THE CHALLENGE OF DARWINISM

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In 1859 Charles Darwin produced what is fairly described as the greatest intellectual challenge in the history of human thought: an uncomplicated theory which promised to explain not only the existence and nature of all nonhuman life on earth but humans themselves. The depth of the challenge involved two facts: (1) life on earth has always been the most complex phenomenon known to humans and (2) no theory about anything extrinsic in the universe could possibly be as intriguing, or as difficult to resolve, as one involving analysis of the theorizers themselves. As an explanation of life, organic evolution was the first alternative to Divine Creation, and it is still the only one.

Darwin's theory was two-part in nature. The first part specified that all of life is continually and relentlessly subjected to a process of differential reproduction, which Darwin termed "survival of the fittest." The second part maintained that all of the attributes of life have somehow resulted, directly or indirectly, from the cumulative effects of this process.[1] During its first century the idea of an evolutionary process guided chiefly by natural selection became the central principle of biology. It became the basis for animal and plant breeding and the battle against pests and diseases; the way of understanding genetics, species diversity, life cycles, short- and long-term ecological changes, and almost everything else about life.

But evolutionary theory did not fulfill its promise of explaining the behavioral aspects of human nature, and the social sciences matured in this century without any great influence from Darwinism. Indeed, the effects of biology on theories about human learning and culture were generally deemed pernicious because they invariably derived from oversimplified views of the relationship between genes and behavior, thus implying a kind of determinism inconsistent with our personal views of free will. They were often expressed in ideologies called "social Darwinism," which provided self-serving excuses for, paradoxically, either interfering or not interfering in any process of change among humans, in the name of "survival of the fittest."

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Even in biology the usefulness of knowledge of the evolutionary process seemed to stagnate rather than grow in the first half of the twentieth century. Then, within the space of seven years, 1957-1964, three different evolutionary biologists independently discovered a crucial imprecision in Darwin's theory: He had failed to specify survival of the fittest *what*? The ramifications of this discovery are responsible for the current controversy.

Darwin's Organization of Life

The "what" that Darwin left out has to be identified along the hierarchy of organization of life. For Darwin this hierarchy consisted of individuals, families, social groups, and species. For modern biologists it has been lengthened, especially because genes and their various interactions and linkages, including chromosomes, have been added at the lower end. The point is that what is good for the individual's reproduction is not always good for that of the gene or gene group, and what is good for the species does not always maximize the individual's reproduction. The question, in terms of understanding how evolution works, is: When reproductive interests differ, who wins? Darwin didn't know, and it seems that in some instances he deliberately avoided the question.

Evolutionists are now generally agreed that, in the establishment of traits by natural selection, the interests of individuals almost always win over conflicting interests of social groups or other higher categories. They are not so sure about what happens at the genic versus individual levels but, for the moment, we can regard that as less important because conflict between these levels is infrequent.

What does this conclusion of evolutionists mean? It means that evolved function, or the *raison d'etre* for any trait, cannot be glibly ascribed to levels higher than the individual's reproductive interests. Disney notwithstanding, bluejays do not scream to warn other species of the approach of predators; lemmings do not drown themselves to save their species from overpopulation; and parents do not adjust their brood sizes or the ratio of males and females in their broods to what is optimal for the social group, population, or species. Instead, such traits exist because natural selection maximizes the likelihood of the survival of some genes over their alternatives. This is accomplished through reproductive striving induced in individuals by the actions of their particular genes in the particular environment in which they develop and behave.[2 3]

Altruism and Free Will?

And so we are brought to a modern version of what I have regarded as the greatest of all intellectual challenges: What about us humans, who seem so certain of our altruism toward others and our free wills? In what way could it possibly be true, and how could it ever be acceptable, that we are derived through a process

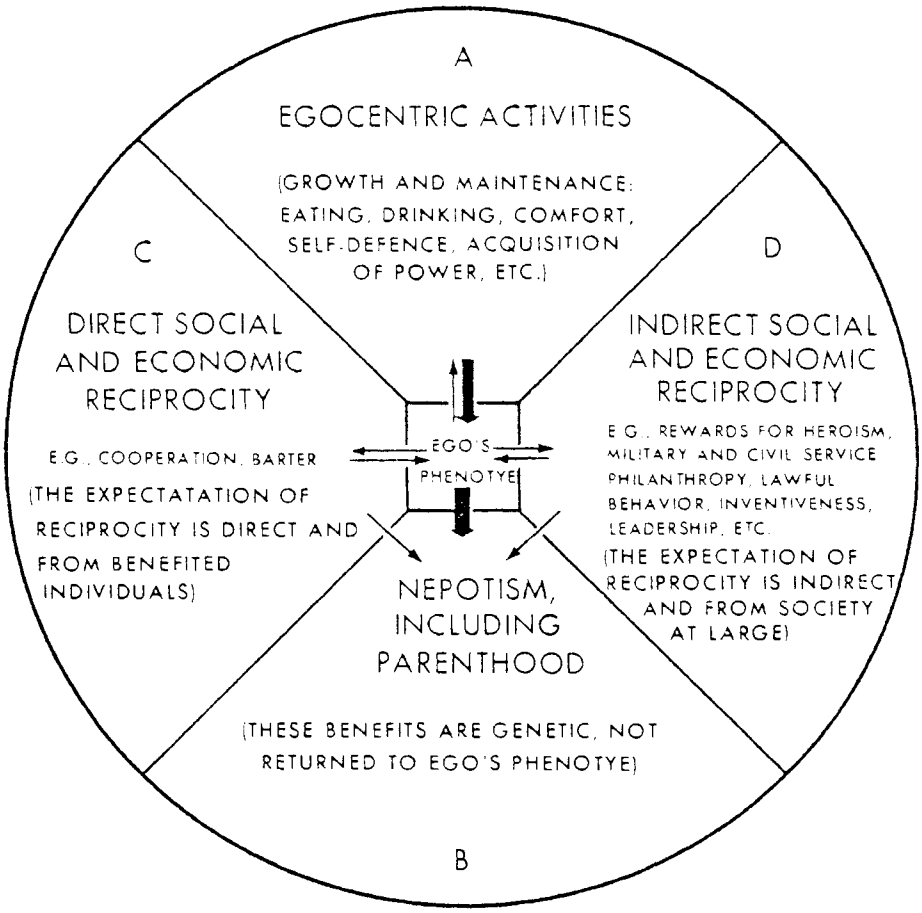
which has differentially preserved genes that cause us to behave, at least in the usual environments of our history, so as to maximize their reproduction? The whole idea at first seems either ludicrous or outrageous, depending upon one's mood. Faced with such questions we can empathize all over again with the prominent British lady of the mid-nineteenth century, who, upon hearing of Darwin's theory that humans are descended from ape-like ancestors, is said to have exclaimed, "Oh, let us pray that it not be true, and if it be true let us pray that it not become generally known!"

It is scarcely surprising that social scientists, humanists, philosophers, students of ethics, and others familiar with the history of human thought should at first throw up their hands at the new emphasis on natural selection. After all, Darwin's book stirred consternation for exactly the reason that it might apply to humans. And the current approach to natural selection must look to many outsiders like just another effort at justifying selfishness, determinism, and social Darwinism. On the other hand, it is also easy to understand how biologists, always respectful of *general* theory because of the role of organic evolution in their science, and exhilarated over the new precision of Darwinism in biology as a whole, might enthusiastically, if sometimes naively, try to apply it to understanding human endeavors.[4]

Hence, the controversy and the challenge. To what extent can the uniqueness of humans be better understood as an outcome--however complex and indirect--of the collective striving of all our ancestors to further their individual reproductive successes by helping themselves, their offspring, and other genetic relatives, and those nonrelatives who could be depended upon to reciprocate their kindnesses? That is, to what extent can reproductive striving better explain the rules, traditions, and conventions of culture; the existence and nature of consciousness, purpose, and intellect; the capacity for symbolism and language; the seeming arbitrariness of much of fashion, art, music, and literature; the significance of religion and rigid belief systems; the concepts of justice, morality, and rationality? Perhaps most intriguing of all, can we so explain our obvious failure to recognize a centrality of any such reproductive propensities in ourselves and our outrage or denial when this is suggested?

I do not know the answers; nor, I think, does anyone else. And that is the intellectual challenge of Darwinism in 1978. It is being met by a flood of positive attention, among growing numbers of social and biological scientists, to the kinds of questions raised here. Their efforts during the next several years will be well worth watching. Indeed, whatever conclusions are eventually reached, I think they will be an essential part of the reflections of every person intent upon placing his own emotions and intellect, and those of others, into the most satisfying and useful perspective.

> ...your book drove away the constraint of my old superstition as if it had been a nightmare and was the first to give me freedom of thought.
>
> Francis Galton, in a letter to Charles Darwin



The organism as nepotist. The diagram purports to show all routes by which expenditures of calories and taking of risks by humans can lead, both directly and indirectly to genetic reproduction. Reproduction will be maximized when the benefits from egocentric activities and reciprocal transactions maximally exceed their costs, and when their benefits are channeled to the closest relatives with the greatest ability to use the benefits to maximize the reproduction of their relatives in turn.

NOTES

1. The operation of differential reproduction, as we now know, is influenced by accidental changes in the genetic material (mutations), which are ultimately the source of all genetic novelty, and accidental losses (called drift), as well as extrinsic (e.g., geographic) and intrinsic isolation of genetic lines. Together with inheritance and selection these phenomena make up the process of organic evolution as we understand it today.

2. Because of confusion about the degree and kind of determinism implied by a statement like this, I emphasize that the term "environment" demonstrably includes stimuli by which behavioral traits can be either altered or erased--for example as a result of conscious reflection about them, or even about their probable effects before they are carried out. There is no implication of genetic determinism in modern evolutionary views of behavior, only the implication that we are the product of both our genes and our environments, neither alone.

3. Because of space limitation I am forced to condense arguments into assertions; the relevant references, and the logic and evidence for arguments suggested in this essay, can be traced in my 1977 paper, "Natural selection and the analysis of human sociality," in *Changing Scenes in the Natural Sciences*, Philadelphia Academy of Natural Sciences Special Publication 12, edited by Clyde E. Goulden.

4. Edward O. Wilson, in the influential book in which he attempted to label the new interest in evolution as "sociobiology," did not clearly identify the reason for the revolution. He left the impression that what he called the "new synthesis" is owing simply to the sheer weight of accumulated data from behavioral studies within zoology, and he defined sociobiology as the "biological" study of behavior. But that is not a new endeavor. Moreover, the adjective "biological" has come to be used outside biology to mean "genetic" (or "physiological," which then translates to "genetic") and to be opposed to "social." The new precision in analyzing natural selection allowed an *appropriate* reintroduction of genes into the formula: Genes + Environment yields Organism and its traits (including behavior). Under the circumstance, it is not surprising this has appeared to many as simply a new wave of unacceptable genetic determinism rather than the result of a new paradigm in evolutionary analysis.