

# THE POSSIBILITY OF MEANING IN HUMAN EVOLUTION

by *Barbara Forrest*

*Abstract.* Science undermines the certitude of non-naturalistic answers to the question of whether human life has meaning. I explore whether evolution can provide a naturalistic basis for existential meaning. Using the work of philosopher Daniel Dennett and scientist Ursula Goodenough, I argue that evolution is the locus of the *possibility* of meaning because it has produced intentionality, the matrix of consciousness. I conclude that the question of the meaning of human life is an existentialist one: existential meaning is a product of the individual and collective tasks human beings undertake.

*Keywords:* biology; consciousness; emergence; emergent functions; evolution; existence; existentialism; intentionality; language; life; life forms; meaning; naturalism; organisms; philosophy; purpose; reductionism; religion; science; self-consciousness; significance; species; symbol; value; worldview.

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*The human species will one day be extinct.* The impact of this realization upon the human psyche is jarring, yet science provides evidence for it: 99 percent of all species that have ever lived on earth are now extinct (Wilson 1992, 344). And if the past rate of extinction does not constitute a guarantee of our future, the death of the sun surely does: several billion years from now, our sun will go the inevitable way of all stars, depriving Earth of the only source of energy that makes human life possible (Friedman 1986, 229–35).

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We have established scientifically some disquieting facts: (1) human beings have evolved from nonhuman life forms, meaning that (2) at one time we did not exist, and that (3) according to paleontological and astronomical evidence, at some time in the future we shall cease to exist. Furthermore, from a scientific standpoint, there is no discernible reason that we *had* to evolve in the first place, and there is no guarantee that we shall continue to evolve successfully; more hominid species have become extinct than have survived. The price of such knowledge has been the gnawing question of whether human existence has genuine meaning if it was constructed with cranes rather than supported by skyhooks, as Daniel Dennett says.<sup>1</sup>

The problem of meaning is easily resolved for those who embrace a preconstructed system of meaning such as religion.<sup>2</sup> However, religion cannot help us find meaning in any honest sense unless it can assimilate the truth about where human beings have come from, and the only real knowledge we have about where we came from we have acquired through science. Yet the journey from ignorance to knowledge about our origins has deposited us at a point that Philip Kitcher calls “painful enlightenment,” a sometimes-experienced result of scientific inquiry in which “people acquire beliefs that have an impact on their values” and experience a loss of “psychological comfort” (Kitcher 1998, 52–53):

The normal course of scientific inquiry may make our community better off in either (or both) of two ways. First, one of the items valued may be knowledge of some aspect of nature, and a new discovery may deliver that knowledge. Second, inquiry can expand the available strategies, making it possible for the community to pursue goals that previously seemed beyond reach or to proceed with greater efficiency and thus attain far more than it would otherwise have done. . . .

Painful enlightenment is different. Even though the goal of knowing some aspect of nature may be achieved, the principal consequence of the advance in knowledge is constriction of the set of available strategies and/or destabilization of the scheme of values. The set of available strategies associated with a valued item may become empty, or the community may come to believe that there are no strategies for attaining that item, or the standard justifications for valuing the item may become untenable, or the community may come to believe that there is no possible way of justifying the value of that item. If the item has a high index of value, representing its importance and centrality to the lives of the community, then the dislocation will be severe. (Kitcher 1998, 53–54)

Human existence as inherently meaningful—one of the cornerstones of the religious worldview—is such an item.

If the human species is headed for extinction, which the evolutionary record and solar astronomy tell us it is, then the problem of meaning for many people becomes acute. Is the choice either to reject science, with its unhappy discoveries and implications, or to ignore it in favor of a more comfortable but less supportable worldview? If we accept what science shows us about ourselves, does human existence mean anything?

In this paper I explore the question of whether evolution can provide a basis of meaning for human existence. The word *meaning* here will jointly denote purpose, value, and significance. I understand the *purpose* of human existence to refer to a plan or agenda advanced either during an individual life or through collective human existence. The *value* of human existence refers to whether it is of any merit or account, whether it is *important*. The notion of *significance* is roughly the same as that of value, but it may include the idea that human existence is indicative of something beyond itself. Meaning in the higher sense I specify includes these connotations and will be referred to as *existential meaning*. So the question of meaning is the question of whether human existence is endowed with purpose, whether it is important to something/someone, and whether it is meritorious in any sense. A related question is whether meaning is inherent in human existence or is an artifact or construct.

The implication of evolution is that the problem of existential meaning has not always existed, because it is a problem only for human beings, and they have not always existed, nor have they always had the ability to pose questions about meaning. The problem of meaning exists only because there are human beings, and there are human beings only because of evolution, which was taking place long before we appeared on its timeline and would have continued even if we had not showed up at all.

I argue that, although the phenomenon of human evolution itself endows human existence with no existential meaning, it *is* the origin of the *possibility* of *creating* such meaning, because our ability to pose the question of meaning is rooted in our existence as intentional beings, and intentionality is a product of evolution. Human intentionality is of a sufficiently high grade to enable us to make our existence one of the focal points of this intentionality. The human capacity to seek meaning in the existential sense is rooted in our capacity for meaning in the intentional sense: our ability to direct our thinking, first toward something external to ourselves and then to ourselves, and to be aware or conscious that we do this. Meaning in both senses is rooted in our ability to make connections—between our thoughts or words and what they represent and between ourselves and what we see as vital to human interests.

I also argue that meaning in the higher sense is an *existential* artifact, constructed out of capabilities we possess by virtue of the particular evolutionary path we have traveled. What science shows us about ourselves has seriously undermined—or at least forced changes in—the belief that human existence is either naturally or divinely endowed with predefined meaning. Humans must *achieve* meaning in the sense enunciated by various existentialist thinkers, and evolution has endowed us with the capacities essential for this achievement.

I base my position on the work of Dennett, a philosopher who constructs his views in large measure on the basis of evolutionary biology and

cognitive science, and Ursula Goodenough, a cell biologist who has ventured onto the humanistic side of the academic field in an attempt to ground meaning in the continuity not only between human beings and other animals but between human life at the cellular level and at the conscious level.

#### LOOKING FOR MEANING

Humans were intentional beings before they became conscious ones, so we can refine our earlier understanding of meaning by viewing it as a continuum, with simple intentionality on the *lower*, or evolutionarily earlier, end, semantic or symbolic (representative) meaning on the ascent toward the *higher*, or evolutionarily more recent, end, and existential meaning on the *highest*, or most recent, end. Meaning in the highest sense is derived from whatever enables an individual to live with a sense of worth and importance—a belief system, a purpose, a mission. It may be understood by those who seek it as originating in an ultimate, transcendent dimension, or it may not be so understood, depending on the social and psychological needs and epistemic commitments of the meaning seeker.

Clearly our lives revolve around meaning. On the lower end of the meaning continuum, things shape our behavior by being objects we seek or avoid, acquiring value for us insofar as they serve our purposes. A berry or a fish meets a metabolic need and acquires survival value. A flat surface “means” we can use it as a table where we can cut the fish, and thus it acquires utilitarian value. When human beings began to wonder whether we ourselves serve a purpose—the ability to wonder about this having been made possible by the ability to examine our lives representatively through language—the search for meaning in the higher sense began.

The concept of meaning in the higher sense, understood as a product of evolution, is not a reassuring notion. Edward O. Wilson’s explanation deromanticizes meaning even further by defining it in the lower sense, in terms of its neurobiological matrix: “What we call *meaning* is the linkage among the neural networks created by the spreading excitation that enlarges imagery and engages emotion” (Wilson 1998, 115). He is referring to semantic meaning as it is employed by semantic memory, the ability to connect “objects and ideas to other objects and ideas” (1998, 134). Wilson thus locates the origin of meaning in the ability not only to remember but to imagine, to symbolize, and to feel emotively, all of which in their most basic forms are neural activities. This is related to what I have specified as meaning on the lower end of the continuum.

The import of such neural activity for meaning in the higher sense is that if our brains had no capacity to produce imagery, we could not envision or create possibilities for ourselves—eliminating the ability to consider the meaning of our existence; if we could not symbolize possibilities, we could not communicate our visions to ourselves or to others; and finally, if imagining and symbolizing were not linked to emotive capability,

then we would not *care* if life had meaning in any sense at all. Furthermore, it is important that these present capabilities are built on the (genetically and culturally) conserved capabilities of our evolutionary ancestors, whose successful adaptation made human existence possible.<sup>3</sup>

#### MEANING'S LOCUS IN INTENTIONALITY

Human beings are not so much meaning seekers as meaning makers, and human existence acquired the possibility of meaning when human persons became able to reflect on themselves and their situations. Our ability to make meanings is rooted in our nature as intentional systems, a nature we share with all living things, and our intentionality is a product of the evolutionary process.

Not all intentional systems are organisms—computers are also intentional systems—but all organisms are intentional systems. Because I am human, the fact that my thinking/mental state is *about* something, is focused or directed, marks me as an intentional being. The fact that I am *aware* of what it is about marks my uniquely human intentionality. The fact that my thinking is *about* whether my existence itself has meaning marks my relatively high level of human intentionality. Although we share intentionality with even the lowliest life forms, we are unique in that we alone are aware of our intentionality, and we can express both our intentionality and our awareness of it in words and other symbols.

An intentional system is one whose internal disposition or state or functioning is directed toward or linked to, aims at, or functions in conjunction with something external to itself. As Dennett puts it, an intentional state is “about” something. An intentional state is directed toward the consumption of food, for example; thus, the state has content. According to Dennett, “*Intentional systems* are, by definition, all and only those entities whose behavior is predictable/explicable from the intentional stance. Self-replicating macromolecules, thermostats, amoebas, plants, rats, bats, people, and chess-playing computers are all intentional systems” (Dennett 1996, 34). The “intentional stance,” Dennett says, is “the strategy of interpreting the behavior of an entity (person, animal, artifact, whatever) by treating it *as if* it were a rational agent who governed its ‘choice’ of ‘action’ by a ‘consideration’ of its ‘beliefs’ and ‘desires’” (1996, 27). In short, if the intentional stance means explaining the behavior or functioning of something as if that something could think about what it is doing, then intentional systems are those whose functioning or behavior exhibits *apparently* purposeful, goal-directed, rational activity, that is, the functioning *looks* purposeful even when the system is not the kind in which conscious purpose is present. At the very least, an intentional system’s functioning or behavior is the kind for which there are *reasons*, even when the system is not truly rational. Human, and some animal, behavior is purposeful and

goal-directed. The functioning or behavior of all other intentional systems is more properly referred to as quasi-purposeful, quasi-goal-directed, and quasi-rational. An intentional system is a teleological system whose telos is entirely natural, determined by its systemic configuration and the external availability of whatever answers to the requirements of its particular configuration.

Dennett explains intentionality as a trait of even the most primitive organic system such as the amoeba:

Consider a simple organism—say, a planarian or an amoeba—moving nonrandomly across the bottom of a laboratory dish, always heading to the nutrient-rich end of the dish, or away from the toxic end. This organism is seeking the good, or shunning the bad—*its own* good and bad, not those of some human artifact-user. Seeking one's own good is a fundamental feature of any rational agent, but are these simple organisms seeking or just "seeking?" [*sic*] We don't need to answer that question. The organism is a predictable intentional system in either case. (Dennett 1996, 32)

The amoeba, of course, is not conscious of its behavior. That does not preclude our explaining its behavior from the intentional stance, but it does point out a contrast between human beings and other intentional systems. An amoeba, for example, can "track" or follow a food source and can discern the difference between a nutrient and a toxin; its intentionality lies in the possession of appropriate receptors. Human beings, however, can track an object or person over time and *reidentify* it as the same. Dennett points out that "The practice and projects of many creatures require them to track and reidentify individuals . . . but no evidence suggests they must appreciate that this is what they are doing. . . . Their intentionality never rises to the pitch of metaphysical particularity that ours can rise to" (Dennett 1996, 117). For example, a human being is capable not only of reidentifying another human being but of doing so with joyful anticipation of the reunion, resentful memories of past conflicts, or deliberately cultivated indifference.

For all its uniqueness, however, human intentionality is what Dennett calls "derived intentionality." It is not self-constitutive. The fact that human thought is *about* something implies a referent in which the thought is grounded. Dennett explains it this way:

A shopping list written down on a piece of paper has only the derived intentionality it gets from the intentions of the agent who made it. . . . It is . . . an artifact created by your brain and means what it does because of its particular position in the ongoing economy of your brain's internal activities and their role in governing your body's complex in the real, surrounding world.

. . . the brain is an artifact, and it gets whatever intentionality its parts have . . . from the intentions of its creator, Mother Nature (otherwise known as the process of evolution by natural selection).

. . . the intentionality of brain states is derived from the intentionality of the system or process that designed them. (Dennett 1996, 51–53)

Dennett's explanation of human intentionality embeds it in a natural matrix from which the mind is not differentiated in any metaphysically significant way.

Until Darwin, saying that human intentionality is derived would have been tantamount to saying that human intentionality derives from divine intentionality. Insofar as human beings are rational, they share one of God's characteristics, that is, human thought is a derivative of divine thought, and thus human beings are blessed with their quasi-divine and uniquely human essence. However, modern biology, beginning with Darwin, continuing through current work in neuroscience, and supplemented by cognitive science, has undermined this essentialist idea by undermining the idea of divinely derived intentionality; at the very least, it has pushed the concept of the divine origin of human intentionality further back in the explanatory scheme.

We now know that we are one species among millions, all linked by the presence of DNA, the possession of which we share with the lowliest life forms. We have our set of 100,000 human genes only because having this genome turned out to be advantageous in making us the kind of creature whose technological prowess permits the successful occupancy of almost any ecological niche on the planet. There was nothing initially special about this; the specialness derives from the end result—successful adaptation and successful continuation. This is the kind of knowledge that results in the painful enlightenment of which Kitcher speaks.

Evolutionary biology, which now, unlike in Darwin's day, includes genetics, undercuts completely the Aristotelian view that the manifest properties of human beings are the constituents of an essence that eternally defines what being human means. It has made human rationality a historical phenomenon. Dennett aptly expresses this:

In the beginning there were no reasons; there were only causes. Nothing had a purpose, nothing had so much as a function; there was no teleology in the world at all . . . [because] There was nothing that had interests. But after millennia there happened to emerge simple replicators. . . . *If* these simple replicators [were] to survive and replicate . . . their environment [had to] meet certain conditions . . . conducive to replication. . . .

When an entity arrives on the scene capable of behavior that staves off, however primitively, its own dissolution and decomposition, it brings with it into the world its own "good" . . . it creates a point of view from which the world's events can be roughly partitioned into the favorable, the unfavorable, and the neutral. (Dennett 1991, 173–74)

The entity now has interests to pursue. There are specifiable reasons for what it does, although these reasons are certainly not known to it, as Dennett emphasizes: "The first reasons preexisted their own recognition. Indeed, the first problem faced by the first problem-facers was to learn how to recognize and act on the reasons that their very existence brought into existence" (Dennett 1991, 174).

This means that reasons themselves have an evolutionary history precisely coextensive with the evolution of life forms. The first self-replicating macromolecule was the first intentional system, and from this point in history there is an entity of which it makes sense to understand its behavior as having reasons, or having a rationale. Moreover, if life evolved from nonlife, we can infer that meaning (in both the lower and the higher senses) evolved from nonmeaning. So meaning originates in the ability to do something, that initial something being self-replication, and is therefore rooted in this primitive kind of agency. Dennett explains this:

Through the microscope of molecular biology, we get to witness the birth of agency, in the first macromolecules that have enough complexity to “do things.” This is not . . . intentional action, with the representation of reasons, deliberation, reflection, and conscious decision—but it is the only possible ground from which the seeds of intentional action could grow. . . .

. . . An impersonal, unreflective, robotic, mindless little scrap of molecular machinery is the ultimate basis of all the agency, hence meaning, and hence consciousness, in the universe. (Dennett 1995, 202–3)

There is no longer any serious informed debate about this: *we are the direct descendants of these self-replicating robots*. (Dennett 1996, 22)

In short, consciousness, the construction site of meaning in the higher sense, is rooted in intentionality, the locus of meaning in the lower sense. Intentionality in turn is rooted in primitive agency, beginning with the self-replication of the first macromolecules on earth. This realization points to the major thesis of this paper, also expressed by Dennett:

This is the defining theme of existentialism in its various species: the only meaning there can be is the meaning you (somehow) create for yourself. . . . Darwinism does have some demystification to offer in its account of the process of meaning-creation . . . *importance itself*, like everything else that we treasure, gradually evolves from nothingness. (Dennett 1995, 184)

At this point the anguished cry of “Reductionism!” may be anticipated: If we are nothing but robots, then our lives are meaningless, worthless! To interpret reductionism so drastically, however, is to misunderstand what it truly is.

Let us accept, for the sake of argument, Dennett’s assertion that the most basic physiological processes of which our higher capabilities are constructed are those occurring in the most basic organic system, the cell. A robot is a machine programmed with instructions to accomplish a certain task. That is exactly what a cell does—it accomplishes the tasks specified by its genome. The human brain, the locus of all human higher capabilities, including meaning making, is composed of cells, as is every part of the body. However, this kind of reductionism does not imply that there is no more worth to human existence than to a single cell or a sophisticated machine. The reduction of these human higher capabilities is merely the explanation of them. They still exist, functioning exactly the same way,

endowing human experience with the same richness as before the explanation. A proper reductionism does not explain away our higher capabilities; rather, our understanding of them is simply grounded in a better understanding of their foundations.

Knowledge of the basic processes of consciousness is no threat to the value of consciousness itself unless, as Dennett says, our understanding of consciousness is “based all along on confusion or mistaken identity” (Dennett 1995, 82). The fact that we are “descended from robots”—the first self-replicating macromolecules—does not mean, according to Dennett, that we are robots ourselves when considered at the level of the full, particularized configuration of organs that constitutes a human being:

Now, it certainly does not follow from the fact that we are descended from robots that we are robots ourselves. After all, we are also direct descendants of fish, and we are not fish. . . . But unless there is some extra ingredient in us (which is what dualists and vitalists used to think), we are *made* of robots—or, what comes to the same thing, we are each a collection of trillions of macromolecular machines. And all of these are ultimately descended from the original self-replicating macromolecules. So something made of robots *can* exhibit genuine consciousness, because you do if anything does. (Dennett 1996, 23–34)

According to Dennett, whatever we lose through better scientific understanding of human consciousness and intentionality is offset by the deeper, more accurate understanding we gain. This point is illustrated by the fact that water is no less enjoyable and essential to human well-being after we understand that it is composed of hydrogen and oxygen atoms. We also can draw upon a metaphor used by Goodenough to show that reductionism is not a threat to the value and appreciation of something at a higher level. Goodenough asks us to consider a Mozart sonata. Understanding the composition techniques and the notes diminishes neither its beauty nor our capacity to appreciate it (Goodenough 1998, 34). If one subsequently loses the capacity to enjoy the music, Dennett will say that this loss is caused not by one’s understanding the circumstances under which the music was composed but by one’s initially mistaken idea of its unearthly origins. A more realistic conception of Mozart’s genius at the outset forestalls the disillusionment that might result from its demystification.

Now let us apply this reductive analysis to the question of the meaning of human existence. Evolutionary theory, by demonstrating that human life has evolved from nonhuman life, is thus accused of robbing human existence of meaning. But this accusation is well placed only if there is no other source of meaning in human existence. If the possibility of meaning is contingent upon the development of intentionality, and if intentionality is a product of evolution, making the possibility of meaning likewise a product of evolution, to deny the value of any meaning human beings themselves construct because of its roots in our evolutionary development is to commit the genetic fallacy of condemning or devaluing something because of its origin, which is irrelevant to value.

Moreover, if a reductionist explanation is a threat to the possibility of meaning in human existence, it may be that our concept of meaningful existence is unrealistic from the outset. Maybe the human search for existential meaning beyond existence itself is an inflation of our own importance in the cosmos. Why do our lives have to mean anything in any sense that goes beyond the span of each individual life or the life span of the species?

Although consciousness of our own intentionality is impressive, the value of its singularity should not be overestimated. As Dennett argues philosophically and Goodenough explains scientifically, consciousness is part of the continuum of life. Although on the “higher” end—the end at which we, the conscious, meaning-making organism, can puzzle over whether our existence has any meaning—it is firmly related to the “lower” end, which Dennett says is “the only possible ground from which the seeds of intentional action could grow” (Dennett 1995, 202). Our consciousness of our intentionality is the product of the human genome, which ultimately determines the fate of our species. Roger Masters puts human existence in a perspective that should serve to keep our hubris in check:

Evolutionary biology does not permit such an exaggerated view of human nature. We are living beings, no more precious than any other living form except in our own eyes. Because we can eat or kill virtually all other animals in the environment, we are at the top of the food chain—what is technically called “top carnivores.” But this does not mean that we are independent of natural necessity or in control of our evolutionary destiny. (Masters 1989, 122)

Being top carnivore is certainly an enviable position, but can we wring any meaning out of it?

#### THE CONTINUITY OF INTENTIONALITY

I have tried to explain how the human capacity for meaningful existence is rooted in consciousness of our intentionality, the product of evolution. At this point I shall connect this philosophical view to Goodenough’s scientific one, showing how it is supported and complemented by her scientific explanation of the origin of intentionality and meaning at a very basic organismic level.

In *The Sacred Depths of Nature* (1998), Goodenough says, “Reproductive success is governed by many variables, but key adaptations have included the evolution of awareness, valuation, and purpose. In order to continue, genomes must dictate organisms that are aware of their environmental circumstances, evaluate these inputs correctly, and respond with intentionality” (Goodenough 1998, 170–71). Given the fact of reproductive success in any species, Goodenough’s remark implies that, despite being top carnivore, humanity is not the only life form capable of purposive and evaluative behavior. Although human consciousness is the highest

manifestation of awareness and intentionality in the natural world, Goodenough shows that there are degrees of awareness and intentionality, beginning with the light-sensitive reactions of one-celled life forms and existing even in plants: “Indexical meaning systems are found throughout life: in plants, perception of red light by the seed’s phytochrome system means that the seed should germinate” (Goodenough 1998, 111). This is intentionality in a very basic sense, but the fact that it is intentionality at all indicates that perhaps human beings have elevated their self-awareness to a metaphysical status it does not deserve. As stated earlier, learning more about our situation in the cosmos can be painful; Goodenough, too, has experienced the “existential shudder” such knowledge can produce:

I’ve had a lot of trouble with the universe. It began soon after I was told about it in physics class . . . I was overwhelmed with terror. . . .

- Our Sun . . . will die, frying the Earth to a crisp during its heat-death, spewing its bits and pieces out into the frigid nothingness of curved spacetime.

. . . And when I later encountered the famous quote from physicist Steven Weinberg—“The more the universe seems comprehensible, the more it seems pointless”—I wallowed in its poignant nihilism. A bleak emptiness overtook me whenever I thought about what was really going on out in the cosmos or deep in the atom. So I did my best not to think about such things. (Goodenough 1998, 9–10). . . .

We are told that life is so many manifestations of chemistry and we shudder, a long existential shudder. (Goodenough 1998, 33)

Goodenough appears to have experienced what Hilary Putnam refers to when he says, “Science is wonderful at destroying metaphysical answers, but incapable of providing substitute ones. Science takes away foundations without providing a replacement” (Putnam 1987, 29).

Although science has made some metaphysical answers untenable (the existence of mind as an ontologically independent substance, for example), I do not agree that it leaves us without foundations. Rather, it has *changed* those foundations; taking away some, it has given us others. Science gives us a platform that is not only all around us but—perhaps less vividly because less *tangibly* for us—in our genes. With respect to the need for a stable platform upon which to construct an epistemologically justifiable worldview, Goodenough’s view is that “our scientific understanding of nature seems to me like a good place to begin since it at least tells us what it is that we’re working with. It doesn’t follow that this understanding becomes a blueprint, but rather a touchstone.”<sup>4</sup> That is, science does not prescribe every aspect of any worldview but rather serves as a reference point by which to gauge the accuracy of the empirical claims underlying the belief systems that constitute a worldview.

In response to the problem of nihilism posed by Steven Weinberg’s observation that the universe appears pointless, Goodenough offers the possibility of existential meaning rooted in the *continuity* of all life forms and in the human goal of *continuation* of our species. Continuity is present

not only in the biological universality of DNA but in the presence of “meaning systems,” which are “unique to biology” (Goodenough 1994, 608). The presence of meaning systems—intentionality—at all biological levels indicates various levels of awareness, though only human beings are *consciously* aware. Human consciousness—mystifying to most people—is continuous with the bacterium’s awareness of its environment, although human consciousness is at the “high” end of the continuum. All awareness, and thus human consciousness, is the product of evolution—not only at the human level but, according to Goodenough, even at the bacterial level: “I see the whole enterprise, from bacteria to starfish to maples to humans, as operating on the same principles, as profoundly homologous” (1994, 604). Recognizing the religious implications of this view, Goodenough informs us that “Recent discoveries in biology tell us that concepts central to religious thought [meaning, valuation, and purpose], concepts that we have believed to be unique to human perceptions and concerns, are in fact operant throughout the biological world” (1994, 604). With respect to meaning, the beginning of the process of valuation, Goodenough asserts that “meaning . . . is in fact fully applicable to the perceptions of a bacterium or a starfish or a maple” (1994, 605). The question, then, concerns the nature of the intentional continuity between the bacterium and human beings. Human beings have the ability to represent meanings mentally through the use of symbols, but meaning is present at both the molecular level and the mental level. Goodenough first explains human meaning making, the most familiar and well-established form.

At the mental level—where we are aware of meaning making—the process begins, for example, with the visual perception of a chair; the perception elicits a physical response, or meaning, such as sitting. The brain can also respond to the *word* “chair” by producing a mental image or by summoning the concept of a chair, and the meaning becomes symbolic. If one spots a chair when one is tired, the perception elicits an affective meaning as well. The continuity of the mental level of meaning with the molecular level consists in the simultaneous biochemical reactions that occur at the cellular level, for example at the thought of the chair: “The purpose of the word *chair* . . . is to elicit the biochemistry necessary to call up the mental concept of the piece of furniture” (1994, 607). A biochemical process is also initiated, of course, with the visual perception of a chair.

There is a less intuitively recognizable but just as genuine production of meaning in human beings at the molecular level, for example, during the production of insulin. The presence of high blood sugar indicates, or “means,” that insulin is needed, and the pancreas cells are accordingly stimulated to produce it. The insulin molecule then binds to the insulin receptor on a cell, “meaning” that sugar is present, and stimulates the absorption of the sugar by the cell. The sugar’s indication of the need for the insulin constitutes a rudimentary yet genuine case of meaning. This molecular

meaning making is the same thing that happens in mental perception when neurotransmitters, stimulated by the perception of the chair, bind to their receptors on brain cells (1994, 606–7). Mental activity and cellular activity are continuous by virtue of the common presence of such molecular meaning production.

In the bacterium, intentionality is evident—as in human beings at the molecular level—in the functioning of receptors, proteins that “serve as transducers of meaning.” Bacterial receptors interact with molecules released by decaying organisms that indicate the presence and location of food—meaning in the most basic sense. This interaction stimulates a “cascade” of shape changes in the bacterium enabling it to move toward the food, a process known as *chemotaxis*. Bacteria “use receptors continuously to evaluate their circumstances,” and in the presence of toxic molecules, a cascade of shape changes results in the bacterium’s moving away from the toxin (1994, 605–7).

It is clear that Goodenough sees the functioning of receptors in bacteria and other life forms as genuine instances of meaning, not just analogues of human meaning making. There *is* something unique about meaning at the mental level in human beings: “The uniqueness of humans is that we know the meaning of the word *meaning*” (1994, 608). Yet Goodenough also says that “This ability, while an astonishing innovation, is only the most recent innovation in the evolution of receptors. Meaning and valuation systems, per se, prevail all the way down” (1994, 608). Evaluation, too, consequently, is engaged in by organisms at all levels of life, evaluative capability—the ability of an organism to respond to its environment—having further evolved out of simple awareness and intentionality:

The evolution of awareness has spun off two important capabilities:

- Organisms usually attach a *value* to the things they perceive—this is good, that is bad—which, in complex animals, is experienced via neural and hormonal emotional systems.
- Organisms usually attribute a *meaning* to something they’re aware of, an ability that has for us become manifest in our capacity to think and act symbolically.

These capabilities have converged in human brains as our ability to symbolize ideas and emotions, integrate them, and present them to the working memory. (Goodenough 1998, 105)

In the ability to form symbolic representations Goodenough sees the uniquely human aspect of meaning making. Human beings have the capacity to infuse life with meaning at the cognitive level by means of one of the most vital instruments of meaning making, language, through which we articulate emotional and intellectual states that form the basis of culture. Goodenough sees all of our higher capabilities, including our ability to create morally normative meanings, as issuing from our ability to create symbols, which is an evolved capability.<sup>5</sup>

It is, I believe, our capacity to apprehend the meaning and the emotion embedded in symbols that endows us with our capacity for empathy. . . . Once there is empathy, then there can be the feeling we call compassion. . . . And emergent from our sense of compassion, in mortal conflict with our insistent sense that we should win, is our haunting sense that things should be fair. (1998, 114–15)

The idea that moral norms emerged from our evolved cognitive and emotive capacity, if correct, shows that all of our higher capabilities are rooted in our evolved capacity to preserve meanings through symbols. However, while language is uniquely human—an aspect of conscious human intentionality—it is nevertheless continuous with what happens at the molecular level, not only in human beings themselves but in all other forms of life. Goodenough can explain human linguistic ability as she explains other increasingly ascendant capabilities of life forms for which the matrix is molecular activity: as “emergent” functions. Through the concept of emergence, the specter of reductionism ceases to threaten the value of higher human capabilities, because we can understand and appreciate the capabilities at one level while recognizing their origin at a lower level.

Life can be explained by its underlying chemistry, just as chemistry can be explained by its underlying physics. But the life that emerges from the underlying chemistry of biomolecules is something more than the collection of molecules. . . . once these molecules came to reside within cells, they began to interact with one another to generate new processes, like motility and metabolism and perception, processes that are unique to living creatures, processes that have no counterpart at simpler levels. These new, life-specific functions are referred to as emergent functions. (1998, 28)

And just as life emerges from the underlying chemistry of biomolecules, so human consciousness—with all that it entails—emerges from intentionality, which in turn has emerged from the evolution-produced human brain in interaction with its environment.<sup>6</sup>

#### WHENCE MEANING? (THE *REALLY* IMPORTANT KIND)

Goodenough is doing what Darwin did, but more thoroughly, aided by the mountain of biological data accumulated since Darwin. She is explaining the human capacity for meaning naturalistically by locating it in a natural function. Human intentionality, she and Dennett tell us, is a product of evolution. Goodenough’s explanation as a scientist—that meaning making at the conscious human level is continuous with the bacterium’s ability to detect differences in the substances surrounding it—is the same as Dennett’s explanation as a philosopher; both are based on science. However, she knows that her explanation is not likely to strike a positive chord in people who seek meaning in a transcendent source.

For me, the existence of all this meaning and intent, and my ability to apprehend it, *is* the ultimate value. The continuation of life reaches around and grabs its own

tail, and forms a sacred circle that requires no further justification, no purpose other than that the continuation continue until the sun collapses or the final meteor collides. . . .

Very well. Such a statement, which we can call a credo of continuation, may or may not elicit emotional resonance. (Goodenough 1994, 612)

The plain fact is that human beings exist because earlier life forms constituted the biological ancestry that has produced us. But this is the *historical* reason we exist. It does not address the question of the *reason* for our existence when reason is understood as *purpose*. The purpose of human existence implies a future with a task to be accomplished or a plan to be fulfilled—but there is no evidence that human beings exist in order to accomplish a task or in order to fulfill a plan determined by anyone but ourselves. The tasks and intentions we understand ourselves to have are the result of existing in a cosmos that would—and did, and will—exist without us. The mere fact of existence, with its natural pressure toward continuation, confers tasks and suggests purposes that become our conscious intentions (understanding *intentions* in the usual sense), along with any other goals we adopt. Most fundamentally, the goal of biological continuation, Goodenough says, can “suggest principles and practices for the leading out of our lives” (1994, 612). In addition to the basic process of continuation, however, or perhaps as part of it, values and purposes are suggested by what we must do to further the process. Human beings have created social, intellectual, and spiritual structures, all of which have genuine, if not demonstrably transcendent, meaning.<sup>7</sup>

Finding meaning, then, is a task we can assume only because we have evolved to the stage of self-consciousness—consciousness of our own consciousness. Death consciousness also surely plays a significant role in the effort to find meaning in our existence; each individual’s certainty of death exerts a more pronounced pressure to locate a source of meaning than does the prospect of species extinction. In an imaginary scenario in which human beings were naturally immortal, if we had all the time in the world, if there were no end toward which life moves biologically, there would arguably be little need for concern over its purpose. The question of meaning would likely cease to press us at all. In addition to individual death, the natural telos of the species—extinction—merely compounds the urgency of the question of existential meaning.

For Goodenough, the sufficiency of a naturalistic explanation and the fruitfulness of the search within nature for the meaning of existence is the product of a realization that one need not have ultimate answers in the traditional sense: “The realization that I needn’t have answers to the Big Questions, needn’t seek answers to the Big Questions, has served as an epiphany” (Goodenough 1998, 12). In this epiphany, she finds herself capable of acceptance, which, she says,

can be disappointed and resentful; it can be passive and acquiescent; or it can be the active response we call assent. When my awe at how life works gives way to self-pity because it doesn't work the way I would like, I call on assent. . . . To give assent is to understand, incorporate, and then let go. With the letting go comes that deep sigh we call relief, and relief allows the joy-of-being-alive-at-all to come tumbling forth again. . . . Once [assent] is freely given, one can move fluidly within it." (1998, 47)

So can evolution be the locus of meaning in human existence? The answer is in one sense yes and in another sense no. It is yes if by *meaning* we understand intentionality and human consciousness, which make a meaningful existence possible, because the question itself is not possible without consciousness of our intentionality, a direct product of evolution. The answer is no if we expand meaning to include inherent purpose or value or significance. From an evolutionary standpoint, human beings have no more significance than any other organism. If we did, we would be special in the sense of being uniquely important to the planetary and cosmic scheme of things; however, the evolutionary history of all living things indicates that we are not so privileged. In *The Meaning of Evolution*, George Gaylord Simpson conveys an estimation of human existence that is not likely to strike a positive chord in most people: "Man is the result of a purposeless and natural process that did not have him in mind. He was not planned" (Simpson 1967, 345). So how can human existence have any meaning in the higher sense?

The answer is an existentialist one: We must constitute our own significance as existing beings, bearing the existential burden of choosing what we will become individually and collectively—a burden human beings inherited along with the particular spot we occupy on our particular branch of the evolutionary tree of life. Yet if we occupied any other branch of this tree, we would not be capable of even wondering what our choices are. Dennett endorses the distinctly existentialist implications of Stephen Jay Gould's assertion that "We are the offspring of history, and must establish our own paths in this most diverse and interesting of conceivable universes—one indifferent to our suffering, and therefore offering us maximal freedom to thrive, or to fail, in our own chosen way" (Dennett 1995, 311).

There are various responses to our inability to discern *intrinsic* meaning in human existence. I have noted Ursula Goodenough's response of acceptance in letting go of the need for answers to the "Big Questions." Another possibility, common since Darwin, is retreat into religious dogma, ignoring the findings of science. Of course, there is also the possibility of assimilating evolution into the religious worldview, a possibility not to be lightly dismissed provided certain conditions are met. Finally, there is the existentialist response, exemplified by Nietzsche and others.<sup>8</sup>

Eliminating outright the viability of a worldview based on the dogmatic religious rejection of science, and acknowledging the less-than-conclusive epistemological justification for any religious view that requires a super-

natural source of meaning, the most well-founded choice is the existentialist view when it is grounded naturalistically in the scientific illumination of human existence.<sup>9</sup> This is essentially Goodenough's view, as well as Dennett's; it consists of a forward-looking acceptance (without existentialism's usual morbidity) of the task of creating meaning at both the individual and societal levels. If evolution is the source of intentionality, and conscious intentionality is the matrix of the possibility of existential meaning, then existence really does precede essence, as Sartre asserted—if we define essence as the kind of conscious intentionality that has evolved in human beings and accept the temporality and mutability—the *historicality*—of this kind of essence. Furthermore, there is no inherent reason why other higher animals cannot share this kind of intentionality to some degree, and such shared capability provides a sense of connection between ourselves and other intelligent creatures.

Once we accept the idea that there are no skyhooks, as Dennett asserts, then where must we look for meaning? Precisely where some are already looking; at the projects we choose for ourselves individually and collectively. This choice offers no ultimate solace, but Goodenough's description of the continuity of all life may diminish the threat of alienation in an existence without ultimate answers. It can offer the possibility of naturally grounded purpose if not the hope of an ultimate purpose to human life.

The project of the continuation of biological life that Goodenough proposes is a long-term one, however. In the short term, human beings confront the existentialist task of choosing projects. Both collective and individual projects require existential fortitude in the face of knowledge that even if the project of continuation is successfully undertaken, it, too, will be nullified by the one astronomical event with which human life is most vitally connected—the death of the sun—not to mention the statistical probability that we will be extinct long before our most important star becomes “a black rock, cold as the void of space” (Friedman 1986, 235).

The yearning for an ultimate answer to the problem of meaning may be too deep in most persons to be given up. Certainly we may credit the *desire* for ultimate answers as a stimulant to inquiry, but if it were possible to achieve them, there would no longer be such a stimulant. In any case, no answer to any fundamental question is truly an ultimate one; we can always raise further questions. So we must settle for penultimate answers, stopping when our existential yearnings cannot be satisfied from within the natural context out of which they arise. And while the enhanced understanding of human existence made possible by science is alone not a *sufficient* determinant of value and meaning, it can engender in us a “natural piety” before the universe and the process that has produced us.<sup>10</sup>

The locus of the *possibility* of meaning—human evolution, encompassing the development of intentionality—is determinate. The content and future of meaning are open-ended and indeterminate, however. Evolution

means change, and the constancy of change means we will never have ultimate answers. This promises inexhaustible possibilities of meaning as human beings individually and collectively search for deeper natural knowledge and social understanding. Science by its nature cannot yield ultimate answers; as its history amply documents, neither can philosophy. Scientific knowledge increases incrementally in a permanently asymptotic relationship to the uniquely human goal of truth, at the pinnacle of which we stand as the initiators of the search. The fact that only human beings occupy this pinnacle makes it appropriate now to return to George Gaylord Simpson's remarks in *The Meaning of Evolution*, which, although beginning with the discomfiting observation that human beings are not an inevitable product of the evolutionary process, end with the assurance that we are indeed a unique one: "It is . . . a gross misrepresentation to say that [man] is just an accident or nothing but an animal. . . . man is unique . . . defined by qualities found nowhere else, not by those he has in common with apes, fishes, trees, fire, or anything other than himself" (Simpson 1967, 345).

#### NOTES

1. "Cranes," in Dennett's terminology, are the natural mechanisms that enhance the power of natural selection, whereas "skyhooks" are explanations of life forms that presuppose the need for a supernatural "mind" to account for their design (Dennett 1995, 73–80).

2. I call religion a preconstructed system of meaning because for almost everyone, except the few people in history who have been innovative enough to found new religions, religion comes to them in a form determined by its earlier adherents. Of course, there can be other sources of meaning—political worldviews such as Marxism, for example. But these have been less universal and less fundamental to the human search for meaning than religion has been.

3. "[O]ne of the basic principles of evolution is the conservation of previous gains in adaptation" (Donald 1991, 165).

4. Ursula Goodenough, personal communication, 6 March 1999. This comment was in response to my question of how one can avoid the dilemma of relativism.

5. Dennett says that language "is ultimately grounded in the rich earth of biological function" (Dennett, 1995, 402). Many nonhuman animals experience emotional states. Emotional experience is not dependent on the capacity to create symbols. Other animals, however, cannot reflect on these states and represent those reflections. For that, symbol-making capability is needed.

6. Emergence is not a new idea; nor is continuity. John Dewey discusses both in much the same form as Goodenough conceives them: "Continuity . . . means that rational operations *grow out of* organic activities, without being identical with that from which they emerge" (Dewey 1938, 19).

7. Robert Pennock provides a whole slate of such structures, none of which is undermined by our evolutionary origins: "Ask people what is most valuable in their lives, what gives their lives meaning, and you will get a wide range of answers. Certainly some people will cite their faith in God (though for most of these their faith does not depend upon whether or not the Genesis account is literally true). Many more will mention the pride and joy they feel for their children, the tenderness they feel for their lovers and friends, the sense of accomplishment they derive from their work, the pleasure they receive from music and art, or the deep satisfaction they feel in the struggle to build a better tomorrow. People find value in a well-crafted novel and a well-cooked meal, in vigorous athletic activity and in quiet moments of reflective contemplation. They find purpose in the building of a home, the furtherance of social justice, and the pursuit of scientific knowledge. How easy it is to extend such a list!" (Pennock 1996, 22)

8. "The sense that the meaning of the universe had evaporated was what seemed to escape those who welcomed Darwin as a benefactor of mankind. Nietzsche considered that evolution presented a correct picture of the world, but that it was a disastrous picture. His philosophy was an attempt to produce a new world-picture which took Darwinism into account but was not nullified by it" (Hollingdale 1965, 90).

9. Despite my reference to Nietzsche, my use of the concept of existentialism in this paper is generic, employing the concept central to virtually all existentialist thinkers: A fundamental aspect of the human condition is the search for meaning in life, and this search is of pivotal importance to individuals. My reference to Nietzsche is based on his recognition of the implications of evolution for existential meaning and his emphasis on the essentiality of an individual's establishing meaning and identity through chosen tasks. I could just as well have used Sartre to make the latter point. For this clarification, I am indebted to a question from Peter Derkx, director of the research program, "Humanism, Meanings of Life, Worldviews," at the University for Humanist Studies in Utrecht, the Netherlands.

10. "Natural piety" is Sidney Hook's term in *The Quest for Being*: "Man can live with a natural piety for the sources of his being. He can rely upon nature and himself without worshipping them. Man in fact relies only on his own natural and human resources even when he claims to rely on other resources" (Hook 1991, 208).

## REFERENCES

- Dennett, Daniel. 1991. *Consciousness Explained*. Boston: Little, Brown.
- . 1995. *Darwin's Dangerous Idea: Evolution and the Meanings of Life*. New York: Simon and Schuster.
- . 1996. *Kinds of Minds: Toward an Understanding of Consciousness*. New York: Basic Books. Science Masters Series.
- Dewey, John. 1938. *Logic: The Theory of Inquiry*. New York: Henry Holt.
- Donald, Merlin. 1991. *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition*. Cambridge: Harvard Univ. Press.
- Friedman, Herbert. 1986. *Sun and Earth*. New York: Scientific American Library.
- Goodenough, Ursula. 1994. "The Religious Dimensions of the Biological Narrative." *Zygon: Journal for Religion and Science* 29 (December): 603–18.
- . 1998. *The Sacred Depths of Nature*. New York: Oxford Univ. Press.
- Gould, Stephen Jay. 1989. *Wonderful Life*, 323. New York: Norton. Quoted in Dennett 1995, 311.
- Hollingdale, R. J. 1965. *Nietzsche: The Man and His Philosophy*, 90. London: Routledge and Kegan Paul. Quoted in Dennett 1995, 181.
- Hook, Sidney. 1991. *Quest for Being*. Buffalo, N.Y.: Prometheus Books.
- Kitcher, Philip. 1998. "Truth or Consequences?" *Proceedings and Addresses of the American Philosophical Association* 72:49–63.
- Masters, Roger D. 1989. "Evolutionary Biology and Naturalism." *Interpretation* 17:111–26.
- Pennock, Robert. 1996. "Naturalism, Creationism and the Meaning of Life: The Case of Philip Johnson Revisited." *Creation/Evolution* 16:10–30.
- Putnam, Hilary. 1987. *The Many Faces of Realism*. LaSalle, Ill.: Open Court.
- Simpson, George Gaylord. 1967. *The Meaning of Evolution: A Study of the History of Life and of Its Significance for Man*. New Haven: Yale Univ. Press.
- Wilson, Edward O. 1992. *The Diversity of Life*. Cambridge: Harvard Univ. Press, Belknap Press.
- . 1998. *Consilience*. New York: Alfred A. Knopf.