had their roots in the animal mind, he conceded that these faculties had yet developed far beyond those of our progenitors. By contrast, he considered human emotions and their display not to have comparably progressed. The fear displayed by his little dog over a wind-blown parasol differed little, he thought, from that of the native who trembled because invisible spirits might be causing a lightning storm – or, as Darwin intimated, from the Christian's fear of the wraith of an unseen God.<sup>61</sup> Certainly few English sportsmen would have difficulty reading human-like emotions off the expressions displayed by their dogs. The belief that humans shared comparable emotions and expressions with animals accorded with a common intellectual tradition that can easily be traced back to Aristotle. Yet

Darwin's own evolutionary analysis in his *Expression of the Emotions in Man and Animals* (1872) has a peculiar and, for us, an unexpected contour, which can only be understood in the light of an unusual theory worked out by one of his contemporaries.

Sir Charles Bell's *The Anatomy and Philosophy of Expression* (1844) displays a research physician's detailed knowledge of facial anatomy and a devoted humanist's understanding of emotional depiction in art and literature. Bell argued that the smiles and frowns, laughs and sighs, beams and grimaces of the human countenance functioned as a natural language by which one soul communicated with another. Ultimately this repertoire of signs, he asserted, referred back to its divine author, who 'has laid the foundation of emotions that point to Him, affections by which we are drawn to Him, and which rest in Him as their object'.<sup>62</sup> Thus according to Bell, the expression of the emotions served for communication, human and divine.

Darwin read Bell's book with considerable interest. He focused on the physician's precise descriptions of the structure and operation of facial muscles during the expression of emotions. He denied, however, the theological foundation for emotional expression that Bell divined. But in rejecting Bell's particular conception of the utility of emotional response, he rejected completely all notions of utility for the expressions. Emotional display, to be sure, had an evolutionary history. Darwin's many comparisons of facial movements in children, adults, the insane, as well as in apes, dogs and cats – done with the aid of photography and sketches – showed similarities across ages, sexes and mental capacities. This kind of comparative evidence bespoke a common origin for emotional expression. But since he could discover no social or communicative function in these emotional reactions – unlike neo-Darwinians today – his theory of natural selection did not readily apply.<sup>63</sup> Instead, Darwin appealed to a number of other principles, especially his notion that instinctive reactions could derive from practices that had been, by dint of exercise, scored into the heritable substance. He argued that among our ancestors, if a certain mental state was often accompanied by actions that brought relief or gratification, then those actions thereafter accompanied the mental state – for example, the turning away and the wrinkled nose of disgust, elicited originally by the sight of some repulsive object, might again be displayed due to the feeling alone. Darwin

called this the 'principle of serviceable associated habits' and used it to explain variously frowning, dejection, smiling and so on.<sup>64</sup> He formulated two more principles to handle other kinds of expression. The 'principle of antithesis' specified that when certain actions were connected with a particular state of mind, an opposite state would tend to elicit an opposite action. For instance, a hostile dog will stand rigid with tail stiff and hair erect, while a docile, happy animal will crouch low with back bent and tail curled. Finally, there was the principle (borrowed from Herbert Spencer), according to which a violent emotion might spill over to adjacent nerve pathways and produce an outward effect – when, for example, great fear caused trembling.<sup>65</sup>

#### IX CONCLUSION

Among the many sources for Darwin's ideas about nature, German romanticism supplied one of the deeper and more powerful currents. The anatomist Richard Owen served as one especially important conduit for this tradition. His Goethean morphology and Schellingian archetype theory, suitably reconsidered, formed staples of Darwin's own intellectual repertoire. The doctrine of embryological recapitulation, a fundamental feature of German romantic biology, became a main supporting pillar of Darwin's general theory.<sup>66</sup> Darwin modelled his *Journal of Researches on Humboldt's Personal Narrative*, and Humboldt, that doyen of German science in the first half of the century, returned the compliment by singling out in his book *Kosmos* the merits of the young English adventurer.<sup>67</sup> Humboldt conceived nature as an organism exhibiting interacting parts, and Darwin, rejecting the clockwork universe of his English heritage, discovered many ingenious ways of tracing out those organic interactions in the *Origin*. Humboldt's nature had those aesthetic, moral and creative properties characteristic of the retired Detry, and these are exactly the features exhibited by natural selection. We usually take the measure of Darwin's ideas looking backward, from the photograph by Julia Cameron, who portrayed Darwin as a sad English prophet. But in his youth, this future fixture of the Victorian establishment sailed to exotic lands, became intoxicated with the sublimity of their environs, and tested his mettle against the forces of man and nature. Like many of the romantics, he also discovered the

human core of that nature, and continually reckoned with it as he constructed his general theory of evolution.

Mind, morals and emotions occupied Darwin's attention in his early notebooks and found places even within the *Origin of Species*, which ostensibly avoided the problem of human evolution. His argumentative strategy in the *Descent* and in the *Expression of the Emotions* continued that of the *Origin*. He employed vast amounts of empirical evidence gathered from many different sources and was able to show that when properly juxtaposed, evolutionary consequences quite naturally followed. But he did not simply rely on the observations of others. He, of course, made use of his own experience on the *Beagle* voyage, especially his knowledge of tribal life among the Indians of South America and his encounters with the slave trade. Further, he stuffed these books with experiments and mathematical calculations of his own devising. The language of his arguments and experiments did not have the dry, crusty sound of many of the empirical studies from which he drew. His prose had a poetic lilt and his tropes, such as nature scrutinising the internal fabric of organisms, allowed the reader to feel the more comfortable presence of a larger power watching over all of life. The Humboldtian message was that nature was no meaningless machine, but an intelligent and moral agent, to be understood through aesthetic judgement as well as analysis.

On Darwin's account, nature had a multiply dependent structure. Darwin's arguments often mirrored that structure. He would advance several possible causes to explain the same event, holding those events in a tangled bank of organic relations. Thus, not only did he account for man's big brain by appeal to group selection, he had the inherited effects of language by which to reinforce his naturalistic theory. He secured human moral character with the interacting forces of community selection, reciprocal altruism and incultated habit. The principal force, community selection, along with an evolving intellect, would ensure that human nature might preserve an authentic moral core. As he interpreted his own accomplishment, his theory thus escaped the reproach of grounding human moral capacity in 'the base principle of selfishness'. Darwin's subtle, artistic effects, along with his voluminous evidence and compelling arguments, have rendered his conclusions powerful even today for the supple of mind.

## NOTES

1. Barrett *et al.* 1987, *Charles Darwin's Notebooks, Notebook B*, MS p. 3 (hereafter B3).
2. B4.
3. B169 and B215.
4. Humboldt [1814-29] 1966.
5. Keynes 1988, 443.
6. R. J. Richards 1999 and 2002b. For further discussion of Humboldt's contribution to Darwin's conception of nature, see Sloan, this volume.
7. C171 and C63.
8. Darwin to Susan Darwin [1 April 1838], in F. Burkhardt *et al.* 1985-2001, *Correspondence* II, 80 (hereafter CCD).
9. M107. Double wedge-brackets indicate a later insertion into the entry.
10. M95.
11. See M104 and *Darwin's Reading Notebooks*, in CCD IV, 438 [Darwin Papers, Cambridge, DAR \*119: 3v].
12. N21e.
13. Hume [1739] 1888, 179. Darwin refers to this passage in N101, and remarks: 'Hume has section [IX] on Reason of Animals . . . he seems to allow it is an instinct.'
14. N48.
15. C210e. I read 'world' for the transcription 'word'. Darwin studied Carus in translation. See Carus 1837.
16. See especially Fleming 1822, I, 220-2; Wells 1834, 20; and Brougham 1839, 175. Darwin's copy of Fleming, with annotations, is held in the Manuscript Room of Cambridge University Library. His notes on Brougham and Wells are, respectively, in N62 and N68-72. He wrote: 'Lr. Brougham . . . says animals have abstraction because they understand signs.—very profound.—concludes that difference of intellect between animals & men only in Kind [*sic*, degree].'
17. See Susan Darwin to Darwin (3-6 March 1833), in CCD I, 299.
18. See Humboldt 1814-29, III, 3.
19. C. Darwin [1860] 1962, 497.
20. Paley [1785] 1806, I, 89-90.
21. Paley, [1785] 1806, I, 76.
22. M132e.
23. This problem and other aspects of the development of Darwin's moral theory are more extensively discussed in R. J. Richards 1987, chs. 2 and 5.
24. C. Darwin 1975, 510.
25. Lewontin *et al.* 1984, 51.

26. S. F. Cannon 1978, 275.
27. C. Darwin [1859] 1964, 83-4.
28. C. Darwin [1859] 1964, 84.
29. C. Darwin 1909, 85.
30. C. Darwin [1859] 1964, 489.
31. Darwin to Caroline Kennard (9 January 1882), Darwin Papers, Cambridge, DAR 185. For further discussion of Darwin's arguments on sexual selection, see Enderby, this volume.
32. Lyell 1863, 505.
33. Wallace [1864] 1991, clxiii.
34. Darwin and Wallace 1958, 268-79.
35. Wallace [1864] 1991, clxx.
36. Spencer [1851] 1970. Spencer's own trajectory moved from an early, youthful enthusiasm for radical socialism (with land held in common) to the *laissez-faire* individualism of his later years. See R. J. Richards 1987, chs. 6-7.
37. Darwin generalised his concept of community selection to include what is today called group selection - that is, selection of groups of individuals for traits that benefit the group, even if its members are not related. By the sixth edition of the *Origin* (1872), in a passage that underwent gradual change through the editions, he asserted: 'In social animals it [natural selection] will adapt the structure of each individual for the benefit of the community; if the community profits by the selected change.' For the several passages, see C. Darwin 1959, 172.
38. Spencer contended that the higher mental powers required delicate co-adaptation of elemental traits that themselves could have provided no advantage singly. Moreover, many mental powers - aesthetic preference, for instance - had no survival value at all, and could not, therefore, have arisen by natural selection. See Spencer [1864-7] 1884, 1, 454-5.
39. Wallace wrote to Darwin (18 April 1869) to say that his altered view about human evolution derived from his empirical testing of the medium's power. See Marchant 1916, 1, 244.
40. Wallace 1870, 359.
41. Darwin to Alfred Wallace (26 January 1870), in Marchant 1916, 1, 251.
42. Greg 1868, 361. Darwin quotes this passage with some relish in C. Darwin [1871] 1981, 1, 174.
43. C. Darwin, [1871] 1981, 1, 174-80.
44. C. Darwin [1871] 1981, 1, 177.
45. See N65. See also R. J. Richards 2002a.
46. See Wedgwood 1866, 13-14 and 129.
47. Schleicher 1863. See also Taub 1993 and Alter 1999, 73-9.
48. Schleicher 1865, 21.

49. Darwin to William S. Dallas (9 June 1868), Darwin Papers, Cambridge, DAR 162.
50. Darwin's copy of Haeckel 1868 is held in the Manuscript Room of Cambridge University Library. For Darwin's annotations, see Di Gregorio 1990, 359-60.
51. C. Darwin [1871] 1981, 1, 57.
52. C. Darwin [1871] 1981, 1, 161.
53. C. Darwin [1871] 1981, 1, 166.
54. C. Darwin [1871] 1981, 1, 163.
55. C. Darwin [1871] 1981, 1, 163-5.
56. C. Darwin [1871] 1981, 1, 100-1.
57. C. Darwin [1871] 1981, 1, 97.
58. Ghiselin 1973, 967.
59. Dawkins 1976, 3.
60. C. Darwin [1871] 1981, 1, 98.
61. C. Darwin [1871] 1981, 1, 67-8.
62. Bell [1844] 1873, 78.
63. On the present-day discussion about Darwinism and emotional expression, see Flanagan, this volume.
64. C. Darwin [1872] 1998, ch. 1.
65. C. Darwin [1872] 1998, chs. 2 and 3.
66. See R. J. Richards 1992, 91-166.
67. Humboldt 1845-62, 11, 72.