CHAPTER 8

Darwin and Agency – Intention or Automatism?

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> The weak point in Mr. Darwin's theory would seem to be a deficiency, so to speak, of motive power to originate and direct the variations which time is to accumulate.
>
> Samuel Butler, *Life and Habit*

"Love of the deity effect of organization. Oh you materialist."[1] So Darwin famously wrote in an early notebook. And although there are alternative interpretations of this entry, its self-mocking accusation of materialism fairly enough characterizes the critical assumption that underlies Darwin's scientific method: All phenomena, even faith, are to be explained by reference to material processes, to causes now in operation; the "motive power" for all the growth, change, development, for all the apparent design in nature, emerges from matter alone with no assistance from God or from consciousness conceived of as unrelated to the material.

This method, the very basis of the uniformitarianism that Darwin learned from Charles Lyell, has been the fundamental assumption of mainstream science since the nineteenth century. It was obviously central to the development of geology, which Darwin studied at Cambridge and was learning from Lyell, and extended across biology, reaching even to psychology, to, for example, Alexander Bain's determination to explain psychological phenomena physiologically. It is also an ostensibly innocent source of that powerful if embattled tendency in nineteenth-century science to translate all human actions, all human feelings, all human thought, into the language of mechanism. While it was not Darwin who explicitly made this translation, his language and his theory – "oh you materialist" – certainly was a major factor in the growth of the tendency. Darwin himself would not have agreed with this application of his ideas.

A very large question invariably comes with the insistence on material mechanism: Where, in this world full of life with its endless and wonderful

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variations, is the agency that shapes us and the world? Where do "purpose," "desire," "will" come in? Is every form of life, every action, every thought, every feeling simply a function of "material" phenomena? How does William Paley's watch tick on without a watchmaker? Even strong secularists and believers in evolution felt the pressure of questions such as those. But it was not only a scientific question at stake; it was, with even more cultural significance, a moral one. In the light of Darwin's materialist assumption, the world, even as it filled with matter, seemed for many to empty out. Did Darwin himself believe in the materialism that he professed (secretly) and mocked at the same time? Did it inevitably lead to where T. H. Huxley was shortly to take it?

Is Huxley's famous essay, "On the Hypothesis that Animals are Automata, and its History" a logical and inevitable consequence of Darwin's theory? Huxley's big game, of course, is not the frog with whose spinal column he experiments. Not only Huxley's frog, but all of us – we might all be machines. Huxley gets around what he speaks of as "the logical consequences of this conviction of mine," not by denying that humans are machines, but by dismissing clerical assumptions that the logical consequences of that position are "fatalism, materialism, and atheism."[2] "Logical consequences," he says, "are the scarecrows of fools and the beacons of wise men," and the only question is "whether a doctrine is true or false."[3] In this way he ducks what is, indeed, a not unreasonable clerical understanding of the argument that humans are automata also, their will having nothing to do with the actions they take. The disclaimer strikes me as disingenuous. Huxley does not fully endorse Descartes' view "that brute animals are mere machines or automata," allowing that animals do have consciousness, for, as he puts it, it is not "permissible to me to suppose that such complex phenomena as those of consciousness, first comes into existence suddenly, and without being preceded by simpler modifications." His point is rather an almost more devastating one, that is, that what we have taken to be the cause of our actions – our conscious will – turns out to be not a cause but a "symbol" of them. Whatever logical inference priests and others might choose to make of the fact, "all states of consciousness in us, as in them [animals] are immediately caused by molecular changes of the brain substance … we are conscious automata."[4]

For Huxley only the material, by way of the laws that govern it, can affect the material. Our arms move not because we intend to move them, but because of automatic, unconsciously aroused energies, of which our professed intention is only the symbol. This makes Huxley's argument even more troubling morally and religiously than Descartes' because

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Huxley banishes from his argument any outside agent. Although he cleverly evades the charge of "materialism," the world he describes operates entirely through material forces with no motive intelligent force, no purposeful agent. But what happens when Darwin turns the deity himself into an "effect of organization"?

If Descartes' God is out of the argument, from where in heaven's name does the machine get its energy and its direction; what makes it run? Can mere accumulation of variations through time really get us to that peacock's gorgeous feathering? Or to the pepper moth's protective adaptation to the dust and smog of the Industrial Revolution? Darwin's explanation, "natural selection," looks like an answer, but examined carefully by many skeptical readers, it turns out not to do the job. Everyone noticed right away that "natural selection" was a metaphor, and one which, when investigated closely, seems only inches away from implying Huxley's frogs jumping around with their spinal columns cut. The metaphor smuggles in an agent with the word "selection" – for Darwin knew that an agent is necessary. But as Samuel Butler insisted, that agent was a fraud: Darwin's explanation for how the marvelous and apparently designed variations develop turns out, on Butler's account, to be a mere redundancy – nature is responsible for the movements of nature. Even to this date, despite a vast majority of scientists who work with the idea of natural selection, that critique remains alive, as in J. Scott Turner's recent book, *Purpose and Desire*.[5] But it was also a problem for Darwin, who was not quite so absolute a "materialist" as his cynical notebook comment implies. Rather, he was, as Jessica Riskin has argued, "torn between the mechanist dictate to banish agency from nature and the organicist impulse to naturalize agency, to make agency synonymous with life."[6] And it is his "profound and extraordinarily productive ambivalence" that, I believe, kept him from taking Huxley's step toward the notion of automata, on which I want to focus here.

Riskin explains that Darwin was influenced by two traditions, one that saw nature as passive before the workings of an agent, God, outside it, and the other, the Romantic organicist "impulse to naturalize agency."[7] So, on the one hand, and as the current dominant view has it, he expelled external agency from nature, and on the other, he responded to nature by recurring regularly to its own internal agency. Always defensive and annoyed that Lyell and others often saw his theory as akin to Jean Baptiste Lamarck's, he nevertheless increasingly included the idea of inheritance of acquired characteristics in his own arguments, and more important for my argument here, regularly animated nature even as he was expelling God from its workings.

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As August Weismann developed Darwin's views, he proposed a "Darwinian" theory that effectively banished intention and agency from evolutionary development: The famous Weismann "barrier," as it is called. In the name of Darwin, will and purpose do seem to disappear from the evolutionary process. And this reading of nature was accompanied, almost as a corollary, with a sweeping minimizing of the possibility of animal intelligence, and the exclusion of much that Darwin said and much that Darwin worried over, from what is now generally meant by Darwinism. For many, the Weismann barrier was morally repulsive, and George Bernard Shaw, an aggressively assertive vegetarian for whom the reality of animal sensibility was a given, found it morally and intellectually insupportable. (To be fair, Huxley too, in his essay on automata, attributes the capacity of feeling to animals.) Shaw was gentler on Darwin than his predecessor, Samuel Butler, because he recognized the humanity of Darwin and the ambivalence in him that Riskin identifies, but he was relentlessly severe on what he saw as the scientific establishment in its movement to what Stephen Jay Gould would later call "ultra-Darwinism."[8] Shaw was appalled by vivisection, a scientific practice that was partly justified by the idea that animals are, in effect, only matter, mere automata without even the consciousness that Huxley ascribed to them: They have no feelings, no intentions. Behind this way of thinking there is actually far more Weismann than there is Huxley. When a dog howls in pain, it is not really experiencing pain. There is a perhaps unphilosophical but certainly a temperamental connection between such vivisection-favoring attitudes toward animals (whose humanoid behaviors, when taken literally by lay animal lovers, have been regularly discounted as mere anthropomorphism) and the idea that we are, as in Huxley's phrase, "conscious automata."

The materialist method became a metaphysical idea. Riskin points out that Weismannian science, seeming itself to be so materialist, in fact picks up the view of natural theologians. For those theologians, all agency lay with God and the natural world itself was all like Paley's rock – without intention, mind, and agency. And thus, just as with Paley, there is no contradiction between Weismann's deep religiosity and his science. Darwin, plagued as it were with a feeling for all organic life, could not reconcile his ideas with traditional religious faith.

All agency *in* Paley's nature comes from outside it – oh, Paley, you materialist! For Weismann too there is nothing that can cross the barrier between those immaterial phenomena of intelligence and desire and the physical processes of inheritance. Natural selection, which by definition was not an agent, he believed to be a theory sufficient to account for all

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evolutionary change (this was not the case even for Darwin). So agency once again disappears from the world, but is reinstated in the mode of automatism. Having no explanation for the apparent agency of forces in the natural world, Weismann falls back on a "'Universal Cause' – sometimes the 'Final Cause' – operating behind the mechanism of the universe": "a brute-mechanist … theory in which development took place by means of an essentially passive, preset machinery."[9] The great irony that Riskin persuasively asserts is that a rigorous Weismannian materialism almost always entails something like natural theology, in which all agency comes from an intelligent nonmaterial force, like God, so that today's ultra-Darwinism is, at least logically, perfectly compatible with natural theology.

Under the regime of materialist methodology, nature functions mindlessly, like an automaton: It is in effect, a machine. Intention and desire, manifest in human activity, have no place in inheritance, an idea that eliminated (until very recent developments, most particularly in epigenetics, have called it into question) the Lamarckian idea that acquired characteristics might be inherited. Mind is nonmaterial and is only epiphenomenal, incapable of directing or even affecting the physical. As we would put it now, it is in the genes, the DNA, not in the exemplary giraffe's desire to reach the higher branches of the tree for dinner. Oddly, one of the effects of the Weismann barrier, as it accounts for all evolutionary development by way of genetic transmission, is to ignore the possibility that science might need a fuller account of agency. Ultra-Darwinism is implicitly metaphysically materialist, and anticipates Daniel Dennett's transformation of "natural selection" into an algorithm.[10] Natural selection is in effect simply a recipe for development and change, with no motive force. If there is a driving force of the machine, it lies outside the domain of science. If there is any telos, any order or meaning, it comes from outside the world that science investigates. There is no internal force, energy, direction, purpose.

This way of thinking certainly has been made, by mainstream evolutionary biology itself, to seem intellectually compatible with Darwin's theories, to be "Darwinian," but it is affectively dissonant, not consistent with the way Darwin himself describes the world. While the dominant reading of Darwin has tended to be that he did not believe in progress, or direction in evolution – and thus the prevailing sense that his world is entirely driven by chance – the theory, as he develops it, has often been taken as compatible with ideas of progress. Robert Richards has made a powerful and meticulously documented case that Darwin was not, as Butler snarkily and tragically described him, mechanistic. Rather, Darwin's "conception

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of nature derived, via various channels, in significant measure from the German Romantic movement."[11] And this movement, like Romanticism almost everywhere, "discovered mind to be deeply implicated in the organic structure of nature."[12]

That this is likely the case is suggested by the ambivalence baked into the metaphor, "natural selection," a phrase that persists through all six editions of the *Origin*. It persists despite the fact that Darwin finally conceded that Herbert Spencer's "Survival of the Fittest" is probably a better, a more precise term for what he is after, and that phrase shows up in the fifth and sixth editions of the *Origin* and has of course been regularly attributed to Darwin himself. Earlier, in the third edition, Darwin directly confronted the critique of his agential metaphor, and with a perhaps forced casual air, he there demetaphorizes it. When reduced to nonmetaphorical prose, its failure to account for agency becomes clear. The passage is worth looking at in its entirety:

> Several writers have misapprehended or objected to the term Natural Selection.
>
> Some have even imagined that natural selection induces variability, whereas it implies only the preservation of such variations as occur and are beneficial to the being under its condition of life. No one objects to agriculturalists speaking of the potent effects of man's selection; and in this case the individual differences given by nature, which man for some object selects, must of necessity first occur. Others have objected that the term selection implies conscious choice in the animals which become modified; and it has even been urged that as plants have no volition, natural selection is not applicable to them! In the literal sense of the word, no doubt, natural selection is a misnomer; but who ever objected to chemists speaking of the elective affinities of the various elements? – and yet an acid cannot strictly be said to elect the base with which it will in preference combine. It has been said that I speak of natural selection as an active power or Deity; but who objects to an author speaking of the attraction of gravity as ruling the movements of the planets? Every one knows what is meant and is implied by such metaphorical expressions; and they are almost necessary for brevity. So again it is difficult to avoid personifying the word Nature; but I mean by Nature, only the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us. With a little familiarity such superficial objections will be forgotten.[13]

The tone puts off critique by suggesting that ongoing critiques are mere nitpicking since everyone understands that metaphors of this type are commonplace in the sciences for reasons of simple convenience. Strikingly, the long passage does not directly engage the problem that is actually the

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difficulty with the metaphor – that is, agency itself. It only indicates that the evasion of the problem is very common in the language of science.

If all he really means by natural selection is "the aggregate action and product of many natural laws," how can one make a fuss about that? But of course, that's just the point. The objection is not "superficial": The shade of intention and intelligence built into the word, "selection," is actually very important to Darwin's overall argument, not merely a pretty shortcut. Its elimination here reduces "selection" to nothing more than, again, "the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us." Once Darwin de-anthropomorphizes "natural selection," so that it becomes nature, or the laws of nature, instead of the maternal figure looking after every organism, he opens himself to Samuel Butler's brilliant critique: All Darwin really says, as Butler sees it, is that natural phenomena are caused by nature – a mere empty redundancy.

All of which returns us to the Victorian preoccupation with the question of "automata," as Huxley had proposed it. The fascination about automata is precisely the question of what makes them go. As Rick Rylance puts it, the controversy over the prospect of human automatism, "familiar from the 1840s, came to a head in the 1870s when post-Darwinian debate amplified anxieties over the direction of psychological theory."[14] John Tyndall, thinking within a framework very much like Huxley's, takes up the crucial question – the relation between mind and matter. And like Huxley he cannot explain it: "For every fact of consciousness," he claims, "whether in the domain of sense, thought, or emotion, a definite molecular condition, of motion or structure, is set up in the brain."[15]

The materialist position entails a view that there is nothing in this world that is, literally, *meta*physical. Traditionally, the question of agency was not a problem in that one could posit a God, a metaphysical entity, as an initiating force. But this often entailed, as in natural theology, a vision of the world as nothing but a brute entity that came to life, like Paley's watch, because of God's will. As the Victorian materialists did their scientific work, without any consideration of the possibility of divine agency, they were left with Paley's rock. The agency they could allow had to be entirely physical. Tyndall's world, Huxley's world, thus became something like Paley's world though without God – which in effect left not only animals, but the whole world, something of an automaton.

The illusion of intentional external intervention in the workings of matter had already been dispelled by Lyell's gradualist explanations of geological change. No need for divine intervention at all to explain phenomena

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which, at first sight, seem too grand to be the result of normal natural law. In Roy Porter's words, Lyell saw himself as "the spiritual saviour of geology, freeing the science from the old dispensation of Moses."[16] While this language seems explicitly antireligious, it was consistent with the tradition of natural theology. The very respectable Lyell persisted in his religious orthodoxy; his compromise position was not so much a dismissal of religion as a compartmentalizing of it. Science and religion needed to keep to their separate spheres, a view updated by Gould's modern version of it, his idea that science and religion have nothing to do with each other, but operate, as he put it, in separate "nonoverlapping magisteria."[17] Science affirms its independence by excluding from its deliberations anything that is not matter. Even if God lay behind it all, the ultimate cause, as such division of labor allows, it must be an absentee God who mediates intention through the laws of nature.

It was not only Huxley and Tyndall, refusing the work of the absentee God, who were puzzled by the question of the relation between the material and consciousness. In the end, Darwin too was stymied. Both as in the production of literal automata and in the study of the mind, transforming into the study of the brain, all of this puzzlement reflected an effort to understand phenomena traditionally thought of as extra-material, metaphysical, as functions of material processes. Though reluctant to enter combat, not least on matters of religion, Darwin, at the end of the brilliant and difficult last paragraph of *The Variation of Plants and Animals under Domestication*, essentially banishes God from the work of evolutionary development. The climax of the two volumes is the imaginative demonstration that natural things that look designed are not designed.

With a concluding long metaphor that compares the development of organic variations to an architect's building of "a noble and commodious edifice," Darwin tries to banish intelligent design from nature. Without previously cut stone, the architect attempting to build his "edifice" chooses fragments of stone from the base of a precipice according to how they serve his purposes, just as, Darwin claims, natural selection "chooses" variations to adapt best to their environment: "These stone pieces bear the same relation which the fluctuating variations of organic beings bear to the varied and admirable structures ultimately acquired by their modified descendants." That is, they are "accidental," distinctly *not* intentional. "Can it be reasonably maintained," Darwin asks, "that the Creator intentionally ordered … that certain fragments of rock should assume certain shapes so that the builder might erect his edifice?" The answer to this spells out the argument of two volumes of close study of variations: "No shadow of

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reason can be assigned for the belief that variations, alike in nature and the result of the same general laws, which have been the groundwork through natural selection of the formation of the most perfectly adapted animals in the world, man included, were intentionally and specially guided."[18]

But this metaphor runs into problems. In the analogy, while the pieces the architect uses are "accidental," the edifice is intentionally designed and structured by the architect – but then, to what is the architect being compared? Where is the intentional agent in the other half of the metaphor? Darwin makes a forceful case for the "accidental" nature of the variations, but leaves the question of design still hanging. Although, as I have indicated, Darwin avoided direct engagement with such problems, he left the battling to his "bulldog," Huxley, and to scientific popularizers of science like Tyndall, who were always itching for a fight in their efforts to displace religious authority with the authority of the increasingly professionalized vocation of "science." But the gentleman Darwin thus left many troubling questions to be resolved, and particularly does so here, where, having demonstrated, as we have seen, that there is no intention in nature, he concludes by alluding to God after all: "On the other hand, an omnipotent and omniscient Creator ordains everything and foresees everything. Thus, we are brought face to face with a difficulty as insoluble as is that of free will and predestination."[19] Note that he carefully does not say that he believes there is such a "Creator," only that his own view here is, on the surface, at least incompatible with an omniscient God. Instead then of clamping down fiercely on the side of a more or less automatic nature, he makes a point of demonstrating his ambivalence (a rhetorical sop?) – "a difficulty as insoluble as is that of free will and destination."[20]

It was not only religion that resisted the mechanistic interpretation. As we have seen, Butler – followed by Shaw – , spoke from an entirely secular view that happily accepted the idea of evolution, but found Darwin's theory absolutely inadequate in its determination to eliminate mind and intention from evolutionary processes. While that theory, Butler thought, takes "luck" as the determinant of development and speciation, he insisted instead that the process was guided by "cunning," by what he called "inherited memory." With devilish wit, Butler accused Darwin of "pitchforking … mind … out of the Universe."[21] Darwin's theory, he believed, was "mechanical" as opposed to the "vitalistic" form of another tradition of evolutionary thinking, which he admired in Lamarck and Erasmus Darwin. Darwin's theory may describe nature a bit more elaborately than his predecessors did, but it does not tell us anything about the agency that pushes evolution. The material world,

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as Butler and many others interpreted Darwin, is populated by automata whose movements were meaninglessly produced by chance, with no intention, no direction, no purpose. The apparent design that Butler takes Darwin to have written off as the product of mere chance is, rather, the product of a form of intelligence, an intelligence manifested in what Darwin had called "instinct," but which Butler insisted was "memory." Whatever they called it, all participants in the argument agreed that it is inherited. Butler sided, then, with Darwin's grandfather Erasmus, and with Lamarck, as did Herbert Spencer, in believing that acquired characteristics are inherited and carry forward with them human desires. (It should be noted, however, that Lamarck himself is partly overinterpreted by Butler, for Lamarck does not heavily emphasize the work of intention in evolutionary development, allowing that it only enter in its later stages with humans themselves.[22])

But this secular critique of Darwin, like the religious one, and, indeed, like the view of evolution that still dominates modern evolutionary science, is inadequate to the complexity (and perhaps at times confusion) of Darwin's thinking. While it is certainly reasonable, in this respect, to think of Darwin's theory as reductive (it reduces certain distinctive human traits to mere instinctive motion), it is equally possible to think of it as expansive, one in which matter truly matters as it did to Butler, even incorporates agency in itself, without positing long-range intention and teleological design. Riskin's argument, which I have earlier quoted, gets at the heart of Darwin's ultimate escape from a vision of the crude, raw nature that ultra-Darwinism implies: Darwin was, again, "torn between the mechanist dictate to banish agency from nature and the organicist impulse to naturalize agency." It is that "profound and extraordinarily productive ambivalence" that ultimately makes Darwin's theorizing so rich and so difficult to reconcile with the Huxleyan idea of the "automata" that it seems to have inspired.

I want then to suggest several different ways, neither Butlerian nor Paleyan, in which Darwin's writing might be taken to short-circuit, or radically complicate, the connection between his theory and automatism. Unlike Huxley's, Darwin's work is threaded through with that "profound and extraordinarily productive ambivalence" that Riskin identifies. Darwin may have argued design out of the biosphere, but he had, at the same time, a feeling for life that cannot (at least, in my estimation, should not) be reduced to mechanism. I have already briefly discussed the nature of his much chronicled and ambivalent relation to his idea, his metaphor "natural selection." This metaphor, as we have seen, simultaneously disguised

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the sheer materiality of the evolutionary process and implied an agency capable of "design."

A second aspect of Darwin's thinking incompatible with the pure materialism of which he accused himself is regularly detectable in his anthropomorphism. Ironically, part of the reaction to Darwin's views was just his tendency to locate humanoid qualities in animals, thus, from traditional perspectives, degrading the human. But of course, Darwin's anthropomorphism was intrinsic, absolutely essential, to his efforts to prove that all species develop from, evolve from earlier species, eventually to be recognized as emerging from one, or few: We are all, that is, related. He had to demonstrate continuity from the "lower" organisms to the human, and tends therefore to infuse the organisms that occupy nature with a sense of intentionality that he will at the same time deny to nature itself.

A third aspect of Darwin's writing and thinking that resisted the tendency toward Huxleyan automatism manifests itself in Darwin's ambivalence toward mindless change as opposed to intentional agency. Huxley's outspoken, blithe, self-confident refusal to allow moral and theological conclusions to influence the "facts" takes the shape of a philosophical argument, a mode that Darwin only rarely uses. Both Darwin and Huxley explain evident design in nature as the effect of the laws of nature, of time and contingent change. But while in Huxley dualism is alive and well, in Darwin there is almost always a hint of doubt, a struggle. As ever, itching for the fight, Huxley aggressively pushes into battle the basic epistemological assumptions by which he was attempting to establish for himself and biological science professional status and cultural supremacy. In the Huxleyan narrative, intention and purpose will always yield to the unceasing pressure of the "cosmic process," as he called it in *Evolution and Ethics*.[23] In any Huxleyan contest between agential life and mindless cosmic laws, the mindless cosmos wins.

Darwin treads in a more gingerly manner. When he talks about instinct, which embraces several "distinct mental actions," he is reluctant to provide a complete definition. He makes an analogy with habit, and even concedes that some habits are directly transmissible: "I think it can be shown that this does sometimes happen."[24] Even as the idea of instinct seems to be another element in the attempt to dehumanize, or materialize the process, Darwin points out that "a little dose of judgment or reason, often comes into play." This, of course, is not quite Butler's effort to transform "instinct" into inherited memory. But the inherited instinct, which Huxley uses to make the case for the powerlessness of intelligence to affect physical action, is not *all* there is in Darwin's descriptions. In Darwin,

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instinct, at least sometimes, is supplemented by what is by definition not instinct, a power to react to the new: "A little dose of Judgment or reason." A little dose that in effect exempts Darwin from that Huxleyan tradition. While there is no denying that Darwin's constant goal, even against the most commonsense sort of conclusions, was to build what was really a circumstantial argument into an inevitable one for the power of natural selection over time to achieve all that design had hitherto been assumed to have achieved, he allowed that habit, emerging from repeated willed efforts, can bring about some of the changes he describes.[25]

The very heart of Darwin's theory is the effort to show the continuity of taxonomy, behaviors, expressions, feelings, from the lowest organisms to "the most exalted object which we are capable of conceiving":[26] us higher animals. Those apparently nonmaterial qualities, like intelligence and emotions, which traditionally we have taken as marks of the distinctiveness of humans, he finds present in varied forms in almost all living creatures, even in those, like worms, that seemed mere matter in motion. This view of things might take matter in two very different directions – the reductive one, in which on its own it has none but the crudest value, and the other, an expansive one, in which matter takes upon itself the values hitherto reserved for nonmaterial phenomena, like thought and feeling. Consonant with Darwin's apparently anthropomorphic tendencies in reading animal behavior, that almost all forms of life incline toward the intelligence and capacity for feeling that we honor among humans, we are now discovering that such a Darwinian view of things makes it increasingly difficult to treat most organic things like *mere* matter, objects for our use and exploitation, for our dinners. It gives to Shaw's vegetarianism a yet more substantial grounding. A sense of the sacredness of all matter, incompatible with the reductionist view implicit in automatism, can be taken to lie only half hidden in Darwin's very secular readings of nature.

Science has increasingly focused its attention on the intelligence and capacity for feeling of a widening range of creatures. Octopuses and elephants have been getting a lot of attention. The minds of birds are being explored with wonder. Studies have been made arguing or demonstrating the capacity for altruism in apes, toolmaking ability in crows, and we have even pushed beyond that. Jane Bennett, reacting not only to environmental disasters but to the earth-friendliness of ecology, proposes a theory of "vibrant matter" that begins, in a Spinozan way, to blur the line between living organic and mere brute matter.[27] Darwin, of course, does not go nearly that far, but his microscopically close study of natural phenomena opens the way to such a view.

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Bennett uses Darwin's "worms" as a key example, and justifiably. She does not, of course, argue that worms intentionally work "to enable human culture," which Darwin shows they significantly manage to do. But, according to Darwin, "worms have played a more important part in the history of the world than most persons would at first assume."[28] As Bennett puts it, this can be taken as the "unplanned result of worms acting in conjunction and competition with other (biological, bacterial, chemical, human) agents."[29] Nevertheless, Darwin's close observation of worms leads him to believe that their actions are *not* – as would, by definition, be expected of instinctual behavior – the result "of unvarying inherited impulse."[30] Part of the remarkable charm of Darwin's last (and surprisingly most popular book) is that intimate views of worms' ways show them to be acting with intention, responding to the requirements of different conditions. Worms, as it were, become "characters" inside narratives, and not entirely predictable, even on the matter of whether they draw leaves into their burrows by their pointed ends – which they normally and quite sensibly do. Darwin's worms, it seems, intelligently "improvise." Luck, or cunning, as Butler asked – the worms, it seems, are after all rather cunning. The ostensibly insensible world of worms, about the closest thing to mere matter among organisms, is full of agency and intelligence, after all. Worms are not automata. One might argue, following Bennett, that neither are Huxley's frogs.

A fourth kind of resistance to pure materialism in Darwin emerges more clearly and forcefully in an area with which I will be concerned for the rest of my discussion here: His theory of sexual selection, which has only fairly recently been given the kind of attention that its important role in evolution has deserved. That theory quite specifically gives members of the species some power in shaping their own evolution. It almost immediately became a troubling theory, and one that evoked resistance even from Darwin's intellectual allies.

But all of these – his dominant metaphor, "natural selection," his anthropomorphism, his recognizing more than instinct even in the lowest organisms, and his theory of sexual selection ironically tend to give back to nature what Darwin has so often been interpreted as denying it. While he never allowed agency from outside the material world that was his subject, he did, however contradictory it might seem, allow for forms of agency, and agency coming from the very place of consciousness and intention and desire that Huxley insists have no effect on what we actually do. There are tendencies in Darwin's writing that reinfuse matter with value and short-circuit the idea that his views emptied the world of intelligence and meaning.

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Sexual Selection and Lamarckian Evolution

Sexual selection, from its first introduction in the *Origin*, has been a troublesome theory. It seemed in some ways to contradict Darwin's dominant argument – the centrality of natural selection to the processes of evolution. It might be read – as I will read it here – as an alternative to the view that Darwin's materialist theory entails the exclusion of any agency but "nature," and thus logically also implies the Huxleyan option: Perhaps we are all machines, automata. Certainly, the main stream of post-Darwinian evolutionary theory resisted the very idea that sexual selection plays a serious role in speciation, and found, and continues to find ways to assimilate its apparent effectiveness to natural selection.

Without more elaborate explanation, a phenomenon that has no useful, no practical purpose is very unlikely in nature, where there is always a cost in expenditure of energy that, for survival, must be balanced with a reward. The argument that Alfred Russel Wallace made, as did many others resistant to the idea that sexual selection has so important a role in evolutionary history, is that the extravagant display of many male animals is an honest signal, received by the selector, and leading her to choose the mate most likely to produce the most and the best offspring. So the extravagant and dangerous plumage and behavior of courting male birds contribute to survival through their superior powers of productivity and adaptability. On this accounting, and the accounting of most contemporary evolutionary biology, sexual selection is functional in just the way natural selection is – simply a more elaborate way toward adaptation. Will, choice, whim are out of court. Conformable as this is to modern science's rigorous reading of the way nature works, it does not do justice to what Darwin was saying.

For Darwin, certain evolutionary developments could not be explained by the working of natural selection alone – most particularly the differences between the sexes in secondary sex characteristics. His horror at the sight of a peacock resulted from its inexplicable, gorgeous plumage, which clearly made it more vulnerable to depredation, and thus incompatible with the rigors of natural selection. The development of variations that improve the ability to combat made sense in the world of natural selection, but what could possibly account for variations that make the males more, not less vulnerable. Only sexual desire might explain it. And given the various and elaborate courting procedures that we see among birds – the female bird's rejection of many, selection of one – Darwin reasonably infers that the gaudy ornamentation develops under the pressure of female desire.

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For Wallace and today's ultra-Darwinians, while it might have looked like sexual selection to Darwin, it is really just another version of natural selection, governed by the usual cost–return mechanisms of nature. That is why the female of the species, however great a risk the male might take, tends to remain drab. The female need not show off; there is no urgency, given that, as Darwin puts it, the males are more or less indiscriminately "eager." There will always be males ready to help in reproduction, and the female instinctively chooses the one that will most obviously be successful in the process, but in doing so she avoids the risks she imposes on the male by remaining drab, hidden. So, the problem that Darwin's theory faced, as Wallace and then most of the scientific establishment rejected it, was that sexual selection and natural selection not only were different; at times they contradicted each other.

No wonder that sexual selection was almost immediately attacked on all sides, by those friendly to Darwin's ideas, like Wallace, or hostile to them, like St. George Mivart. Sexual selection, unlike natural selection, is not a metaphor. It identifies an intelligent agent. And, horror of horrors, that agent turns out, most of the time, to be a female. So, the theory threatened to contradict Darwin's own emphasis on "natural selection" as the dominant, if not exclusive, evolutionary force. It also challenged cultural norms by giving that power of "choice" to the female of the species, with the unlikely argument that the female had a fine aesthetic sense. And worse, the female choice of suitors seemed to Wallace and others "arbitrary," a quality entirely incompatible with full commitment to natural selection, where usefulness always determines adaptive success. Darwin's insistence, against his own instincts about the intellectual weakness of women and the explanatory power of natural selection and also against the majority of scientists and critics, crosses what was to be called the "Weismann barrier" by implying that what we do now, what we desire, how we act on that desire, can be inherited and can affect the directions of evolutionary change. Contra Huxley's materialism, it suggests that conscious will actually can affect physical qualities.

And there is the other crucial question: How was it possible that so unadaptive a quality as "beauty," or fancy display, could survive the depredations of natural selection. It was not until well into the twentieth century that Ronald A. Fisher, by demonstrating mathematically how arbitrary choice might, through the mating process, survive those inevitable depredations, made the idea of sexual selection's role in evolution scientifically respectable,

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Note that from the first, when he introduced the subject in the *Origin*, Darwin was careful to distinguish sexual from natural selection. He makes the distinction but does not suggest or infer from that difference that the two "selections" were incompatible. In sexual selection, he wrote, the result of the struggle between the males for possession of the females "is not death to the unsuccessful competitor, but few or no offspring. Sexual selection is, therefore, less rigorous than natural selection."[31] What is also not explicit in his discussion, emphasizing "struggle" between the males, is that the males too are driven by desire and take great risks in yielding to it. And even after winning the battle, the male has work to do; he has to win the female through courtship. The real complications are implicit but not announced when Darwin asserts that the females "often take individual preferences and dislikes."[32]

That phrase, "individual preferences and dislikes," is the heart of the problem, since it introduces, quietly enough, something of the arbitrary, and awards to the will considerable power toward the physical changes involved in speciation. The presence of these rather nonmaterial forces (remember, Huxley and Tyndall exclude the possibility that nonmaterial forces could ever affect material ones) drives a yet deeper wedge between sexual and natural selection. Fisher, saving sexual selection from critiques like those of Wallace, argues that the "preference and dislikes" were, initially, geared to the health, vigor, and survival qualities of the suitor, but then, inevitably, got separated from that very adaptive function.[33] Nevertheless, sexual selection, particularly as it is discussed by Elizabeth Grosz, but yet more importantly for my purposes, Richard Prum, entails intention and desire and will. It suggests what mainstream evolutionary biology long resisted, that there are ways to get around the power of natural selection – up to a point, that is, as Mr. Brooke in *Middlemarch* might have put it. Fisher, much later, showed how that was possible.

We are on the edge here of a Lamarckian understanding of evolutionary possibilities, for mate choice in sexual selection entails a member of the species choosing the way she (it is usually a "she" doing the choosing), wants her partner to look and behave and consequently determining to a large extent how offspring will look and behave. By choosing generation after generation the partners whose plumage or performance most appeals to them, females increasingly heighten their demands on potential mates. Slight changes gradually accumulate, and these changes are passed on to their young.

This view of evolutionary possibility was difficult enough both for Darwin and his readers to accept because it implies a process not fully

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controlled by natural selection, but even worse, it implies that females and female desire and taste determined these striking, apparently anomalous developments. Oddly, it was in part because Darwin held female intellectual and aesthetic power so low that he managed to hang on to his theory against the widespread rejection he encountered. "No doubt," he writes, after describing female contributions to the development of their species, "this implies powers of discrimination and taste on the part of the female which will at first appear extremely improbable; but by the facts to be adduced, hereafter, I hope to be able to show that the females actually have these powers."[34] Perhaps not happily, Darwin sticks to his point as the only way to explain the peacock.

"In defense of this reading of female evolutionary agency," Darwin writes,

> Many will declare that it is utterly incredible that a female should be able to appreciate fine shading and exquisite patterns. It is undoubtedly a marvelous fact that she should possess this almost human degree of taste. He who thinks he can safely gauge the discrimination and taste of the lower animals may deny that the female Argus pheasant can appreciate such refined beauty; but he will be compelled to admit that the extraordinary attitudes assumed by the male during the act of courtship, by which the wonderful beauty of his plumage is fully displayed, are purposeless, and this is a conclusion which I for one will never admit.[35]

Evolution by way of mate choice in sexual selection introduces just those elements of intention and desire in agency that the Weismann barrier and ultra-Darwinism reject. The bird becomes an agent.

In an extended and brilliant passage imagining the way the Argus pheasant developed its extraordinary plumage, Darwin argues that the bird "affords good evidence that the most refined beauty may serve as a sexual charm and for no other purpose."[36] Yet the gaudiness of the "refined beauty" makes the bird a sitting duck, very vulnerable prey. Darwin in effect devotes the whole of *The Descent of Man* to working out how this seemingly purposeless extravagance, in the face of the dangers to which it exposed the bird, might possibly have evolved. Against the power of sexual selection that Darwin spent most of the *Descent* attempting to demonstrate, Darwin was intruding the mere whim of sexual desire, desire that had no end but the satisfaction of itself.

I do not propose, as a layman exploring cultural ground, to intrude into the scientific debates about evolution and the processes of selection. Rather, I am interested in considering whether Darwin's own work, so often characterized as rigidly "materialist," so rigidly determined by his

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commitment to the power of natural selection, can legitimately be taken as denying the agency of intelligence, will, even whim, in the unfoldings of evolution. "Individual preferences and dislikes" are essential to Darwin's way of looking at nature, and thus his view belies the Huxleyan option that we are all automata. Darwin's theory, contrary to how it has been interpreted and reinterpreted in this history of evolutionary biology, makes of the evolutionary process something other than the "hogwash" that Shaw inferred from it.

Prum describes the work of Amotz Zahavi, who argued that "sexual selection is effective because it improves the ability of the selecting sex to detect quality in the selected sex."[37] Zahavi saves the idea that the elaborate male displays are "honest signals." As Prum puts it, Zahavi believes that "the individual who is attracted to a mate with such costly traits is responding not to its subjective beauty, which is incidental to its costs, but to what it tells her about the male's ability to rise above its costs."[38] The extravagant and dangerous plumage and behavior of courting male birds are "honest signals" of superior powers of productivity and adaptability. It may be that a Darwin come back to the twenty-first century would after all embrace Zahavi's theory, but the Darwin of 1871 insisted on the "no purpose" and allowed for the free play of individual preference. The choosing female is anything but an automaton.

Darwin, for his part, accounted for what he too regarded as the silliness of choosing mates who are particularly vulnerable to predators by attributing it to "fashion." Evelleen Richards notes how "the fashion metaphor was crucial to his thoroughgoing identification of animal breeder with sexual selection."[39] In a long, illuminating chapter, Richards demonstrates the importance of the idea of fashion to Darwin's thinking, and the way his very disrespect for female intelligence allowed him to attribute to females the power to choose and to shape species destiny.

Domestic breeders too designed the races their breeding strategies produced on the lines of fashion. The pug nose on a dog carefully bred has no value for survival except that the breeder is attracted by the dog's form. Darwin makes this analogy – both female bird in the wild and domestic breeder at home are governed by the whims of fashion, not by the strenuous cost accounting of natural selection. But this analogy, even if it implies some distaste for "fashion," is further indication of how mate choice in sexual selection, probably against Darwin's own preferences, implies an almost Lamarckian tendency in his thinking.

We recall that against the advice of thinkers like Wallace, Darwin begins his *Origin* with consideration of domestic selection. Conceding

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that domestic selection and "selection" in nature are quite different, Darwin manages brilliantly to lay out the means by which the choice of small gradations by breeders allows for the development of notoriously odd variations, like the pouter pigeon, inconceivable in a state of nature. And Darwin goes on to argue that the same processes take place in the wild, where nature is the selector. But the breeder, unlike nature, is also in quest not of the fittest but of the most fashionable; and within the limits of domestication it is possible to breed variations, races, that would not survive in the wild. In sexual selection in nature, the female bird, the peahen, the female of the Argus pheasant, can push the male to the limits of variation that will allow survival. All for the sake of fashion. The irrationality that Darwin assumes in the female turns out to be an effective, if arbitrary, agent, deriving not from the forces of natural selection or instinct, but from desire, indeed, aesthetic preference. Natural selection loses out for a moment, at least, to the whims of the ladies.[40] And the ladies, it seems, have wills of their own, wills that amazingly shape the development of new species but without the adaptability that marks all evolutionary development by natural selection. While sexual selection, as Darwin explained it from the start, is a weaker force than natural selection, in Darwin's elaboration of its workings, it becomes striking evidence that the pursuit of "fitness," "adaptability," via natural selection is not the only force in nature leading to evolution. Darwin even tries to demonstrate – a point that Prum elaborates by way of contemporary scientific evidence – that it does not always follow that the strongest either manages to win the female over or, having managed, helps breed the most and the strongest offspring. As Darwin notes, in many cases, "males have acquired their present structure, not from being better fitted in the struggle for existence, but from having gained an advantage over other males, and from having transmitted the advantage to their male offspring alone."[41] Wonderfully, the very sensible Darwin, arguing that many secondary sex characteristics depend on "the will, choice, and rivalry of the individuals of either sex," concludes firmly, and against majority opinion, "we cannot doubt that, though led by instinct, they know what they are about, and consciously exert their mental and bodily powers."[42]

The striking thing about Darwin as he struggled to account for phenomena that couldn't immediately be explained by natural selection, is that even in spite of his own inclinations and prejudices – his lifelong struggle to prove the reality and pervasiveness of natural selection – he did what Huxley in his automaton essay enjoined when confronted: "the only question which any wise man can ask himself, and which any honest man will

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ask himself, is whether a doctrine is true or false."[43] Darwin "adduced" the facts and followed what he took to be indisputable evidence that seemed to belie his own beliefs.

While Darwin's attitudes toward these phenomena are mixed and sometimes even self-contradictory, in the light of his views on sexual selection it is hard to argue what Butler so strongly believed, that he expelled mind from nature, from the world. His is no land of "hogwash," and we should remind ourselves that Shaw did not so much blame Darwin, but the science that took Darwin's theories to the world of ultra-Darwinism from which, indeed, intelligence is consistently expelled. Darwin is not responsible for the various ways his theories have been used, except insofar as he was himself not entirely consistent. But the full world of Darwinian evolution is rich with wonders and with life, and while he certainly tried to separate himself from Lamarck at every opportunity, let me dare to suggest that as one reads his arguments for sexual selection, his stunning explanation of how the ball and socket designs on the Argus pheasant's wings might have developed, it is hard not to believe that he had just a touch of Lamarck in him, the Lamarck who affirmed evolutionary development "according to which living forms developed gradually and contingently, driven by their own inner agencies."[44]

Notes

1 Charles Darwin, *Charles Darwin's Notebooks, 1836–1844*, ed. Paul H. Barrett et al. (Cornell University Press, 1987), 291; Notebook C, 166.
2 T. H. Huxley, "On the Hypothesis the Animals are Automata, and Its History," in *Methods and Results* (London: Macmillan, 1874), 243.
3 Ibid., 244.
4 Ibid.
5 J. Scott Turner, *Purpose and Desire: What Makes Something "Alive" and Why Modern Darwinism Has Failed to Explain It* (New York: HarperCollins, 2017).
6 Jessica Riskin, *The Restless Clock: A History of the Centuries Long Argument over What Makes Living Things Tick* (University of Chicago Press, 2016), 215.
7 Ibid., 215.
8 Stephen Jay Gould, "Response to *Darwin's Dangerous Idea: Evolution and the Meanings of Life*," *New York Review of Books*, 44, no. 10 (June 1997), https://libcom.org/article/darwinian-fundamentalism.
9 Riskin, *Restless Clock*, 280, 277.
10 Daniel Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (New York: Simon & Schuster, 1995), 48–60 and *passim*.
11 Robert Richards, *The Romantic Conception of Life: Science and Philosophy in the Age of Goethe* (University of Chicago Press, 2002), 516.

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12 Ibid., 515.
13 "Online Variorum of Darwin's *Origin of Species*: *Second British Edition* (1860), Page 81," Darwin Online, http://darwin-online.org.uk/Variorum/1860/1860-81-c-1861.html.
14 Rick Rylance, *Victorian Psychology and British Culture, 1850–1880* (Oxford University Press, 2000), 91.
15 John Tyndall, "Scientific Materialism," in *Fragments of Science*, vol. 2 (New York: D. Appleton & Co., 1899), 86.
16 Roy Porter, "Charles Lyell and the Principles of the History of Geography," *The British Journal for the History of Science* 32, no. 2 (July 1976): 91–103, p. 91.
17 See Stephen Jay Gould, "Non-Overlapping Magisteria," *Natural History* 106 (1997): 16–22.
18 Charles Darwin, *The Variation of Animals and Plants under Domestication,* 2 vols. (New York: D. Appleton & Co., 1900), 2: 415.
19 Ibid., 2: 414.
20 Ibid., 2: 415.
21 Samuel Butler, *Luck, or Cunning as the Main Means of Organic Modification*?, 3rd ed. (London: Jonathan Cape, 1922), 18.
22 See the introduction by Richard W. Burkhardt, Jr., to J. B. Lamarck, *Zoological Philosophy* (University of Chicago Press, 1984), xxxi: "What counted for Lamarck in the way animals responded to their environments was not the *desires* of the animals but rather their habits."
23 Thomas Henry Huxley, *Evolution and Ethics* (London: Macmillan & Co., 1893), 5.
24 Charles Darwin, *On the Origin of Species*, facsimile of the 1st ed. (Cambridge, MA: Harvard University Press, 1964), 209.
25 Ibid., 209.
26 Ibid., 459.
27 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010).
28 Charles Darwin, *The Formation of Vegetable Mould Through the Action of Worms, with Observation of Their Habits* (London: John Murray, 1883), 308.
29 Bennett, *Vibrant Matter*, 96,
30 Ibid., 96.
31 Darwin, *Origin*, 88.
32 Ibid., 89.
33 Richard O. Prum, *The Evolution of Beauty: How Darwin's Forgotten Theory of Mate Selection Shapes the Animal World – And Us* (New York: Doubleday, 2017), 36. I owe most of the material about Fisher to Prum's account.
34 Charles Darwin, *The Descent of Man, and Selection in Relation to Sex*, 2nd ed. (London: Penguin Books, 2004), 246. This edition of the book, originally published by Murray in 1871, suggests in its revision that Darwin was carefully defensive of his claim for female choice. The first edition version of this sentence reads, more sparely, "No doubt this implies powers of discrimination and taste on the part of the female which will at first appear extremely

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improbable; but I hope hereafter to shew that this is not the case": Charles Darwin, *The Descent of Man, and Selection in Relation to Sex*, 1st ed. (Princeton University Press, 1981), 259.

35 Darwin, *Origin*, 450.
36 Ibid., 449.
37 Prum, *Evolution of Beauty*, 45.
38 Ibid., 45.
39 Evelleen Richards, *Darwin and the Making of Sexual Selection* (University of Chicago Press, 1995), 220.
40 Elizabeth Grosz deals at length with the relation between sexual selection, particularly female choice, and aesthetics in several important volumes, particularly, *Becoming Undone: Darwinian Reflections on Life, Politics, and Art* (Durham, NC: Duke University Press, 2011). See also my essays, "Why Beauty Matters," *Victorian Literature and Culture*, 47, no. 1 (Spring 2019): 243–65; and "Victorian Excess and the Darwinian Aesthetic," *Victorian Studies*, 62, no. 1 (2019): 9–34.
41 Darwin, *Descent*, 244.
42 Ibid., 243.
43 Ibid., 244.
44 Riskin, *Restless Clock*, 251.

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