

ON NATURAL AND HUMAN SELECTION, OR SAVING RELIGION

by Arnold W. Ravin

I trust that Ralph Wendell Burhoe will appreciate the intent of my opening remarks. They are somewhat facetious, but their intent is that of dramatic emphasis rather than that of ridicule or scorn. Indeed, who can quarrel with Burhoe's fervent desire to save religion in a world of unfettered technical power? It is with Burhoe's solution that I quarrel. In "The Human Prospect and the 'Lord of History'" Burhoe argues, for example, "that the nature of the system of entities and forces portrayed by the sciences is the modern equivalent of the realm of God or ultimate reality of the higher religions and theologies, with characteristics very close to those of the monotheistic God or ultimate reality of certain of the traditional high religions."¹ Burhoe's equation of God with nature and his definition of religion as the submission of man to the ultimate realities of nature constitute what I shall call a naturalistic religion. Unfortunately, it is at least as troublesome as the problems he sought to attack. If God is equivalent to the entities and processes we perceive through our senses, the word "God" has been saved, perhaps, but who needs it? If religion consists in understanding the laws of nature so that we may submit ourselves to them, in what way have we given religion a task distinct from that of science? With such a savior of religion as Burhoe, who needs enemies?

Burhoe's attempt to create a naturalistic religion is based on the laudable desire to reconcile science and religion. That science and religion are compatible, we agree, Burhoe and I. My view of religion and science, however, is one of interdependence, much like the dualities of genotype and phenotype, organism and environment, structure and function: It is difficult to conceive of one without the other—or, in invoking one, the other is implied. But of that, more later. For the time being, I simply wish to point out that Burhoe has

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achieved a compatibility of science with religion by collapsing one into the other, a somewhat different situation than the one I envisage.

ROOTS OF NATURALISTIC RELIGION

Burhoe's naturalistic religion has a history and a certain currency. It is a descendant of earlier attempts to obtain a naturalistic ethics, a system of values based on what science has learned about nature. Not surprisingly, therefore, the problems that attend the advocacy of naturalistic ethics are similar to those that plague Burhoe's program for the religious enterprise. Interestingly enough, some of the same problems plague the current controversy about sociobiology: To what extent do we find in cosmic and biological evolution the rules by which men act? Do these rules alone determine men's actions, or does a set of criteria operate as well as, or exclusively of, the laws of the nonhuman universe? Whatever we decide about these questions will bear upon the validity of Burhoe's religious program as well as upon the characterization of sociobiological research. It is quite logical that Burhoe has been studying with great interest the writings on human genetics and social evolution by E. O. Wilson, R. L. Trivers, G. C. Williams, and company. With a similar interest is the distinguished psychologist, Donald T. Campbell, who has been postulating an essential stabilizing role for religion as the bearer of value-laden traditions in the evolution of human society.²

In the sociobiological controversy we are asked to consider the robustness of an analogy, in this case the analogy between human and biological evolution. As we shall see, we should distrust analogies even if we cannot get along without them. One of the common strategies in scientific explanation is to think, at least temporarily, in terms of analogical models: the solar system as a model of the atom, the lock and key as a model of the enzyme and its substrate, the electrical switchboard as a model for the central nervous system. There are great advantages to the use of such models, which I will not detail here. In summary, they provide new ways of "seeing things" and engender new avenues of research: They help get us from "here" to "there" in science. I shall not justify their use any further; but they do create difficulties for us.

The analogy that is at the root of the problem we are discussing here is due to none other than Darwin. In the first edition of his *On the Origin of Species* the first chapter is devoted to "Variation under Domestication," in which Darwin considers the causes of "the vast diversity of the plants and animals which have been cultivated by man" in contradistinction to the homogeneity of the individuals of a

given species as they are found in nature. He comes to the conclusion that of all the “causes of Change . . . the accumulative action of Selection . . . is by far the predominant Power.”³ In this chapter Darwin is speaking of the selection of traits by man—what we have come to call “artificial selection.” In artificial selection humans preferentially breed animals or plants with desired characters, thereby increasing the numbers of individuals with such characters and even the extent of expression of those characters. By carrying on such selection for a wide variety of characters in different subpopulations of a domesticated species, a great diversity of types is obtained. In this way, the original phenomenon—the variety within domesticated species—is satisfactorily explained.

Why does this account of “artificial selection” come first in a book concerned with the origin of species in nature? Obviously, Darwin was preparing the reader for an analogy that had already struck him. In his case, however, the question of the origin of species in nature preceded his thoughts about human selection of domesticated plants and animals and the relevance of such selection to the origin of species. The analogy was between artificial selection and a process that leads to new species in nature. If variations arise among the individuals of a species for any reason whatsoever and if resources for the maintenance of life and reproduction are limited, as indeed they appear to be, a competition will ensue in which unequal numbers of descendants will arise from the existing members of the species. By definition, those individuals leaving relatively larger numbers of descendants are more fit, or more adapted to their environmental situation, than those leaving fewer numbers or no descendants. By analogy with artificial selection, the more fit are being selected insofar as the competition for resources is an adequate analog of the discrimination manifested by humans in the breeding of animals and plants for traits desired by the breeders. Analogically, then, something has to take the place of man in the context of biological evolution, and this thing is called “nature.”

That Darwin did in fact reify and anthropomorphize nature may be easily seen in *Origin*. He says, for example, in chapter 4: “. . . as man can certainly produce great results by adding up in any given direction mere individual differences, so could Nature, but far more easily, from having incomparably longer time at her disposal. . . . [Or again] Man can act only on external and visible characters: nature cares nothing for appearances, except in so far as they may be useful to any being. She can act on every internal organ, on every shade of constitutional difference, on the whole machinery of life. Man selects only for

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his own good; Nature only for that of the being which she tends" (p. 82). Or, "Can we wonder, then, that nature's productions should be far 'truer' [i.e., meaning 'adapted'] in character than man's productions . . . ?" (p. 84). Or, "Now, if nature had to make the beak of a full-grown pigeon very short for the bird's own advantage, the process would be very slow . . ." (p. 87).

And finally, to show that Darwin was consciously thinking on the basis of analogy, I quote from page 112:

Here, then, we see in man's productions the action of what may be called the principle of divergence, causing differences, at first barely appreciable, steadily to increase, and the breeds to diverge in character both from each other and from their common parent.

But how, it may be asked, can any analogous principle apply in nature? I believe it can and does apply most efficiently, from the simple circumstance that the more diversified the descendants from any one species become in structure, constitution, and habits, by so much will they be better enabled to seize on many and widely diversified places in the polity of nature, and so be enabled to increase in numbers.

Now, of course, Darwin was not alone among naturalists to speak in these anthropomorphic tones about nature. It was, for them, a "manner of speaking," and to the extent they were conscious of it—as I believe Darwin was—they could correct or prevent unjustified excesses. The important point, after all, is that by thinking analogically in this fashion Darwin was able to perceive a process to account for the origin of new species and so avoid the difficult doctrine of unique, special, and independent creation of species.

But it is a misnomer to apply the term "selection" to the world of unconscious creatures. It is all too easy to see in the metaphor of nature a guiding, selecting, winnowing entity choosing among possibilities and even creating the possibilities themselves. My point is that there is no selection in the domain of nonhuman creatures, certainly not of the sort we associate with choice and that is practiced by man. Let me be clear about this point. I am not quarreling with the Darwinian mechanism as a plausible explanation of the origin of diversity and speciation; nor can I hope that, at this late date, the widely accepted metaphorical term "natural selection," with which this mechanism is labeled, can or will be dropped from general usage. I am concerned, however, with a naive use of the metaphor that results in loss of any distinction between biological and human evolution. If, indeed, human selection amounted to the same thing as natural selection, except for a difference in agency—humans selecting where nature otherwise would—there would be every reason for believing that

biological and human sociocultural evolution were entirely coincident.

That I am not talking about a purely hypothetical question for which there is no actual example is supported by reference to Burhoe's own work. In his article "The Civilization of the Future: Ideals and Possibility" Burhoe writes as follows: "My account of natural selection of genetic types or genotypes is intended simply to indicate how its basic mechanism is an example of a universal selection procedure we have seen operating in a hierarchy of levels prior to life, in cosmic evolution, and in the evolutionary history of the earth at all levels from nuclear particles to the whole earth. And I shall show later how the same principles are involved in determining the goodness, viability, or stability of civilizations."⁴

As preparation for the argument he goes on to make, he defines natural selection as follows: "Natural selection is the usually random attainment of a new preferred or stable configuration that lies hidden in nature until an occasional member of some population of a previously selected level of organization strays from its norm and comes within range of a new level of preferred configuration, where the natural forces of the new situation hold it, or *select* it."⁵ This is a strange formulation of the mechanism of natural selection, at least to a biologist. What is not being made clear is that the configurations that arise and compete for limited resources are beyond the control of the selecting mechanism. The variant configurations arise in a random way, adaptively unrelated to the environment in which they appear. Natural selection has to select from whatever is offered to it. Moreover, the selection consists uniquely in a change in proportion of these configurations or genotypes on the basis of their fitness, which is nothing more than their relative rates of reproduction. What determines the outcome is the relative capacity to survive and multiply. No other criterion exists, and there is no need to postulate an agency that is doing any selection. The change in proportions of genotypes occurs, in a real sense, by itself as a consequence of the different rates of reproduction in a given environment. That is to say, there is no intermediary between the genotypes, or their bearers, and the environment imposing conditions for survival and reproduction—at least in the "natural" or nonhuman situation.

But man intervenes, is an intermediary, in the evolution of other creatures. And his choices are based not merely upon the standard of reproductive rate; he has other criteria for selection: what strike him—man—as esthetically pleasing or useful or whatever. Moreover, man intervenes in his own evolution and does so because of his conscious interpretation of his situation.

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MAN'S SELF-CONSCIOUSNESS AS AN EVOLUTIONARY FACTOR

This very consciousness is, in fact, the heart of the matter. While it is true that man, like all other creatures, must contend with the problems of existence and generation, he differs from all of them in having acquired the capacity, undoubtedly as a consequence of biological evolution, to codify in oral and written language the mental representations of his experiences, to formulate in symbolic language such abstractions as "organism," "environment," and "nature." These representations or metaphors are the basis of his characteristic activity of constructing myths, explanations, or hypotheses that account for the experiences he has abstracted and represented in symbolic form. In assuming as I do that man's unique powers are the consequence of biological evolution I do not thereby suppose that the laws or processes that explain biological evolution are adequate to explain human evolution. *Homo sapiens* is a very different animal. His unique differences make possible modes of evolution that were not possible, and were not necessarily preordained in the "working of nature," prior to his appearance.

What evolutionary modes become possible with man? The answer resides, it seems to me, in the coupled use of knowledge and values. I take knowledge to be the very explanatory hypotheses man uses to account for his experiences. They guide his conscious and deliberate action by predicting the different outcomes of alternative courses of action. But the explanatory hypotheses do not suffice. The human being's choice or selection of a particular course of action depends upon another human characteristic, an awareness of the "rightness" of things, a sense of values. Without values, there is no rational way of choosing or selecting between alternatives. Neither prediction nor selection by humans is random, and I must disagree with Burhoe, who claims that "human choices may be considered for all practical purposes to be random mutations."⁶

It is an interesting idea, suggested by the late C. H. Waddington, that knowledge and values both owe their origin to the sociogenetic mode of cultural transmission in man. It is through parental restriction of infantile behavior that the infant acquires a realization of something beyond itself, an external authority or order that has "reasons" for behavior within specified limits.⁷ Be that as it may, it is nevertheless clear that knowledge and values are closely coupled in human actions. As I have tried to describe elsewhere, scientific change and new technological capacities sometimes cause us to alter our ethical standards.⁸ Yet, if science affects religious thought, the relationship is reciprocal. We have considerable historical evidence of the

effect that metaphysical, subjective, and religious ideas have on “the vision of the scientist as he seeks to interpret the shadows dancing on the wall.”⁹ For example, Stephen Cotgrove effectively quotes E. J. Dijksterhuis: “The strong influence which Newton’s religious ideas exercised on his scientific thoughts is revealed, among other things, in his belief in the existence of absolute space and absolute time. . . . Compared with the mechanistic idea of impact as the only cause of a change in the state of motion, there is a spiritual or animistic flavor about the idea of an incomprehensible force operating at a distance which does not seem out of keeping with an antimaterialistic philosophy of nature.” Cotgrove goes on to say: “Needless to say, Newton’s use of the concept of force was strongly opposed by many of the leading philosophers of his day precisely on the grounds that it was an occult quality and unmechanistic.”¹⁰

The coupled use of knowledge and values makes possible human selection among alternative courses of action, and the consequence of human selection is evolution, for it is to change some painful or distressing situation or to advance some condition that men act. Of course, what is regarded as painful, distressing, or worthy of advance depends upon value judgments. Nevertheless, change ensues. Were our knowledge of the system in which we find ourselves a perfect one—that is, if man were omniscient—our choices eventually should end in a final configuration, *the* preferred one; for if our explanatory hypotheses were not subject to correction or replacement, that is, if we could be finally certain of them, we should be able to arrange a world in accordance with our values that needed no further amelioration or removal of distress. It would be final and perfect. But, alas, while man intervenes in his evolution—as well as in the evolution of other beings—he ultimately cannot control that evolution, for, lacking certainty about his explanatory model of the cosmic system, he cannot be sure that the course of action he does pursue will not generate new, distressful problems even while removing old ones. Indeed, the history of modern science, for all its vaunted prowess in contributing to the material well-being of man, has provided ample evidence of the essentially open-ended nature of the scientific enterprise. The scientific view of nature has changed, and we may as well expect it to change again.¹¹ The changes have resulted from our ability to correct or replace hypotheses when their predictions fail to conform with experience. We are unable to give other than a limited and contingent credence to hypotheses whose predictions remain empirically successful.¹²

The imperfection of human knowledge leads to the occurrence of unforeseen events in human evolution. What this means is that we

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have no warrant for anticipating other than a continuity of problems facing the existence and generation of human life. Yet we have no means to deploy for the solution of these problems but the creation of knowledge and the application of values—unless, of course, some new type of creature evolves with the capacity for certain knowledge, in which case evolution might very well come to an end in Teilhardian fashion. But, as I doubtless do not need to assure you, we have no grounds for such a prediction. There is nothing in either cosmic, biological, or cultural evolution that guarantees an end, human or other, perfection. The condition of man seems to involve unremitting use of knowledge and values in the conscious, deliberate—that is, nonrandom—intervention in his own evolution without certainty of absolute or ultimate control. In this picture of the human state, who or what can be said to control human destiny?

In a sense, the open-endedness of human evolution is similar to that of biological evolution. Perhaps this similarity accounts for current tendencies to analogize cultural with biological evolution. Campbell has been making a valiant effort to find the analogs of variation and selection in human social evolution, but he has already had to correct some early proposals.¹³ While it seems to me interesting and worthwhile to compare biological and cultural evolution, we must be on our guard against the possible misleading results of such analogy. We really understand precious little about sociocultural evolution, particularly the roles therein of moral tradition, conscience, and human altruism (as opposed to what passes for the animal variety), to make strong claims of an analogical kind: that biological evolution is a suitable model for human change. Burhoe, for example, has coined the term “culturetype” to represent “the structure or information that is accumulated in and transmitted by a culture,”¹⁴ which is supposedly analogous to “genotype,” the encoded information in DNA. He states, “If a culture’s evolved system of information patterns does not produce viable organisms or phenotypes, then, as a ‘higher court of judgment,’ nature (the total reality involved in the system) obliterates those phenotypes and hence that culturetype, just as she obliterates inadequate DNA information in biological evolution.”¹⁵

I call your attention to the curious use of the term “nature” in this sentence. In what sense is nature the arbiter or agent of cultural change? If Burhoe means no more by “the total reality” than a system in which evolving patterns occur, the statement is circular. If he means a system in which man intervenes deliberately to affect the viability of particular cultural patterns, what then do we make of the notion of a “higher court of judgment”? Who “second guesses” man, who is the ultimate arbiter?

If man, and no one other than man, is responsible for those selections that lead to cultural change, what help is it to tell us that man is part of a larger reality, that of nature? We are simply avoiding the difficulties inherent in our situation by throwing them all upon nature.

Later on Burhoe argues in fact:

In the scientific picture of man, both his freedom and his responsibility are determined or given him by his environment. Responsibility means that man has a *goal* or value which he wants or must attain.

One meaning of freedom is that man is free to, or has the capacity to, pursue and accomplish *that goal*, even though his immediate environment is pushing him in another direction.

Fish and men may have both the responsibility or goal and the freedom or capacity to swim upstream. Fish and men differ from a floating chip in that fish and men, by a long history of environmental selection, have goals or responsibilities inscribed in their genotypes and central nervous systems and also have there inscribed the freedom or capacity to swim upstream.¹⁶

This argument follows from Burhoe's position about nature or environment as the ultimate determiner. To this argument I say: An ant has the capacity to build a nest despite immediate environmental disruptions; is it free? I say also that the goals of fish and men should not be confused. Indeed, I doubt if the notion of freedom makes sense for any other but conscious, rational beings capable of choice.

Let me diverge again at this point to remark how the issues of determinism and freedom I have been alluding to in the preceding paragraphs are related to the current controversy about sociobiology. The polar views in this debate, which the opponents in the controversy are accusing each other of espousing but which I doubt any one truly maintains, are the following. "Radicals": If man is already programmed by his genetic heritage and limited in his evolution by the workings of natural selection, then he is truly determined; but such biological determinism for man is unreal. "Conservatives": If man is not limited by his biological heritage in what he does and can do, then he is free to become whatever he likes; but this picture of human freedom is contrary to sense and experience.¹⁷

The resolution of this debate lies, it seems to me, in the compromise I have been tracing earlier: Man does not have absolute, certain control of his evolution, but he cannot avoid deliberate, rational intervention in that evolution. The conservatives wish to emphasize the former, as they argue that there is a nature in man that he alone did not shape. The radicals would rather emphasize the latter, as they argue that men, in fact, do shape much more about themselves, and

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faster, than this nature does. Men, they say, are capable of creating the kind of society they desire.

What men desire is precisely the point. Radicals usually know what they desire. But, like all desires for the state of mankind, theirs originates in a value-laden view, a particular idea of the “good” and “right” society of men, a religious view, if you will. I have just intimated what I regard as the proper mission of religion: It is to help man find meaning and motivation for his participation in an evolution over which he has no certain guidance or final control. I understand the awful charge I am conferring upon religion, for I am aware how fraught with difficulty are the questions related to the origin and validation of moral values.

AN EXAMINATION OF THE SURVIVAL CRITERION

Nevertheless, despite this uncertainty, I believe we can scrutinize certain criteria that have been proposed for governing human selection. I would like particularly to examine the criterion of survival that the supporters of a naturalistic religion imply. Burhoe is at least clear about the consequences of his equation of “God” with “nature.” He says: “*Man has no freedom to do other than adapt to what this ‘nature’ requires—except to cease to be.* As ancient theologians have said, to be a slave of the true God is man’s greatest freedom.”¹⁸

Speaking of God or the “Lord of History” as the “real nature of the total ecosystem (both internal as well as external to man),” Burhoe claims, “. . . in the long run technological fixes and popular, common-sense desires and ways of life cannot persist unless they are in accord with what is required by the Lord of History. . . .”¹⁹ And, again, “Man lives only by virtue of God’s original and continuing grace and by man’s continuing in his conscious and cultural patterns to embody the law or evolving requirements of the Lord of History.”²⁰ This means that, “as a first approximation, good is usually identified with what is conducive to life and evil with death.”²¹

But how can there be evil if God—that is, nature—is both just and sovereign? Whatever happens must be good. I quote again, “Since God is omnipotent and since man’s true soul or being is one with God and since God’s program of evolution is indeed the ultimate reality, then all is well.”²²

This does not mean that there may not temporarily be wicked and evil ways but rather: “In due course all wicked and evil (nonviable) ways will be selected out of the picture by the omnipotent God (nature’s requirements for viability or being). The errors of the present phenotype (whether an individual person or a community in a sociocultural system) will be washed out, selected out. In the kingdom

of God all error is cleansed and forgiven, and the true and corrected patterns of the true self or soul will forever flourish under the judgment and grace of the sovereign Lord of History."²³

The prospect logically then is an end to evolution, a prospect surprisingly similar to that of Teilhard de Chardin.²⁴ I must say that, in this respect, there is nothing in the current scientific picture that obligates this point of view. On the contrary, the continuing open-endedness of evolution is at least as compatible with what we know as is the teleological view. I should also like to point out another weakness in the teleological view. It essentially sanctions a submissive fatalism. If the end is determined, what difference does it make how long it takes to get there or by what route? Burhoe's role for religion is hardly stirring in this regard: Religions provide man "with the essential information evolved in the culturetype about his true nature or soul and its relation to the ultimate reality governing the world."²⁵ Given Burhoe's sense of that reality, why should I be anything but passive or interested in anything but mere survival regardless of the character of what is to survive? After all, the Lord of History, and not I, decides in the end what shall reign in the eternal kingdom to come.

I have inserted the first person singular in the previous paragraph deliberately because there is another aspect of submission in Burhoe's naturalistic religion. That is the submission of the individual to some corporate society, a higher level of organization of which the individual is eventually to become a restrained member. This view stems, I believe, from two sources. The first is the erroneous notion of informational homogeneity in a culture, and the second is the somewhat teleological view attributable to Julian Huxley and Waddington that the "laws of evolution" ordain the emergence of increasingly higher levels of organization and that the social organization is the next level to be perfected in man.²⁶

As for the notion of cultural homogeneity, let me quote from Burhoe's "Civilization of the Future": "I suggest that the brains of a culture, insofar as the information they store derives from a common gene pool and a common culturetype, are essentially replications of the same pattern of information. . . . For each culture we may say there is a single brain type or structure that provides the organic unity of the culture."²⁷

Thus, in a sense, the tightly organized state of civilized human society is due to the commonality of its brains or culturetype, just as that of the ant society is due to its genetic homogeneity.

This analogy of human society to ant society is due to a serious error about the extent of both genetic and cultural differences in the populations of many species, including man. While it is perfectly true

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that the ant society is genetically very homogeneous, in that its members usually descend from a single mother and very few fathers, the same is definitely untrue for more nearly panmictic populations. We are still learning about the very rich variety of genetic differences within species populations, including those of man, and, while we are still ignorant of the significance of the heterogeneity we find, we are not ready to dismiss it lightly.²⁸ If genetic heterogeneity or polymorphism is the rule in human populations, so, I daresay, must there be informational heterogeneity of the cultural variety. Indeed, there is every reason to expect the latter since the information content of the human brain is undoubtedly subject to fluctuations and modifications of a locally discontinuous character. We may properly suspect that human society is what it is because of these individual differentiations rather than like an ant society.

The trouble comes, I suspect, from forcing too close an analogy between "genotype" and "culturetype." Since one thinks in terms of high fidelity reproduction in the case of the former, one is inclined to think in terms of replication of the latter. Indeed, for Burhoe, cultural homogeneity is a means of unifying a population that contains some genotypic diversity: "In the case of culturetypes that could bind a population of persons with diverse genotypes into unique, individual, homeostatic sociocultural systems, again we find the emergence of a radically new level of power for rapid evolution. . . . It is significant to note that the culturetypic information in this population of brains is essentially common to each brain, even though the genotypic information in a large society is essentially as varied as in the species."²⁹

The eventual result of socioculturation is the creation of a social organism in which the individual conscience has been replaced by the collective one: "Through this process the individual has come to identify or discern that the best interests for fruitful continuation or survival of his genetically programmed body may be best served by his acceptance of the wisdom of his culture and by his cooperative and even altruistic devotion to the well-being of the sociocultural unit."³⁰

In fact, the sociocultural unit becomes a means of bringing about submission to the ultimate powers, for the sociocultural heritage carries "a corresponding pattern of how the individual is to perceive his own true nature ('soul') as not limited to his 'natural' or genetically programmed perceptions of his body and to perceive his soul's true relation to the ultimate powers, which are not limited to his natural or genetically programmed perceptions of his environing world."³¹

In the final analysis, then, Burhoe's naturalistic religion—despite its modernistic approach in its connection to science—returns man to the

same submissive posture that many of the older religions did. In some respects the submission is more devastating than before, because Burhoe would have us recognize survival and continuity as the ultimate realities and presumably the ultimate values since they become the ultimate criteria of the highest court of judgment, the Lord of History.

What this attitude fails to take into consideration is man's own judgment about what is worth maintaining, what merits survival and continuity. To say of human evolution that that is most fit which has survived is to say no more than what has already been said of natural selection, that what has survived has survived. Man has the unique power, among all living creatures, to affect the outcome, to choose among states and qualities that are to survive. He may choose unwisely, on the basis of inadequate knowledge, or act in such a way as to bring about the demise, against his intent, of conditions he preferred or to propagate conditions he sought to eradicate. But such results cannot be prevented entirely and must be risked so long as man lacks omniscience about the nature of that ultimate reality to which Burhoe would have us submit ourselves.

The meaning of choice based upon values that are cherished, which is what I take to be the essence of humanity, is the acceptance of risk—risk to the survival of what we hold dear and of ourselves as the bearers of that value. This puts the matter of survival in a different perspective: survival not for its own sake, as the ultimate “goodness,” but survival of what we regard as “good” prior to its being applied in a set of circumstances, the “natural” context.

If religion does not help us in discerning and acclaiming the good, what human purpose is there for it? Time and again in the past, fortunately, individuals have risen in crises to carry out this essentially religious function. I am reminded particularly of those religious and political martyrs who have risked or sacrificed their own survival for the sake of some good they held to be dearer than their lives. There were either some acts they could not perform despite the penalty of death in noncompliance or some acts they had to perform despite the high risk of death in performance. Martyrdom is a shabbily treated subject in our cynical and materialistic age, but I find it to be the key to human evolution.

May I, a cultural Jew and a nonbeliever in a personal God, dare suggest what may be regarded as the meaning of Christ? The Christian tradition instructs us that Christ died to save men. I am inclined to accept the idea of salvation, except that I see man's salvation in “doing good” rather than in “everlasting life.” The image of the martyred Christ is, for me, one of a number of images reminding man

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that survival is *not* the ultimate human purpose. If mankind is not conscious of values in selecting his actions, how then can he be distinguished from nonhuman life?

Religion must countervail against the naturalistic mode of selection in human affairs. Human life is a defiance, not an acceptance. It is waged, and it is tolerable only when waged within certain moral bounds. Religion will be saved to the extent that "humanitas" is.

NOTES

1. Ralph Wendell Burhoe, "The Human Prospect and the 'Lord of History,'" *Zygon* 10 (1975): 299-375.
2. Donald T. Campbell, "On the Conflicts between Biological and Social Evolution and between Psychology and Moral Tradition," *American Psychologist* 30 (1975): 1103-26; reprinted in *Zygon* 11 (1976): 167-208.
3. Charles Darwin, *On the Origin of Species*, facsimile of 1st ed. (Cambridge, Mass.: Harvard University Press, 1966), p. 43. Page numbers in parentheses refer to this source.
4. Ralph Wendell Burhoe, "The Civilization of the Future: Ideals and Possibility," *Philosophy Forum* 13 (1973): 157.
5. *Ibid.*
6. *Ibid.*, p. 313. Burhoe actually qualifies this attribute of human choice "for certain very long-range and complex problems," but I frankly do not see what difference that makes.
7. C. H. Waddington, *The Ethical Animal* (Chicago: University of Chicago Press, 1967).
8. Arnold W. Ravin, "Science, Values and Human Evolution," *Zygon* 11 (1976): 138-54.
9. Stephen Cotgrove, "Objections to Science," *Nature* 250 (1974): 764-67.
10. *Ibid.*, p. 764. The quotation from E. J. Dijksterhuis is from his *The Mechanization of the World Picture* (Oxford: Oxford University Press, 1961).
11. See, e.g., Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962); A. C. Crombie, ed., *Scientific Change* (New York: Basic Books, 1963).
12. For a clear perception of this limitation, we owe much, of course, to Karl R. Popper as exemplified in his *Conjectures and Refutations: The Growth of Scientific Knowledge* (New York: Basic Books, 1962).
13. Donald T. Campbell, "Variation and Selective Retention in Sociocultural Evolution," in *Social Change in Developing Areas*, ed. H. R. Barringer, G. L. Blanksten, and R. W. Mack (Cambridge, Mass.: Schenkman Publishing Co., 1965); "On the Genetics of Altruism and the Counter-hedonic Components in Human Culture," *Journal of Social Issues* 28 (1972): 21-37; and n. 2 above.
14. Burhoe, "Civilization," p. 159.
15. Burhoe, "Human Prospect," p. 314.
16. *Ibid.*, p. 337.
17. For a representative "dialogue" between the two sides of the sociobiological debate, see the critique, "Sociobiology: Another Biological Determinism," by the Sociobiology Study Group of Science for the People, and the response, "Academic Vigilantism and the Political Significance of Sociobiology," by E. O. Wilson, in *BioScience* 26 (1976): 182-90.
18. Burhoe, "Human Prospect," p. 339.
19. *Ibid.*, p. 359.
20. *Ibid.*, p. 363.
21. *Ibid.*

22. *Ibid.*, p. 364.
23. *Ibid.*
24. Pierre Teilhard de Chardin, *Man's Place in Nature* (New York: Harper & Row, 1966).
25. Burhoe, "Civilization," p. 365.
26. Julian Huxley, *Evolution in Action* (New York: Harper & Bros., 1953); Waddington (n. 7 above).
27. Burhoe, "Civilization," p. 151. He defines the human brain as the "central locus of organization" of society or civilization, "the key and dynamic source of information that informs or shapes society."
28. For a good discussion of genetic polymorphism, see Richard C. Lewontin, *The Genetic Basis of Evolutionary Change* (New York: Columbia University Press, 1974).
29. Burhoe, "Human Prospect," p. 315.
30. *Ibid.*, p. 343.
31. *Ibid.*, pp. 356–57.