SAMUEL BUTLER'S CONTRIBUTIONS TO BIOLOGICAL PHILOSOPHY

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Samuel Butler, *Life and Habit* (London: Trübner, 1878)

Samuel Butler, *Evolution Old and New; or, The Theories of Buffon, Dr. Erasmus Darwin, and Lamarck, as Compared with that of Mr. Charles Darwin* (London: Hardwicke and Bogue, 1879)

Samuel Butler, *Unconscious Memory* (London: David Bogue, 1880)

Samuel Butler, *Luck, or Cunning, as the Main Means of Organic Modification?* (London: Trübner, 1887)

Samuel Butler is chiefly remembered for *Erewhon*, widely rated among the best English satires. He also wrote another novel and books of history, travel, and art. His paintings were exhibited at the Royal Academy. In addition, he made a substantial contribution to philosophical biology, having unfolded in four books the last and best statement of the evolutionary thesis associated with Lamarck. He became a satirist captured by a serious thought, which occasionally he did not know how to express except in a tone suggesting satire.

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Butler was not presenting science for a popular audience but deliberately intervening in the scientific argument about Darwinism, despite conspicuously lacking scientific credentials. He was an intelligent scholar with a lot of free time, which he liked to spend in the Reading Room of the British Museum. Even though he had no training in scientific biology, he had experience raising sheep, and he knew how to read a book, even one by a scientific author.[1] E. S. Russell, his best reader among the biologists, describes Butler's combination of "extreme intellectual subtlety with childlike simplicity of outlook," saying that he "brought to bear upon the central problems of biology an unbiased and powerful intelligence, and his attitude to these problems is, because it is that of a cultivated layman, singularly illuminating."[2]

Surprised by the success of his first venture, *Life and Habit*, Butler committed himself to the project of developing an alternative to Darwinism, which he did in three additional volumes. These are the works canvassed in this "delayed book review."[3]

The Satirist's Complaint

"I know nothing about science," Butler writes (*LH*, 300–301), and he defines his approach in *Life and Habit* as "artistic": "May not what is commonly called a scientific subject have an artistic value which it is a pity to neglect?" (*LH*, 302). Does artistic value include the art of the joker? He says that his friends "have complained to me that they can never tell whether I am in jest or earnest." He was, after all, the author of *Erewhon*. But he insists he is "in very serious earnest, perhaps too much so, from the first page of my book to the last" (*LH*, 305). Of course, a satirist might well say so. *Satirist* is a label difficult to shake off, and Butler does not help his case when he advises the reader, "I admit that when I began to write upon my subject I did not seriously believe in it" (*LH*, 306). Looking back ten years later, he says that the main argument of *Life and Habit* "was considered so startling a paradox that people would not believe in my desire to be taken seriously" (*LC*, 45). That reception, at least among scientists, was confirmed by

1. In 1859, after going down from Cambridge, Butler refused ordination and emigrated to New Zealand, where he remained almost five years. He raised sheep, did well, sold out, returned to England, invested his profit, and lived on the income for the rest of his life.

2. Russell, *Form and Function*, 335.

3. Butler's works are cited in the text from the modern editions listed in the References, using these abbreviations:

DD: "Deadlock of Darwinism"

E: *Erewhon*

EON: *Evolution Old and New*

LC: *Luck; or, Cunning*

LH: *Life and Habit*

NB: *Note-Books of Samuel Butler*

UM: *Unconscious Memory*

Marcus Hartzog, a zoologist and friend of Butler's, who wrote that *Life and Habit* was "received by professional biologists as a gigantic joke—a joke moreover not in the best possible taste" (*UM*, x).[4]

The question Butler poses in that book is whether the unconsciousness characteristic of habitual action throws light on embryonic development, instinct, or the evolution of species. *Life and Habit* opens with an extended reflection on habitual action, taking as one example the not impossible case of a pianist playing a four-part fugue while carrying on a conversation. The performance is (let us say) flawless, yet each note requires some attention and volition. Since pianists cannot become conscious of their attention without interrupting the play and slowing down, we may conclude that the attention and volition of fluent playing are unconscious. From this and other examples taken from everyday experience, like handwriting or walking while avoiding obstacles, Butler draws his first conclusion: consciousness implies novelty and doubt and vanishes when knowledge becomes perfect, which is his definition of habit. The better we know a matter, the less conscious we are of knowing anything, and the less we know the more conscious we are of the little we *do* know. Human nature mocks epistemology. We know best what we least think we know and hold most strongly what we are least capable of proving.

At this point, Butler proposes a new analogy, between the unconscious proficiency of everyday habit and those acts we have been able to perform almost from birth without benefit of practice. A newborn cannot eat but can swallow and breathe. Vision, hearing, digestion, and heartbeat are all processes of extreme intricacy and almost entirely beyond conscious control. Might this unconsciousness arise from overexperience, the way it does in habits, "as though somewhere or at some other time there must have been more practice than we can account for" (*LH*, 45)? We call such actions *instincts* and say that the infant swallows instinctively. But doing so merely puts a name to our ignorance. What is instinct, that it can do such things?

Butler has a simple answer: instinct is memory. What is done instinctively is based on an unconscious memory of what was done in the past: "Instinct is only the epitome of past experience, revised, corrected, and made perfect, and learnt by rote" (*LH*, 211). Instincts are inherited—products of heredity—which means that heredity, too, is memory. Clarifying the point in *Luck, or Cunning* (1887), his final work on biological philosophy, Butler writes: "All hereditary traits, whether of mind or body, are inherited in virtue of, and as a manifestation of, the same power whereby we are able to remember intelligently what we did half an hour,

4. This generalization is not entirely true. Reviewing *Life and Habit* in the journal *Nature*, Alfred Russel Wallace called it a "remarkable book," notable for "originality" and "logical completeness," and found it "in great part complementary" to Darwin. Wallace, "Organisation and Intelligence"; see also Pauly, "Butler and His Darwinian Critics."

yesterday, or a twelvemonth since, and this in no figurative but in a perfectly real sense" (*LC*, 14).

The idea is not completely original.[5] Between 1860 and 1910, versions of a mnemic theory of heredity were advanced by Ewald Hering, Francis Darwin, Richard Semon, and others. Butler seems to have found his own way to this argument—and then, when he learned of Hering's earlier work, he translated and published Hering's lecture on the mnemic theory. In an age before genetics, this argument was an important advance for Lamarck over Darwin, promising a scientific understanding of what is called "the inheritance of acquired characteristics," a pillar of Lamarckism.

It was at this time widely agreed that what one generation must discover and practice, a later generation may inherit unpracticed. That was commonly regarded as a fact but also considered baffling. How does it work? How does parental experience inform the offspring's body from birth? Butler's mnemic theory explains the process nicely: "Offspring and parent, being in one sense but the same individual, there is no great wonder that, in one sense, the first should remember what happened to the latter" (*LH*, 185). Once an offspring is a new and separate personality, it tends to remember what it did when still a part of its parents, just as soon as it finds itself again in similar circumstances. E. S. Russell adds, in *The Interpretation of Development and Heredity* (1930), that unconscious organic memory is an attested fact, for instance when muscle grows stronger by use and increases in size: "This law of functional adaptation holds good for most organs and tissues, and is clearly a manifestation of organic memory."[6] A mnemic theory holds that heredity is like learning, with the experience extremely telescoped. Each embryo "remembers and is guided by the profounder impressions made upon it while in the person of its parents" (*LH*, 302).

Mnemic heredity is the transmission of energy rather than substance, which makes it an alternative to particle theories of heredity, like Darwin's theory of pangenesis. It also appealed to the Lamarckian view of life and evolution rather than to Darwin's. Practically every evolutionist agreed that the inheritance of acquired characteristics was a fact and wanted explanation. Even though he appealed to it in his own arguments, Darwin could not explain such inheritance. What he did instead was to treat acquired characteristics as supplementary, the principal cause of evolution being luck in random variations. Butler opposed Darwin on this point with tenacity and invention.

Many qualities of embryonic development seem to express ancestral habit, including elegant orderliness, automaticity, and relative independence of environment: "The mnemic theory," Russell wrote, "is the only one that gives any

5. Russell, *Development and Heredity*, 112–59; Gould, *Ontogeny and Phylogeny*, 96–100.

6. Russell, *Development and Heredity*, 125.

explanation of the historical basis of development, and it throws much light upon this important conservative element in form-production."[7] The idea that development is unconscious, organic memory of past experience explains why in the first period of embryonic development structure is formed in advance of functioning—why, for instance, an embryo should start growing lungs, as if it knew it would need them. Memory also explains why development follows routine paths in an orderly succession. It is the repetition of habits, an unconscious habit-memory of ancestral experience, even in cells.

If a fertilized ovum is continuous with the man of eighty years into which it develops, then each fertilized ovum should be regarded not as descended from, but rather as continuous with, the personality of every ovum in the chain of its ancestry. The regress cannot stop short of what Butler calls the primordial cell. As literally as we are the same from one day or decade to the next, each of us is that primordial cell, which never died but has instead differentiated into the species of terrestrial life. Memory and heredity require continuous personal identity. Hence, there is a personal, psychological continuity between an infant and its ancestors, all the way back to the beginning of life on earth: "Every human being," Butler argued, "is still but a fresh edition of the primordial cell with the latest additions and corrections" (*LH*, 306). Butler's delight with his own argument is palpable: "All this has come of admitting that a man may be the same person for two days running!" (*LH*, 307). That remark is the sort that made readers suspect he was having them on, but he was not. He was, as he said, in very serious earnest.

Every human being is a new edition of the primordial cell, and what is true for us is true for our cells. They are not descendants but rather continuants of ancestors: "Each cell in the human body, is a person with an intelligent soul, of a low class, perhaps, but still differing from our own more complex soul in degree, and not in kind" (*LH*, 109). There remains no difference between "organic" and "inorganic." Later, in his book *Unconscious Memory*, Butler referred to *Life and Habit*, where he had written that "matter which cannot remember is dead." He then modified his wording, which, as it stood, he said, implied "that there is such a thing as matter which cannot remember anything at all, and this on fuller consideration I do not believe to be the case" (*UM*, 175). We should, he insisted, "see every atom in the universe as living and able to feel and remember, but in a humble way" (*UM*, 176).

Is Evolution Luck, or Cunning?

Butler was no crank. He thought well and deeply about Darwin's theory, but he refused to surrender one of the best English prose styles of the later nineteenth

7. Russell, *Development and Heredity*, 131.

century to the affectations of objectivity and the verbal gestures of scientific style. As a result, he was predictably dismissed as a noisy amateur. Yet no less knowledgeable a life scientist than William Bateson described Butler as "the most brilliant, and by far the most interesting of Darwin's opponents."[8] Butler had two arguments, one with Darwinism, the other with Charles Darwin. Butler's criticism of Darwinism is first stated in *Life and Habit*, revisited in *Luck, or Cunning?*, and expanded in "The Deadlock of Darwinism." The second argument emerged from Butler's study of the history of evolutionary thought, which led him to a critical view of Charles Darwin's place in that history.

To appreciate this second, more personal argument, I must establish some terminology. *Natural selection* refers to the way that some limited portion of a generation lives to reproduce while the rest do not; it is a *selection* (by elimination) that, assuming a constant environment, depends on heritable differences in the reproducing generation. So, the term *natural selection* means *exactly* what the term *survival of the fittest* means. These are equivalent expressions for the same process. I say this because Butler rightly complains that some evolutionists, not least Charles Darwin, write as if one of these explains the other. Butler painstakingly collated all the editions of *Origin of Species* to compile evidence of Darwin's tendency to say or suggest that natural selection is a *means*, a *cause* of fitness; for instance, Darwin refers to natural selection as "the most important but not the exclusive means of modification" (*EON*, 351).

The generational winnowing performed by natural selection had been recognized as a source of change in species ever since evolutionary change was envisioned at all, first with Buffon. Animals and plants descend with modification, and the best adapted survive. When Charles Darwin presented his theory as "the origin of species by means of natural selection," he announced a theory much like that of Erasmus Darwin and the Chevalier Lamarck. What is distinctive about Charles Darwin's contribution to the theory of evolution is not "natural selection" or "survival of the fittest," but rather natural selection *from fortuitous variations*.[9] For Darwin, the real *origin* of species, the cause of the variations on which natural selection operates, is *luck*, whereas for Lamarckians like Butler it is *cunning*.

What would happen if, as Darwin says, natural selection had nothing to operate on except whatever variations randomly arise in a breeding population? Butler speaks from his experience of breeding sheep in New Zealand when he observes that, under such conditions, "all the 'natural selection' in the world would not prevent stagnation and self-stultification." What is missing from Darwinism and pulls Butler and others to Lamarck is the demand for "something

8. Bateson, "Heredity and Variation," 88.

9. *Fortuitous* or *random*, in this context, refers to random genetic drift. On the role of chance in theories of evolution, see Sober, *Nature of Selection*, chap. 4.

over and above the power to vary, which should give a definite aim to variations" (*LH*, 281–82). A principle must underlie variation to hold selection on a steady course, which is what Butler thinks ideas on memory and continued personality bring to the theory, ensuring a definite tendency for variations: "The evolution of species without the concomitance and direction of mind and effort is as inconceivable as the independent creation of every individual species" (*DD*, 253).

Such views are called "Lamarckian," and Butler agrees that he is saying pretty much what Lamarck said (*LH*, 245), even though he knows that "to mention Lamarck's name in the presence of the conventional English society naturalist has always been like shaking a red rag at a cow" (*LC*, 235). The true origin of species—that is, the source of variations among which nature selects—"must, as Lamarck insisted, be looked for in the needs and experiences of the creatures varying" (*LH*, 263). Variations are due not to the accidental accumulation of fortuitous modification (luck) but are instead the outcome of need and an organism's response to it (cunning). Merely to feel a need or fear is enough for an organism to try to change. Some will be better able to change than others, and they will have an evolutionary advantage that comes to them from cunning.

Authorities laud Darwin for finding a cause of evolution—indeed, a material or mechanical cause. They say that Lamarck had either no theory of the cause, or some inane theory. Butler sets the record straight with an admirable epitome of Lamarck's theory of the cause of evolution:

> Change in surroundings changes the organism's outlook, and thus changes its desires; desires changing, there is corresponding change in the actions performed; actions changing, a corresponding change is by-and-by induced in the organs that perform them; this, if long continued, will be transmitted; becoming augmented by accumulation in many successive generations, and further modifications perhaps arising through further changes in surroundings, the change will amount ultimately to specific and generic difference. Lamarck knows no drug, nor operation, that will medicine one organism into another, and expects the results of adaptive effort to be so gradual as to be only perceptible when accumulated in the course of many generations. (*LC*, 228)

Variations in survival due to need-driven effort can be a cause of evolution only when combined with memory across generations: "Mind, or cunning, is a great factor in the achievement of physical results," but solely when there is "an abiding memory between successive generations," for only then can one say that "the cunning of an earlier one enures to the benefit of its successors" (*LC*, 114). That element is missing in Lamarck and distinguishes Butler's contribution.

Butler gently diminishes, as "an unnecessary adjunct" to the theory, Lamarck's idea of "an inherent tendency towards progressive development in every low organism" (*LH*, 254). He is referring to Lamarck's idea of "an order followed by

nature in bringing the various species into existence," which is an order of rising perfection, understood in terms of complexity of organization. Ideally, ascending complexity charts a straight line from monad to man, except that "nature is forced to submit her works to the influence of their environment, and this environment everywhere produces variations in them."[10] Thus, for Lamarck, evolution, or descent with modification, is not entirely the result of the organic response to need. There is superimposed on this environmental cause an inherently progressive tendency to greater complexity. Lamarckian use-inheritance explains the adaptive differences between, say, wolves and bears, but not the difference between fish and mammals, which is of a progressively higher order and, to Lamarck, indicates an independent vector of evolution. Butler judges this progressive tendency to be gratuitous. He retains Lamarck's theory of variation but drops the impetus to progressive complexity. He does not deny the progressive character of evolution; he denies only that it requires a special cause distinct from that which adapts life to its surroundings.

English opponents of Lamarck relished the evidence August Weismann developed against the inheritance of acquired characteristics. Butler discusses this work in his last publication on evolution, "The Deadlock of Darwinism" (1890). Weismann explains heredity as the transmission across generations of a substance (called a "germ-cell" or "germ-plasm") with a definite (albeit unknown) molecular constitution.[11] Future germ cells are segregated at a very early larval stage, after only a few divisions, and remain sequestered until reproduction begins. The inheritance of characteristics a parent acquires in life is therefore impossible. Nothing that affects the soma cells of the individual body penetrates to the germ cells, which is sequestered like daughters in a harem.

This argument was enthusiastically received in England. Darwin never did renounce the inheritance of acquired characteristics, which was a difference from A. R. Wallace, Darwin's credited codiscoverer, who made a point of excluding any concession to Lamarck. Yet, in a passage that Butler quotes, Weismann draws well away from a categorical conclusion: "I am far from asserting that the germ-plasm . . . is absolutely unchangeable or totally uninfluenced by forces residing in the organism." Weismann allows that "organisms may exert a modifying influence upon their germ cells, and even that such a process is to a certain extent inevitable" (*DD*, 276). That such effects may be very small is irrelevant; the important question is whether they happen at all, since, if they do, then they can accumulate. "A very small effect," Butler writes, "provided it can be repeated and accumulated in successive generations, is all that even the most exacting Lamarckian will ask for" (*DD*, 276).

Do newly constituted germ cells remember the parental body from when

10. Lamarck, *Zoological Philosophy*, 6, 69.

11. See Weismann, *Germ-Plasm*.

they were part of it? Butler finds no objection to the idea in Weismann's evidence, and unlike him, Butler did not suppose that germ cells live a life of their own and go through a special development separate from the differentiation of the soma. Instead, and to use later terminology, he thinks the gametes share in the experience of the parent like a bud or tuber and remember parental experience, developmental tendencies, and instincts. Here, as Butler's best scientific critic observes, "is the point where, in the light of modern conceptions, Butler's theory is difficult to follow."[12]

The Criticism of Darwin: What's Your Theory?

Darwin tended to suggest that the idea of descent with modification (his definition of evolution) never occurred to him until he began pondering his five years' experience as the ship's naturalist aboard the *Beagle*. Butler thinks this is unlikely. Ideas from Buffon, Erasmus Darwin, and Lamarck were widely discussed among natural historians in Britain and on the Continent. Given his family connections and the scientifically sophisticated circles in which Darwin spent his youth, he must have known there was a long-standing theory of descent with modification.

In *Origin of Species*, Darwin tends to say or imply that the bare idea of descent with modifications is "my theory," as if his were the first or most substantial alternative to creationism. Butler spends twenty-four pages documenting ninety-seven instances of this usage across all editions of *Origin of Species*. On average, the claim arises on one in five pages throughout the book, end to end, including prominently at the beginning and in the conclusion, "without acknowledging obligation of any kind to earlier writers" (*LC*, 202). For instance, Butler cites Darwin: "If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." Butler then observes that "this makes 'my theory' to be 'the theory that complex organs have arisen by numerous, successive, slight modifications'; that is to say, to be the theory of descent with modification" (*LC*, 180). This theory is Charles Darwin's only if he shares credit with Buffon, Lamarck, and his own grandfather Erasmus. Charles Darwin's contribution to the theory of evolution was to make a case that finally moved British, European, and ultimately global opinion. As Butler writes: "No one who remembers average middle-class opinion on this subject before 1860 will deny that it was Mr. Darwin who brought us all around to descent with modification" (*LC*, 211). Darwin's only *theoretical* contribution to the theory of evolution is the—to Butler—pathetic thesis that natural selection operates on fortuitous variations alone. All that is left to distinguish Darwin from his predecessors in

12. Russell, *Development and Heredity*, 116.

the theory of evolution is the idea that the course of life's whole planetary evolution has been *nothing but luck*: "He could only put the difference between himself and the early evolutionists clearly before his readers at the cost of seeing his own system come tumbling down like a pack of cards. . . . I know of no more pitiable figure in either literature or science" (*LC*, 209).

Machines and Life

Butler was thinking about the evolution of technology years before he started thinking about the evolution of life. One early idea was to deny the difference between the living and the mechanical. This argument appears in "Darwin among the Machines," which Butler published in a Christchurch newspaper, then expanded in "Lucubratio Ebria" written for the same paper. These ideas receive a polished statement in three chapters of *Erewhon*, in which the author translates an Erewhon classic, "The Book of the Machines." The story is that, five hundred years before, civil war broke out between a party of Machinists and one of Anti-machinists. The conflict, which resulted in the destruction of all the machines formerly in use, was sparked by a book, which the narrator was allowed to read and translate. What made the book inflammatory was a teaching on machine consciousness, which was presented as a dawning new phase of mind on earth, as different from previous expressions of intelligence as animals are from plants. Machine consciousness had already begun and inevitably would become greater; eventually it would be a threat to humanity. *Better nip it in the bud and forbid further progress* became the credo of the Anti-machine party, and they prevailed in the civil wars.

We have a hint about the ideology of the other party, the defeated Machinists. They too had a book, which the *Erewhon* narrator presents along with "The Book of the Machines." In the Machinists' book, it is argued that machines are merely human limbs, and human beings are "a machinate animal": "The lower animals keep all their limbs at home in their own bodies, but many of man's are loose, and lie about detached, now here and now there, in various parts of the world" (*E*, 266). This book says that machines "are to be regarded as the mode of development by which human organism [*sic*] is now especially advancing, every past invention being an addition to the resources of the human body" (*E*, 267). It is not clear that this argument and that of the Anti-machinists' "Book of the Machines" are genuinely two different arguments, despite their supposed divergence having been the cause of civil war.

Butler has an exquisite sense of the futility of distinguishing categorically between machines and life: "The difference between the life of man and that of a machine is one rather of degree than of kind" (*E*, 261). All life is penetrated by machines: "The shell of a hen's egg is made of delicate white ware and is a

machine as much as an egg-cup is" (*E*, 235). A telescope or microscope coupled with the eye becomes a seeing-engine. A human being could not live without the parasites that accompany us, digesting our food. Is their body less our body? And "may not man himself become a sort of parasite upon the machines. An affectionate machine-tickling aphid?" (*E*, 243).

It is said that machines owe their existence and progress to their power of ministering to our needs and must, therefore, perpetually be our inferiors. Butler replies that machines "act upon man and make him man, as much as man has acted upon and made the machines" (*E*, 263). Machines serve us only on condition that we serve them. Radically deprived of machines, we should be extinct in a generation: "Man's very soul is due to the machines; it is a machine-made thing; he thinks as he thinks, and feels as he feels, through the work that machines have wrought upon him, and their existence is quite as much a *sine qua non* for his, as his for theirs" (*E*, 244).

An obvious objection is that machines would not exist without invention and repair, which they cannot do for themselves. Butler contrives a beautiful rebuttal:[13] "What is a reproductive system, if not a system for reproduction? And how few of the machines are there which have not been produced systematically by other machines?" (*E*, 250). There are many organisms that cannot reproduce without the intervention of another species.

In Darwin's account of the symbiosis of humble bee and red clover, the plant would become rare or extinct without visitations from the bees, which are essential to its reproduction. So, the absence of a fully internal reproductive system cannot disqualify machines from being alive. Few creatures reproduce after their own kind anyway; instead, they produce something with the potential to become what the parents were. A butterfly lays an egg, but the egg becomes a caterpillar, the caterpillar a chrysalis, and the chrysalis a butterfly. Therefore, "a reproductive system may be in full force without the thing produced being of the same kind as that which produced it" (*E*, 250–51).

For machines no less than for organisms, "there seems no limit to the results of accumulated improvements if they are allowed to descend with modification from generation to generation" (*E*, 252). The Anti-machinist author of "The Book of the Machines" finds this possibility "the most alarming feature in the case" (*E*, 253): "Is there not enough analogy existing at the present moment, to make us feel seriously uneasy about the future, and to render it our duty to check the evil while we can still do so?" (*E*, 251). On that note, the wars began.

In his last book on evolution, Butler explains that "all else that I have written on biological subjects" is a development of the chapter on animate machines in *Erewhon* (*LC*, 133). He made that claim—an evidently serious reappropriation

13. Gillot, *Butler against the Professionals*, 41–44.

of his earlier work—in 1887. Fifteen years earlier, though, Butler dismissed what he had written in his celebrated satire, complaining in a letter *to Charles Darwin* of satire misunderstood. Samuel and Charles were not strangers. Charles had been friends with Butler's father from school days, they were undergraduates together at Cambridge, and Samuel visited Down House twice after returning from New Zealand. In May 1872, on the publication of *Erewhon* and referring to the chapters on machines, he wrote to Darwin: "I have developed and worked out the obviously absurd theory that [machines] are about to supplant the human race and be developed into a higher kind of life." It was supposed to be a satire, at least so he tells Darwin. His intention was to imply, "See how easy it is to be plausible, and what absurd propositions can be defended by a little ingenuity and distortion and departure from strictly scientific methods."[14]

Later the same year, in a preface to the second edition of *Erewhon*, Butler returns to this point: "I regret that reviewers have in some cases been inclined to treat the chapters on Machines as an attempt to reduce Mr. Darwin's theory to an absurdity. Nothing could be further from my intention, and few things would be more distasteful to me than any attempt to laugh at Mr. Darwin." But, he says, "I have myself to thank for this misconception, for I felt sure that my intention would be missed, but preferred not to weaken the chapters by explanation, and knew very well that Mr. Darwin's theory would take no harm (*E*, 8). A satirist who expects his intention to be missed is writing in the wrong genre. May we not say that Butler knew pretty well what he was doing? He was assimilating life and machines and deconstructing the binary opposition of organic and inorganic—so much is clear, given his later statement that "all else that I have written on biological subjects" is a development of "The Book of the Machines," even if "[I] did not . . . yet fully know what I was driving at" (*LC*, 134).

Butler makes two distinct though entwined claims about machines and life. One is that human evolution continues through the evolution of technology: "Machines are the manner in which man is varying at this moment" (*LH*, 255). Human evolution continues, not in our bodies, simplistically understood, but in the technological carapace with which human life has meshed: "Customs and machines are instincts and organs now in process of development" (*LH*, 200). This was the argument of the Machinist party in *Erewhon*, and one that Butler developed in early writings leading up "The Book of Machines." In one of those ("Lucubratio Ebria"), he had argued that machines "are to be regarded as the mode of development by which the human organism is most especially advancing, and every fresh invention is to be considered as an additional member of the resources of the human body" (*NB*, 50). Personal identity extends spatially beyond the body to embrace technology and extends temporally to all the genera-

14. Butler to Darwin, in Darwin, *Autobiography*, 198.

tions of ancestors whose memories we inherit: "It must be remembered that men are not merely the children of their parents but are begotten of the institutions of the state of the mechanical sciences under which they were born and bred. These things have made us what we are. We are children of the plough, the spade, and the ship; we are children of the extended liberty and knowledge which the printing press has diffused" (*NB*, 51).

The second claim is a presupposition of the first—namely, that there is no categorical difference between a tool and an organ, a hammer and the hand that holds it: "The organs external to the body, and those internal to it, are the second as much as the first, things which we have made for our own convenience, and with a prevision that we shall have need of them" (*EON*, 39). Organ and tool are two species of the same genus and descend "from one common filament of desire and inventive faculty." (*EON*, 39). A Lamarckian philosophy of technology comes easily to those who are already Lamarckians about biological evolution. The evolution of technology is as Lamarckian as that of species: it is a matter of cunning, not luck; and of effort addressed to need, not random variation. It is this view of evolution that galvanized the Anti-machine party in Erewhon's civil wars and that the author of "The Book of the Machines" describes as "the most alarming feature in the case" (*E*, 253).

Leibniz thought that the things we call living are very complicated machines.[15] Organisms are infinitely technical, machines within machines to infinity. Only God, he writes in the *Monadology*, can master such technology. Humanity's machines are artificial only to a point. We can make knives of steel only because we do not have to make iron and carbon. One might object to Leibniz's analogy. If the difference between our machines and divine machines is that of finite to infinite mechanism, then the difference between our machines and divine machines is infinite; they are incomparable. How can they be alike in any way when they are infinitely different? Butler makes a bolder claim than Leibniz: organisms are machines quite like our own, and our machines are so enmeshed with the human modus vivendi as to be indistinguishable from our other organs.

Butler does not want to say that living beings are machines. He wants to deny a categorical distinction between organic and inorganic, the living and the lifeless. Either much that is currently dismissed as purely mechanical and unconscious must be admitted to possess some consciousness, or human beings evolved consciousness from unconsciousness and it is possible that machines might do the same. Butler's conclusion is not—drawing on Epicurus, in antiquity, or on Herbert Spencer, in Butler's own time—that everything is mechanical. Butler's argument is *hylozoism*: matter is alive. "The only thing of which I am sure is," he

15. See Leibniz, *Monadology*, sec. 64, in *Philosophical Essays*, 221: "A machine constructed by man's art is not a machine in each of its parts," though "natural machines, that is, living bodies, are still machines in their least parts, to infinity."

writes, "that the distinction between the organic and inorganic is arbitrary; that it is more coherent with our other ideas, and therefore more acceptable, to start with every molecule as a living thing, and then deduce death as the breaking up of an association or corporation, than to start with inanimate molecules and smuggle life into them" (*UM*, 15).

Evolution Old and New

Evolution Old and New (1879) was Butler's first effort at writing on the history of evolutionary thought. The book has very good discussions of every prominent evolutionist from Francis Bacon to Charles Darwin. As a result of this research, Butler came to the view that first Darwin and then his advocates paid insufficient regard to predecessors, inflating the impression of originality with dismissive evaluations of the competition—of Buffon and Erasmus Darwin, in particular. Indeed, the best parts of Butler's history are his discussions of those predecessors, to whom I now turn.

Butler is without doubt Buffon's best Anglophone reader. In 1739, Georges-Louis Leclerc, comte de Buffon, became the superintendent of the King's Garden, an extensive botanical estate and repository for vast collections of zoological and geological specimens. Under Buffon's administration, the gardens and collections became the century's foremost natural history research center. Besides his administrative work, Buffon began an ambitious research project, drawing on the incomparable resources at his command. The public's first glimpse of his ideas came in 1749, when he published three volumes of his vast *Histoire naturelle*, eventually in thirty-six volumes. The books, brilliantly written and copiously illustrated, comprised a natural history of the entire surface of the earth, air, land, and sea.

There is nothing secondhand in Butler's appreciation of Buffon. He destroys the routinely repeated complaint that Buffon held fluctuating opinions and did not give a settled statement of evolution. Butler demonstrates that this opinion simply shows poor acquaintance with what Buffon wrote in those thirty-six volumes. Observing that "Buffon did infinitely more in the way of discovering and establishing the theory of descent with modification than anyone has ever done before or since" (*LC*, 104), he thinks that "the preeminent claim of Buffon to be considered as the father of the modern doctrine of evolution cannot be reasonably disputed" (*UM*, 30).

For example, here is Buffon writing in 1756, a century before Charles Darwin, in a passage quoted by Butler: "The movement of nature turns on two immovable pivots: one, the illimitable fecundity which she has given to all species; the other, the innumerable difficulties which reduce the results of that fecundity" (*DD*, 248). In this idea of "natural selection," Buffon was followed by Erasmus

Darwin, Lamarck, Herbert Spencer, Charles Darwin, and A. R. Wallace—but "no one broke the ground for Buffon," according to Butler, "to anything like the extent that he broke it for those who followed him" (*LC*, 212). Buffon dismissed the pious theory of supernatural creation for a dynamic environmental determinism. As Butler quotes him: "Nature, I maintain, is in a state of continual flux and movement" (*EON*, 147). Yet, in Butler's view, Buffon had also learned Leibniz's lesson on continuity: "Nature's great workman is time. He marches ever with an even pace, and does nothing by leaps and bounds, but by degrees, gradations, and succession he does all things" (*EON*, 103).

Charles Darwin apparently never read Buffon. The "Historical Sketch of the Recent Progress of Opinion on the Origin of Species," which Darwin added to the third edition of *Origin of Species* (1876), relies on Isidore Geoffroy Saint-Hilaire, who himself butchers Buffon's text to obtain the caricature he needs. Geoffroy cites these words from Buffon: "The different species of animals are separated from one another by a space which Nature cannot overstep."[16] Butler restores the context, quoting more amply from Buffon's *Natural History*: "Although the different species of animals are separated from one another by a space which Nature cannot overstep, yet some of them approach so nearly to one another in so many respects that there is only room enough left for the getting in of a line of separation between them" (*EON*, 100). Butler cites Darwin saying that Buffon (whom, again, Darwin had not studied) "does not enter into the causes or means of the transformation of species" (*EON*, 104). Butler then summarizes Buffon's discussion of more than sixty pages dedicated to this question, advancing three principal causes of modification: change of climate, change of food, and the effects of domestication.

Butler makes an observation that seems to have eluded every reader of Buffon, which is that a vein of irony pervades Buffon's writing, which conveys different meanings to different sets of readers. Buffon comfortably wrote between the lines for the discerning, with irony plain enough once careful readers spot it. His *Natural History* is both scientific and popular. With panache and "subrisive humour" (*EON*, 83), Buffon points irresistibly in the right direction for sophisticated readers and then flatly contradicts himself to reassure anybody shocked by truths for which they are not prepared.

Here is one example. Buffon did not systematically set out an evolutionary theory but scattered his theory across the prefatory remarks introducing the major classes of organisms. Inconspicuously inserted in his discussion of the ass, which is the second animal after human beings to be discussed in his *Natural History*, he proposes that "not only the ass and the horse but even man himself, the

16. Butler, *EON*, 100. This is Butler's translation from Isidore Geoffroy Saint-Hilaire, *Histoire naturelle générale des règnes organiques*, 2:391.

apes, the quadrupeds, and all animals might be regarded but as forming members of one and the same family," then assures readers that *he* draws no such inference, opposed as it obviously is to the book of Genesis (*EON*, 89).

A second example turns on one of Buffon's most important concepts, *dégénération*, as in this passage, quoted by Butler:

> Though all these beings have an identity of their own, and are distinguished from one another by differences of which the gradations are infinitely subtle, there exists at the same time a primitive and general design which we can follow for a long way, and the departures [*dégénérations*] from which are far more gentle than those from mere outward resemblance . . . a single pattern after which all would appear to be conceived. (*EON*, 87–88)

This *dégénération* is not what specious resemblance to English suggests. Butler translates the French as "descent with modification" (*EON*, 153), and his rendering is by no means contrived. Buffon says that if we allow even one case of *dégénération*, "there is no further limit to be set to the power of nature, and we should not be wrong in supposing with sufficient time she could have evolved all other organized forms from one primordial type" (*EON*, 91). Then his next sentence: "But no! It is certain from revelation that all animals have alike been favored with the grace of an act of direct creation, and that the first pair of every species issued full form from the hands of the Creator" (*EON*, 91). To Butler, Buffon's pattern is evident: "Whenever he has shown us clearly what we ought to think, he stops short suddenly on religious grounds" (*EON*, 115). As Butler had good cause to know, "an ironical writer, concerning whom we cannot at once say whether he is in earnest or not, is an actor who is continually interrupting his performance in order to remind the spectator that he is acting" (*EON*, 111).

As for Erasmus Darwin, the other early evolutionist whom Butler preferred to Charles Darwin: he was a physician, trained at Edinburgh, then Great Britain's best medical faculty, and an amateur scientist in an age of amateurs. Working on his own, he came to the idea of species transformation. Life on earth is a progressively more complex series of transformations, beginning from a primordial filament. He regarded the changes as directed, as improving, advancing life toward perfection: "All nature exists in a state of perpetual improvement," he writes. "The world may still be said to be in its infancy and continue to improve *for ever and ever*."[17]

Buffon rested on the thesis of descent with modification, which he labored to establish, proposing modification by direct influence of climate, food, and altered conditions of life. Erasmus Darwin urged the same conclusion, though he saw Buffon's environmental factors as indirect causes, identifying the direct

17. Erasmus Darwin, *Zoonomia*, 2:318.

cause of species transformation as change in actions in consequence of changed needs, which Darwin couples with the inheritance of acquired characteristics. Butler cites this passage: "All animals undergo perpetual translations; which are in part produced by their own exertions in consequence of their desires and aversions, of their pleasures and their pains, or of irritations or of associations; and many of these acquired forms or propensities are transmitted to their posterity" (*EON*, 226).

The effects of successful struggle are passed on to their descendants, who do not have to start over again. It follows that nature has a history. The present complexity of nature was not present at the beginning but instead has unfolded over time as the history of nature. Darwin adds that there is a law to this history, a law of progressive complexity. Each major transformation in species marks an absolute rise in complexity and perfection over preceding forms of life. Plants are more complex than polyps, insects more perfect than plants, mammals an absolute advance over fish. But these are huge families of organisms. All the mammals are progressively more complex than any of the fish, but what about different species on each level? No one wants to argue that tigers are more complex than wolves, or penguins simpler than toucans. Not every difference among organisms can be ranked by progressive complexity.

Here is where use-inheritance, or the inheritance of acquired characteristics, becomes relevant, acting with the environment to variegate the progressive glide toward more perfect forms. To explain the difference between toucans and penguins, we must look not at their place on the Great Chain of Being but at the differences of their environments. Species experience different needs in response to qualities of their environment; since environments are changing all the time, so must the species of life change to remain viable. When in response to changing needs, they change their behavior in ways that prove adaptive, those new actions gradually become heritable characteristics that future generations no longer have to discover and learn.

Erasmus Darwin went unmentioned in *Origin of Species* until the "Historical Sketch" of the third edition, where his grandson writes, "It is curious how largely my grandfather, Dr. Erasmus Darwin, anticipated the views and erroneous grounds of opinion in Lamarck, in his 'Zoonomia'" (*EON*, 196). Observing the same concordance between Lamarck and Erasmus Darwin, Butler inferred that somehow Lamarck knew Erasmus Darwin's ideas, which Butler suggested he may have gleaned from a French translation of Darwin's *Loves of the Plants*, by J. P. F. Deleuze, in 1799.[18] Later scholars have been unimpressed with the suggestion.

18. For more on Joseph Philip Francis Deleuze, see the "Life of Deleuze," ix–xvi. This chapter, which appears in Thomas C. Hartshorn's translation of *Practical Instruction in Animal Magnetism*, is said to be "translated by a lady from the elaborate volume of Doctor Foissac" (ix).

A more likely explanation for similarity is that natural historians were reading the same books and drawing complementary conclusions.[19] One conclusion favored a sensationalist theory of mind, according to which ideas are images of sensations, and rational behavior derives from habitually associated ideas. Consequently, animals no less than people entertain representations of their environment that make their behavior reasonable.[20] Erasmus Darwin thought that even the behavior of insects "arose in the same manner from experience and tradition, as the arts of our own species; though their reasoning is from fewer ideas, is busied about fewer objects, and is exerted with less energy."[21]

The Butler-Darwin Controversy

The controversy that eventually led Butler to refer to Charles Darwin as the man "to whom I have, unfortunately, found myself in more bitter opposition than to any other in the whole course of my life" (*LC*, 239–40) began in February 1879. A German scholar, Dr. Ernst Krause, published a work entitled *Erasmus Darwin*, offering German readers what for many was their first look at a man made retrospectively notable by the famous grandson. Butler had said Erasmus Darwin was underestimated, especially by Charles Darwin, who apparently agreed and arranged to have Krause's work published in English.

When Butler's *Evolution Old and New* appeared in May of the same year, Darwin sent Butler's book to Krause, knowing that Krause was revising his book on Erasmus Darwin for an English translation, which appeared in November with a preface by Charles Darwin. Everything about the publication confirms the impression that the English text is a translation of an earlier German work, though when Butler read it he found that six full pages of his own *Evolution Old and New* were presented as if they were Krause's work and in a way that was calculated to prove that Krause appreciated Erasmus Darwin's accomplishments before Butler brought them to light. Butler sent to Germany for the original, taught himself to read German, then compared the two texts, finding many discrepancies, including Krause's statement, with implied reference to Butler, that to attempt to revive the ideas of Erasmus Darwin "shows a weakness of thought and a mental anachronism which no one can envy."[22] This passage does not appear in the original German edition.

Butler wrote to Darwin on January 2, 1880, asking for an explanation. Darwin replied the next day that he had sent Butler's book to Krause, knowing that Krause was revising, and did not feel he needed to mention it in his preface. But-

19. Richards, *Evolutionary Theories of Mind and Behavior*, 39.

20. Richards, *Evolutionary Theories of Mind and Behavior*, 33.

21. Erasmus Darwin, in Richards, *Evolutionary Theories of Mind and Behavior*, 35.

22. Darwin, *Autobiography*, 184.

ler was unsatisfied and wrote to the *Athenaeum* on January 31, 1880, saying that it was impossible to believe that Darwin did not know of the discrepancies and misrepresentations. Friends and family prevailed on Darwin not to reply, and he never publicly alluded to the affair. After Butler died, it came out that Darwin had found among his papers a proof sheet for his preface, on which his annotations indicate his awareness of the discrepancies.[23] He wrote to Krause, who replied that he would put the corrections in notes, though he never did. Darwin says he wrote on the proofs that "Dr. Krause has added largely to his essay as it appeared in *Kosmos*." Darwin then says that these words were "accidentally omitted" and that, when he replied to Butler, he "had forgotten that they had ever been written."[24] One can understand that the German author might say he would make changes and not do so. It is more difficult to understand how Darwin's own correction to the proof sheets got "accidentally omitted." Were other corrections omitted? This "error" seems too artful to have been random. Darwin's son Francis, writing to his sister Henrietta, two years after Butler's death, says: "After all, I now think he had some cause of complaint."[25]

Unconscious Memory

Life and Habit argued that heredity is unconscious memory. That argument had not been made in an English text before. It sounded Germanic, *naturphilosophisch*—and Butler's readers started pointing him to German authors whom they thought were saying the same thing. One was Eduard von Hartmann, whose *Philosophie des Unbewussten* (1869) included a chapter on instinct. Another was the then-Viennese physiologist Ewald Hering, who in 1870 published a well-received lecture, "Memory as a General Function of Organized Substance," which had advanced the same theory that Butler proposed eight years later. Butler had not looked for these publications because, at the time, he had no German; then came the controversy over the Krause book, which motivated him to learn the language. He was eventually able to translate material from both Hartmann and Hering, which he published with introductions and discussions in *Unconscious Memory*.

No one who reads Butler's translation of Hartmann's "The Unconscious in Instinct" all the way to the end will disagree with Butler that the work is "incomprehensible and repulsive" (*UM*, 89). Hartmann personifies the unconscious and then "in fact deifies it" (*UM*, 56). The unconscious in Hartmann's work is

23. Nora Barlow publicized the details, with relevant correspondence, and she also republished a pamphlet by Butler's friend Henry Festing Jones: "Charles Darwin and Samuel Butler: A Step toward Reconciliation," in Darwin, *Autobiography*, 176–211.

24. Darwin, *Autobiography*, 188.

25. Darwin, *Autobiography*, 208.

busy doing various things "unconsciously," while the unconsciousness that Butler introduced in *Life and Habit* is merely the usual result of something having been done so often as to become habitual. With Hering, the matter is different. Having applied himself to the language, Butler studied Hering's lecture and was impressed and entertained by the similarity. Hering's idea, Butler wrote, "is one the importance of which is hardly inferior to that of the theory of evolution itself—for it puts the backbone, as it were, into the theory of evolution" (*UM*, 53).

Hering argues that "the development of one of the more highly organized animals represents a continuous series of organized recollections concerning the past development of the great chain of living forms" (*UM*, 81). This argument will go on (eight years later) to be Butler's thesis in *Life and Habit*, though in one respect Hering goes further than Butler, and in another it is Butler who goes further. In his lecture, Hering proposes a theory of what memory is—a physical explanation—which is more than Butler essayed, having confined himself "to saying that whatever memory was, heredity was also" (*UM*, 54). Hering's idea is that memory is like an echo, a wave-phenomenon, a vibration with a signature energy that can pass among resonant materials like a communicated tone. Initially, Butler was noncommittal on the vibration theory, which was not received as warmly by scientific peers as the mnemic theory of heredity. Later, at least in his *Note-Books*, Butler warmed to it. "A memory," he writes there, "is the reproduction and recurrence of a rhythm communicated directly or indirectly from one substance to another, and where a certain rhythm exists there is a certain stock of memories, whether the actual matter in which the rhythm now subsists was present with the matter in which it arose or not" (*NB*, 71).

In another way, Butler takes the mnemic theory beyond Hering, who did not address the implications of mnemic heredity for the evolution of species. Butler's conclusion, which might have been too heretical for Hering's liking, is that mnemic heredity is fatal to "any view of evolution except a teleological one" (*UM*, 62). This conclusion, as E. S. Russell confirms, is demanding: "The memory theory of heredity can be properly utilized only by adopting a frankly Lamarckian and vitalistic standpoint."[26] Eight years after the publication of *Life and Habit*, Butler became more impressed with the need to introduce teleology into the theory of evolution. Looking back, he writes: "Though I had not known it, the spirit of the book [*Life and Habit*] was throughout teleological" (*UM*, 24). He now wants to make teleology the centerpiece of his third essay in philosophical biology: "Can we or can we not see signs in the structure of animals and plants, of something which carries with it the idea of contrivance so strongly that it is impossible for us to think of the structure, without at the same time thinking of contrivance, or design, in connection with it?" (*UM*, 1).

26. Russell, *Development and Heredity*, 343.

At the time, in the 1880s, prominent scientific authors agreed on a stark alternative between divine design and mindless mechanism. Either one was a Darwinist and a materialist and disdained the idea of teleology in nature, or one advanced evidence of design in an argument for supernatural creation. Ernst Haeckel offered a characteristically dogmatic statement of the Darwinist-materialist-mechanist position:

> We see in Darwin's discovery of natural selection in the struggle for existence the most striking evidence for the exclusive validity of mechanically operating causes in the entire field of biology. We see in it the definitive death of all teleological and vitalistic interpretations of organisms. . . . We do not think we can emphasize this extremely important point enough. It is the unassailable citadel of scientific biology.[27]

Buffon, Erasmus Darwin, and Lamarck were dissuaded from teleology because, as they understood it, attributing teleology to nature must imply that the adaptation of living beings to their surroundings is "part of a plan devised long ages since by a quasi-anthropomorphic being who schemed everything out much as a man would do, but on an infinitely vaster scale" (*DD*, 254). Since a divinely created universe is by definition "for the best," teleology apparently implies immutable species, precluding even transformation to progressively higher forms. The Old Evolutionists were also impressed by the evidence of rudimentary organs, useless parts. How could anything useless serve a divine purpose? Beginning with Buffon, they reject the Stoic and Galenist idea that nature does nothing in vain, that each thing is good for something, adding its voice to the universal *Te Deum*.

Butler proposed a third way for teleology, slipping between supernatural design and mindless mechanism, where no one saw other possibilities. He was careful here with the analogy between nature and artifacts. The only design we know from experience is our own. So, the analogy to nature cannot depart from the limits of our experience with design. In philosophical logic, analogy is a means of inferring from the given to an unseen cause. It may be unseen because not present, or it may be, like atoms, more radically invisible. This method of analogy was favored in the school of Epicurus and bequeathed to modern empiricism. Butler took an older medical-empirical position, according to which analogy can discover only nonpresent, not radically invisible, causes.[28] On this view, both terms of the analogy have to lie in experience, which undermines any analogy of human power to a power that is infinite. The design in life is comparable to the only design we know—that of our machines—which makes design in nature "tentative" for us "and neither very far-foreseeing nor very retrospective; it is a

27. See Haeckel, *Generelle morphologie*, quoted in Gliboff, "Golden Age of Lamarckism," 47.

28. For details, see Allen, *Empiricisms*, chap. 1.

little of both, but much of neither" (*LC*, 22). If we are rigorous about the analogy, then, since our machines are imperfect, so too are organisms. The design in nature is not greatly better than that of the machines humans make. The result of this insight is a teleology for atheists.

The analogy predicts a history of life with some tendency toward progressive development but never foreseeing any long distance ahead and always pulled in different directions. In each of these ways, the history of life is like the history of human technology. The source of the progressive tendency is in the organism itself: "The design which has designed organisms, has resided within, and been embodied in, the organisms themselves"—embodied, that is, as consciousness of need and the power of choice (*EON*, 31). The primary cause of variation in structure is variation in the response of organisms to felt needs, which when repeated becomes habit and is passed to later generations as unconscious memory. "A bold and enlightened Lamarckism," E. S. Russell says of Butler's theory, "completed and rounded out by the conception that heredity too is a psychological process of the same nature as memory."[29]

Russell closes a lengthy appreciation with criticism of Butler's assumption that "the organism's original effort" must be conscious. He writes that Butler "made his memory theory rather more difficult than it needed to be by bringing in consciousness as a necessary accompaniment of the organism's original effort"—that is, the effort that, repeated, becomes habitual, unconscious, and heritable. He says Butler had "no warrant in experience for assuming that 'organic' or growth activities, as distinct from behavior activities, are ever consciously performed," though these "organic" activities cannot be denied their habitual, mnemic character. Russell refers to evidence "that the phenomena of habit and learning can be manifested by tissues and organs, as is seen in many cases of functional adaptation, where there is not the slightest justification for assuming *conscious* guidance."[30]

Russell argues that Butler has no warrant in experience for extending consciousness to organic activity like the action of organs or tissues, where habits may form without consciousness. Butler's reply would probably be that a habit forms in response to a need and that a need is a perception. To say that an organ or tissue acquires a habit is therefore to say that it feels need, feels satisfaction, and is to that extent conscious. Hence "all action is really psychological" (*LH*, 122), which is to say, motivated and teleological. Action is apparently a mode of consciousness for organs, tissues, and even cells. This mode Butler imagines as a very diminished version of the consciousness we are familiar with, especially from perception: "Each cell in the human body is a person with an intelligent soul, of a low class, perhaps, but still differing from our own more complex soul in degree, and not in kind" (*LH*, 109).

29. Russell, *Form and Function*, 337.

30. Russell, *Development and Heredity*, 119.

Russell finds Butler's expression "personal identity" an unfortunate choice to describe a continuity of organic experience: "the emphasis should be laid on 'continuity' rather than upon 'personality,'" which begs the question whether there is any living, vital continuity that is not psychological. The continuity of interpenetration, absorption, immersion, and duration *is* the continuity of consciousness, which is that of persons.[31] The egg or embryo actually partakes in the life of its producer, sharing the hereditary experience of the parent organism as an unconscious memory continuously inherited (remembered) by generations all the way back to the primordial cells. The personal or psychological is a mode of unity, not a substance; it is the unity of fusion and interpenetration, rather than juxtaposition, which is the sole mechanical possibility.

Butler's third way between antiteleological mechanism and supernatural purpose resembles Aristotle's effort to define an alternative between Plato and Democritus. By Aristotle's time, the evidence of teleology in nature and the idea of its purposiveness or design was already a two-century-old argument.[32] The first phase of the argument runs from Anaxagoras in the sixth century to Plato, culminating in *Phaedo*, when Socrates argues that only an intelligent cause can work for the best, so that to say nature is ordered "for the best" is to say it has an intelligent cause.[33]

Aristotle derives the same conclusion—everything for the best, nothing in vain—from a new concept of nature: *phusis*.[34] Living things have both characteristic ways of changing and tendencies to species-specific ends. These tendencies are an immanent finality, a direction that organisms have by their nature, or by what is nature in them: their *phusis*—an inner principle of self-movement, change, and growth. Aristotle's idea of *phusis* puts finality into natural substances, sourced by what is nature in them, the power to be the form they are by nature. The universe is organized for the best, but the source of finality is immanent to the order it causes; it is the power of nature acting in bodies, directing changes naturally, without intelligence, mind, or purpose.

Aristotle's theory resembles Butler's in making teleology immanent, a source of change acting in organisms one by one, though of course Aristotle does not envision the transformation of species. The forms of life are eternal, and what is *phusis* in each organism is activity sustaining that form. Hence *phusis*, as a principle, does not merely cause self-movement; it defines how the body *ought* to move, the activity that actualizes its form in the best way. Butler's evolving purposiveness, where ends are foreseen but not very far, is quite different from Aristotle's "nothing in vain" mode of eternal teleology. With Butler, limited foresight combined with inheritance of acquired characteristics (finally explained as

31. Russell, *Development and Heredity*, 115.

32. See Sedley, *Creationism and Its Critics in Antiquity*.

33. Plato, *Phaedo* 97b, in *Complete Works*, 84.

34. See Cooper, "Aristotle on Natural Teleology."

memory) sustains the tendency and final cause of evolutionary change—which is why the mnemic theory of heredity was important ("It puts the backbone, as it were, into the theory of evolution" [UM 53]).

Butler's French Reception

There was some posthumous notice of Butler's work in France, usually situating him in relation to pragmatism in America and, in France, to Henri Bergson. Louis Cazamian, for instance, wrote that Butler "is in the direct line of the movement of thought announced in Neo-Lamarckism, pragmatism, [and] Bergsonism."[35] René Lalou held that "Butler ranks among the founders of Neo-Lamarckism, but he already announces the theses of pragmatism and Bergsonism."[36] Floris Delattre, a French scholar of English literature (and Bergson's nephew), argued against any relation to Bergson and reproduced in confirmation a letter from his uncle regarding Butler.[37]

Bergson said he had not heard Butler's name before 1914 and had never encountered it in his searches in the literature of evolution and biology prior to writing *Creative Evolution*. Butler's work was recommended to him by a respected English biologist when Bergson gave his Gifford Lectures at Edinburgh in 1914. He obtained some of Butler's books, but the intervention of the war delayed his studying them. When he was finally able to do so, the books struck him "as being by a remarkably intelligent, critical, and satirical man, full of humor, who had the merit of seeing some of the weaknesses of Darwinism from the beginning, when the doctrine was either accepted as it was, blindly, or rejected on the grounds that its reasoning was not always scientific." As for a resemblance between his own views and Butler's: "I have found none." On the contrary, Bergson writes, "I find a complete opposition on all points except on the insufficiency of Darwinism as professed by Darwin himself."[38] He sees little in Butler apart from criticism and history, and what more there is seems to be neo-Lamarckism, which Bergson thinks that he himself dispatched more than fifteen years before in his book *Creative Evolution*.

Gilles Deleuze and Félix Guattari have a more perceptive and generous appreciation of Butler. In *Anti-Oedipus*, they write that *Erewhon*'s "The Book of the Machines" "shatters the vitalist argument by calling in question the specific or personal unity of the organism," which Butler depicts as a machine composed of machines, and also shatters "the mechanist argument even more decisively, by calling in question the structural unity of the machine." They understand But-

35. Louis Cazamian, *Historie de la littérature anglaise*, quoted in Delattre, "Butler et le bergsonisme," 388n3.

36. Lalou, *Panorama de la littérature anglaise contemporaine*, quoted in Delattre, "Butler et le bergsonisme," 389n3.

37. Delattre, "Butler et le bergsonisme," 396.

38. As quoted in Delattre, "Butler et le bergsonisme," 396.

ler's argument to be that organisms are machines, and machines are the organs of organisms. Organisms are machines, but "they contain such an abundance of parts that they must be compared to very different parts of distinct machines, each relating to others, engineered in combination with others." This assertion is not the banal thesis that machines are extensions of our limbs. The era of extensions has passed. Machines "are really limbs and organs, lying on the body without organs of a society."[39] The structural unity of the machine, which secures its difference from an organism, is undone, as is the unity of the organism. These are all, as Deleuze and Guattari say, *machined*—assembled and held together through interaction in a terrestrial economy of mechano-organic life.

Butler's concept of habit can be compared with interest to a line of French thought running from Félix Ravaisson to Bruno Latour.[40] These thinkers are professional philosophers and argue in a way that Butler would not. For instance, they tend to make their points with reference to Aristotle, who explained virtue as a special sort of habit, or what he called *hexis*.[41] A *hexis* is a stable, relatively lasting quality, in contrast to a transient state like *hot* or *cold*. Rather than a passing affection, habits set in and modify our nature. A *hexis*, Aristotle says, becomes "through length of time part of a man's nature and irremediable or exceedingly hard to change."[42] Probably inspired by Friedrich Schelling, with whom he had studied, Ravaisson seizes on this power to rework nature. Desires habitually repeated become corporeal needs, and consciously posited goals become the body's nature. The second nature that habit engenders is just like the first nature, yet imbued with freedom and intelligence, "a law of the limbs which follows on from the freedom of the spirit."[43]

For Aristotle, a virtue is a habit, and well-ordered habits are the foundation of a good life. A later line of Christian thinkers took a negative view of habit. Augustine, Luther, and Kant interpret religious life as a struggle against a nature whose corruption is entrenched by habits. For Augustine, "the rule of sin is the force of habit [*consuetudo*], by which the mind is swept along and held fast even against its will."[44] Like sin, habit is the enemy of freedom and intelligence. By contrast, for Aristotle, Thomas Aquinas, and Ravaisson, virtue is the right sort of habit, and as the practice of virtue becomes habitual it become both more effective and more enjoyable. "Virtue," Ravaisson writes, "is first of all an effort and wearisome; it becomes something attractive and a pleasure only through practice, as a desire that forgets itself or is unaware of itself, and gradually it draws near to the holiness of innocence."[45] He finds the action of habit in the simplest of organ-

39. Deleuze and Guattari, *Anti-Oedipus*, 284.

40. See Carlisle, "Question of Habit."

41. Aristotle, *Nichomachean Ethics* 1098b, in *Complete Works*, 1736.

42. Aristotle, *Categories* 8b, in *Complete Works*, 14.

43. Ravaisson, *Of Habit*, 44.

44. Augustine, *Confessions*, 164.

45. Ravaisson, *Of Habit*, 45.

isms, facilitating what he calls their movement toward the good. The repetitions of habit weaken passivity and excite activity, doing both "in the same way, by one and the same cause: the development of an unreflective spontaneity, which breaks into passivity and the organism, and increasingly establishes itself there, beyond, beneath the region of will, personality, and consciousness."[46]

Another French thinker in this line is Albert Lemoine, the author of *L'habitude et l'instinct* (1875), in which he attends to habit's power of contraction. By contracting past and present, they interpenetrate, and the past is made to endure: "Habit establishes precisely an indissoluble solidarity between the different moments of duration that unfold; it consists in making the past endure and in prolonging it indefinitely in the present."[47] This is a line of argument that Gilles Deleuze takes up: "We have no other continuities apart from those of our compound habits."[48] Another development comes from Bruno Latour. He refers to Butler in several works but always to make the same point, which is the peculiar "silence" of machines in their relations with human beings. His earliest reference occurs in an epigraph selected from *Erewhon*. The passage reads: "Again, might not the glory of the machines consist in their being without this same boasted gift of language? 'Silence,' it has been said by one writer, 'is a virtue which renders us agreeable to our fellow-creatures.'"[49] Well into his argument and nearing his conclusion, Latour announces "the profound meaning of Butler's sentence I placed at the beginning of this chapter: machines are not talking actors, not because they are unable to do so, but because they have chosen to remain silent to be agreeable to their fellow machines and fellow humans."[50]

The détente is due not to the finesse of the construction alone but also to the habits that it presupposes. Twenty years later, Latour made the connection. The silence of the interface is maintained by waves of what he calls *mini-transcendences*, whose action he attributes to habit. That expression resonates with Butler's way of paving over discontinuity. Everything that exists in time must ceaselessly pass from the happy world of A = A to the hell of A = B. "Writ large," Butler writes, the logical indiscretion "maddens and kills," though writ small "it is our meat and drink: it attends each minutest and most impalpable detail of the ceaseless fusion and diffusion in which change appears to us as consisting, and which we recognize as growth and decay" (*LC*, 35). Change "is essentially miraculous, and the only lawful home of the miracle is in the microscopically small" (*LC*, 34).[51]

46. Ravaisson, *Of Habit*, 53.

47. Lemoine, *L'habitude et l'instinct*, 59, quoted in Sinclair and Wolf, *Bergsonian Mind*, 12.

48. Deleuze, *Difference and Repetition*, 75.

49. Latour, "Where Are the Missing Masses?," 225, quoting Butler, *Erewhon*, chap. 23. See also Latour, *Aramis*, vii, 74, 296; *Reassembling the Social*, 79.

50. Latour, "Where Are the Missing Masses?," 249.

51. Compare Gabriel Tarde, a more likely reference than Butler on this point for Latour: "These tiny beings which we call infinitesimal will be the real agents, and these tiny variations which we call infinitesimal will be the real actions." Tarde, *Monadology and Sociology*, 11.

I think this point is impressively discerned. Latour reaches the same conclusion: continuity is the result of a habitual indifference to discontinuity, a habit that is "the most important, the most widespread, the most indispensable of the modes of existence."[52] Habit, according to Latour, has "the peculiar feature of smoothing over . . . all the little transcendences" to which time and change expose entities, producing "what stays in place on the basis of what does not stay in place."[53]

These authors are all finding the same questions of interest. Duration is the work of an inner force. Things endure, filling out a span of time, through some action of their own. Here theories differ, especially before and after the rise of evolutionary thinking. For Butler, vital duration is activity responding to the new needs that change ceaselessly creates and that create change in response—endogenous change. There is awareness of need, which is perception and consciousness, and there is the feeling of action followed by satisfaction. This passive-active flux is the matrix for the formation of habits and the origin of duration. Thus does life make time endure. Endurance is the action of habits, and all beings in time owe their endurance to life's habitual mini-transcendences—a thesis that has as an implication the obligation to "see every atom in the universe as living and able to feel and remember, but in a humble way" (*UM*, 176).

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52. Latour, *Inquiry into Modes of Existence*, 264.

53. Latour, *Inquiry into Modes of Existence*, 266, 268.

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