

Interpretation

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Volume 17 Number 1

- 3 Ernest L. Fortin Thomas Aquinas and the Reform of Christian Education
- 19 Michael Palmer The Citizen Philosopher: Rousseau's Dedicatory Letter to the *Discourse on Inequality*
- 41 David Bolotin The Concerns of Odysseus: An Introduction to the *Odyssey*
- 59 Morton J. Frisch Edmund Burke and the American Constitution
- 69 Mera J. Flaumenhaft Seeing Justice Done: Aeschylus' *Oresteia*
- 111 Roger D. Masters Evolutionary Biology and Naturalism
- 127 Celia McGuinness The *Fundamental Constitutions of Carolina* as a Tool for Lockean Scholarship
- Book Reviews*
- 145 William Mathie *The Rhetoric of Leviathan: Thomas Hobbes and the Politics of Cultural Transformation* by David Johnston
- 152 Chaninah Maschler *Death and the Disinterested Spectator: An Inquiry into the Nature of Philosophy* by Ann Hartle

Interpretation

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Evolutionary Biology and Naturalism

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Contemporary research in the life sciences challenges the common understanding of human nature and history. Findings in the study of hominid evolution, ethology, neurophysiology, sociobiology, and linguistics can no longer be ignored by anyone seriously interested in human political and social behavior. The task is difficult because it is necessary to integrate biology, political philosophy, and the social sciences in an age of academic specialization. And the results will be controversial because they contradict prevailing opinions concerning science, ethics, and human nature.

A “naturalistic” approach to human behavior has three principal consequences. First, it can provide a new foundation for the social sciences. Second, it can offer an objective basis for moral judgment. Finally, it can give us a deeper understanding of our species’ place in the world. Because such a profound change in attitude is involved, a separate discussion of each of these three issues is appropriate.

I. SCIENCE AND THE STUDY OF HUMAN BEHAVIOR

Behaviorism is dead. Behaviorist theorists sought universal “laws of behavior” that predict the response of any organism to specific stimuli (e.g., Skinner, 1965); contemporary biology shows that different species—and even individuals of different development or age within a single species—respond to a given stimulus in very different ways. The behaviorist conception that the organism is a passive “black box,” with few innate responses beyond reflexes (e.g., Kuo, 1967), has been contradicted by research in ethology, neurology, and social psychology. The cues stimulating an organism are often pre-programmed in the central nervous system; a particular stimulus can elicit different responses depending on the individual or the social context. The effects of conditioning and experience stressed by behavioral psychologists are also

*This article is adapted from the Epilogue to *The Nature of Politics* (New Haven: Yale University Press, 1989; \$25.00), pp. 234-49, from which it is reproduced by permission. Since that volume shows more fully how a “naturalistic” approach can relate the traditional concerns of political philosophy to the contemporary life sciences, only selective references are cited here.

important, but they cannot alone provide a comprehensive explanation of human behavior.

The behaviorist movement in social science was nonetheless useful. It has often been asserted that human life is impossible to study in the light of natural science: for phenomenologists, historical determinists, nihilists, deconstructionists, and traditionalists alike, purpose and subjective experience render our species unique. Although this belief has now been disproven by advances in the life sciences, behaviorism was long the primary school that challenged the comforting myth of the autonomy of an immaterial and uncaused human “will.”

The difficulty with behaviorism was not, as its critics charged, that it sought to link the natural and the social sciences, but rather that the behaviorist approach used an inappropriate scientific discipline as its model. In discovering patterns of conditioning and response that do occur—albeit not with the universality supposed by the movements’ founders—behaviorists sought to build upon the science of physics (Peters and Taijfel, 1968); in economics and political science, attempts to discover a scientific basis for understanding human society were likewise based on Newtonian physics (Bentley, 1908). As a movement in the social sciences, behaviorism generally failed to appreciate the impact of Darwinian biology, not to mention the extent to which the physical sciences themselves had been transformed by quantum mechanics and the theory of relativity.

Many of the reasons against a scientific study of human social life can disappear when the biological sciences are taken as its theoretical foundation. Newtonian physics appeared to establish relationships between cause and effect that were independent of time and place. Transposed to human affairs, such a perspective could only appear “reductionist” and “determinist,” to cite two frequent criticisms (e.g., Lewontin, Rose, and Kamin, 1984). Properly understood, evolutionary biology leads in a different direction. Because of the multiplicity of causal levels in living systems, as one leading neo-Darwinian put it, reductionism is “absurd” in biology (Simpson, 1969). “Determinism” implies causal links that always move in one direction, on the model of the transmission of force by billiard balls which became the implicit metaphor for political theory (Hobbes, *Leviathan*, Ch. 2-3; Bentley, 1908). Living systems are infinitely more complicated, since causal processes operate simultaneously at the levels of the ecosystem (webs of interaction among species as well as between living beings and the physical environment), the species (natural selection of gene frequencies), the group (the stimulation of organisms by events in the physical and social environment), and the individual (irreversible developmental and idiosyncratic events).

Discoveries in the life sciences challenge a number of principles that have been generally shared by social scientists. First, instead of seeking deterministic relationships (whether defined as the influence of the environment or the action of genes), the life sciences focus on probabilities. The “laws” of behav-

iorism assumed that all organisms respond in the same way, so that experiments with mice and rats could illuminate human behavior; most economic theories likewise presume that different individuals respond to market forces in the same way. Beneath this approach has been the assumption that all “organisms,” like all atoms of hydrogen, are essentially similar. Since the life sciences reveal that each human individual (with the exception of identical twins) is genetically different, the extent of similarities and differences both within our species and between humans and other animals must now be a subject of research rather than a theoretical assumption (Kitcher, 1985).

Philosophers have long spoken of “the nature of Man.” Evolutionary biology teaches us that “Man” does not exist. Rather, populations of human beings encounter varied environments which elicit distinct attributes from the range of human responses produced by natural selection. To speak of “Man” confuses the individual, the group, and the species, and blurs the difference between males and females. Individuals have different natures—and without such naturally occurring variation, evolution could not occur. Biological processes can, in general, be described as the production of a multitude of variants among which some are selected depending on context and prior history.

Second, “innate ideas” and biological processes seem necessary to explain many otherwise puzzling aspects of human behavior. The natural propensities of the human organism—generally dismissed since the triumph of Locke and empiricist philosophy—are as important as the environment in forming individual behavior. Evidence is mounting that the inheritance and development of such divergent characteristics as mathematical or musical genius, dyslexias, schizophrenia, depression, criminality, and other personality traits have an organic substrate. As more is learned about genetic and hormonal influences on behavior, there is no reason to assume that the inheritance and development of personal characteristics will be impossible to explain in a nonreductionist, probabilistic model of the interaction of nature and nurture through the life cycle.

The argument against naturalistic explanations of human behavior was, at its inception, in part political (though not thereby unreasonable). Natural differences between individuals, such as the father’s power over the family, were once viewed as divinely ordained grounds for political authority; as Locke argued in the *First Treatise of Government*, such arguments do not withstand scrutiny. Because environmental determinism had served as a philosophical foundation for the Western constitutional principle that all citizens are equal before the law, it is hardly surprising that a biological perspective on human affairs was long opposed on the grounds that it would be inherently “conservative” or “reactionary.”

Modern evolutionary theory removes this difficulty (cf. Masters, 1982). Insofar as the phenotype is simply a “vehicle” for genetic replication (Dawkins, 1982), no individual can claim to be “naturally” superior in all respects. None of us can know which genes will turn out, in future environments, to be essen-

tial for continued human life. All one can know for certain is that variation is essential to every living species; homogeneous gene pools are peculiarly vulnerable to unanticipated disaster. Far from being a sign of inferiority, differences are often advantageous (as in the case of those dyslexics whose reading disability is the counterpart of genius in tasks requiring nonverbal, spatial integration). Respect for each individual can be based on genetics and the theory of natural selection.

Finally, the change and complexity that are at the center of the life sciences require more sophistication and caution than have hitherto characterized research in the social sciences. Psychologists and pedagogues have pretended that one could understand the way humans think without knowledge of the structure of the central nervous system; now we know not only that different cognitive processes tend to be localized precisely, but that individuals have quite different aptitudes reflecting different neurological structures and functioning. Many sociologists and anthropologists have analyzed cultural norms as if they could be chosen at will by human groups, whereas ethology and sociobiology reveal predictable relationships between behavior and ecology or social environment that apply to humans as well as to other species (Maynard-Smith, 1978, 1984; Alexander, 1979, 1987; Tiger, 1987)

Given the complexity of these issues, most people understandably question the possibility or relevance of scientific studies of human affairs. The hostility to the very concept of a science of human behavior carries with it, however, the implication that we are totally unfettered by natural constraint. As more is learned in ecology, neurobiology, and molecular genetics, the presumption that human behavior is uncaused or controlled by "free will" becomes less and less tenable. In place of the hubris of either the behaviorists (who sought to "engineer" human behavior on the model of mechanical engineering) or the humanists (for whom all social life is a question of choice and subjective intention), a biological perspective suggests humility and dignity.

Knowledge of the causes of human behavior does not limit human freedom. Contrary to popular belief, the more we know about physiological and genetic causation, the more independent from accident and blind determinism our choice can become. Discovery of the genetic and cellular processes involved in cancer has not made those with the disease any less "free." If anything, the problem is quite the opposite, since a science of human behavior creates choices that most people are ill-prepared to make (Kass, 1971).

In this as in many other respects, modern medicine provides a revealing indication of the potential (and dangers) of a more comprehensive science of politics and social behavior. Expanding knowledge of human biochemistry, genetics, and ethology is not likely to be prevented by philosophic arguments about science and "free will." Instead, as genetic engineering and chemical modification of behavior become political realities, greater knowledge of human biology forces us to make ethical decisions. As in medicine, the question

is no longer whether humans can influence events and processes that were hitherto neither understood nor controlled by human choice. Now, we are deciding if we ought to do things that are made possible by scientific knowledge.

II. TOWARD A NATURAL BASIS FOR ETHICS

At first, it appears that natural science cannot be a foundation for any moral teaching beyond the justification of the status quo: "Whatever is is right." Were humans not endowed with such complex central nervous systems, permitting the most diverse responses to identical situations, this objection might have force. As it is, humans are all too liable to mistake their own self-interest, committing folly and wickedness on a scale unknown among other species. Traditional moralists from Plutarch ("That Beasts Use Reason," *Moralia*) to Rousseau (*Second Discourse*) had no difficulty showing that so-called "lower animals" are more in tune with "nature" than humans. Evil arises because of the very traits that many contemporary thinkers describe as signs of human excellence: rationality, cultural diversity, scientific knowledge, rapid social change, the centralized state (Tiger, 1987)—in short, what Morin (1963) called our "hypercomplexity."

Because humans appear to have emancipated themselves from the "instinctive" or mechanical causes found in other species, modern social and ethical theorists have typically concluded that nature can no longer be a standard of ethical evaluation. As a result, Western civilization since the eighteenth century has been confronted with a pervasive opposition between nihilists or historicists (for whom all values are subjective or relative) and doctrinaires (for whom theological or ideological principles can be imposed on others by force if need be). A way out of this profound dilemma can now be found by using evolutionary biology as the basis of ethical judgment.

Both relativism and dogmatism can be transcended by a naturalist approach to human life. Logical positivism—which proclaimed that a "gulf" between "fact" and "value" (Brecht, 1959) precludes any scientific basis for judgments of right and wrong—is insufficient as an account of the relationship between science and human behavior. Although skeptics and historicists had good reason to challenge absolute dogmas parading in the cloak of "Natural Law," neo-Darwinian biology provides the foundation for ethical standards consistent with the Western tradition yet open to change and reasoned debate. These assertions are, however, so contrary to contemporary opinions that they need to be explained in some detail.

A. Beyond Nihilism

In one form or another, relativism and nihilism have dominated Western secular thought since Nietzsche. Advances in physics destroyed the image of a divinely ordained cosmic order, confronting us with the picture of a universe

based on chaotic and random processes. If the human meaning of a physical observation depends on one's location in time and space, it seems obvious that all moral judgment will likewise be relative. For over a century, Darwin's challenge to the literal interpretation of the Bible had the same effect: a species descended from the apes and adapted to varied environments does not appear to be governed by a divinely ordained and universally valid "Natural Law."

Arguments for the existence of God based on the presumed harmony of nature, while predominant in the eighteenth century, were indeed an inappropriate foundation for ethical or political principles. The tendency to claim that one's own beliefs are naturally superior to others was compounded by Social Darwinism, which misinterpreted evolutionary principles and transformed them into an apology for Victorian differences in social class and status. Given the palpably false and self-serving uses of the concept of "nature," it is little wonder that most intellectuals and scientists preferred skepticism or even nihilism to dogmatism and ideological deception.

In the philosophy of science, this mood took the form of the "fact-value dichotomy." Reason and logic seemed to show that it was a "naturalistic fallacy" to claim one outcome is preferable to another on scientific grounds. Like the pre-Socratics in ancient Greece, logical positivists open the way to a scientific perspective on social behavior, but their relativism cannot provide an adequate philosophic account of human life (Strauss, 1953). For the relativist or nihilist, each individual's "values" are as good as another person's: "do your own thing." Ultimately, such a perspective is in contradiction with its own premises.

Thoroughgoing relativism presumes that we cannot make moral judgments of others because no one can fully share another's perspective. Language is taken as a totally arbitrary set of conventions. Were this entirely true, there would be no reliable means of communication and no science. The Greek Heraclitus had said that one "cannot step into the same river twice"; Aristotle tells us that Cratylus, taking this argument to its logical conclusion, argued that one can't step into the same river even once—and therewith stopped speaking and merely waved his finger.

If all language and human culture were totally arbitrary conventions, science would also be arbitrary and all communication merely a form of compulsion. Were this an adequate account, natural scientists could neither describe nor predict the world around us. To be consistent, thoroughgoing relativists and nihilists would have to refuse to benefit from modern medicine and technological devices based on science, for to do otherwise is to admit that some humans can discover and communicate truths about the world—and to give the scientists who do so uncontested power.

In practice, relativism and nihilism usually become a rationalization for hedonism. Once traditional morality and religion have been rejected in the name of scientific objectivity, the only basis of ethical judgment comes to be subjec-

tive “value.” Given this choice, that most people prefer their self-interest and pleasure is predictable from the theory of natural selection. The individual’s desire for self-preservation and comfort, taken as a “value” by some philosophers of science, is surely one of the central “facts” of an application of evolutionary biology to human affairs.

The logical positivist’s argument that “values” cannot be deduced from “facts” is thus doubly contradictory. On the one hand, the most widely chosen “value”—individual hedonism or at least self-preservation—is quite obviously a biological “fact”; when the physician says a patient “ought” to have an operation because the “facts” show appendicitis, the patient is unlikely to complain about a fallacious logical deduction. And on the other hand, the logical positivists themselves have unwittingly derived a “value” (it is bad to defer to ethical doctrines based on authority) from a presumed “fact” (traditional dogma seems to be inconsistent with natural science).

Just as Plato and Aristotle transformed the hedonism of the Greek Sophists into a scientific and philosophic tradition capable of lasting to our own day, contemporary naturalism can go beyond relativism and nihilism. Arguments rejecting traditional orthodoxy in the name of new scientific perspectives overstate the human relevance of chance, accident, and chaos. In neo-Darwinian theory, natural selection is driven by events that have neither meaning nor purpose—but it results in living beings whose behavior has meaning and purpose within the constraints of time and place. For Aristotle, human ethics were derived from biology, not from physics (Masters, 1987). The discovery that the cosmos lacks the harmony of the Newtonian world view may contradict eighteenth century theological doctrines; it does not lead ineluctably to Nietzschean principles.

B. Beyond Dogmatism and A Priori Morality

The insufficiency of relativism and hedonism should not blind us to the truth contained in the challenge to traditional dogma. Inclusive fitness theory teaches that humans, like other animals, typically behave in ways that benefit their physical health and welfare. Those in power, benefitting from the perquisites of status and wealth, can be expected to justify the existing state of affairs as “natural” and appropriate; the greater the social or political inequality, the more likely it is that such justification will take the form of dogmatic orthodoxies. Ethical absolutes, whether rooted in theology or in a presumed “natural law,” can readily be used by elites to justify customs or policies in their own self-interest.

Moral relativism is profoundly egalitarian. If “values” are *sui generis*, each individual’s choices (as long as they are “sincere”) would seem to be beyond ethical criticism. It is no accident that relativism and hedonism were developed as a challenge to doctrines of divine or “natural” law rooted in medieval

thought: with the rise of the market economy and constitutional democracies, each citizen needed to take responsibility for his own life. As historicists and Marxists like to point out, doctrines like those of the logical positivists have political implications.

In a changing world, no human action can be judged without reference to time and place. The imposition of abstract and universal norms without regard to circumstances can become naturally unjust, for such a priori standards inevitably favor some people over others. Precisely because each human genotype is of equal importance from an evolutionary perspective, a naturalistic ethics cannot be dogmatic, intolerant, and absolutist. While most secular philosophers would accept this argument as a reason for rejecting religious fundamentalism, it extends to Kantian rationalism and other a priori ethical theories.

An example will illustrate the defect of ethical absolutes. Debates concerning the equality of the sexes in contemporary Western industrial society often reflect the quest for a universal solution: for some, men and women should be equal in all respects; for others the traditional family—and therewith the distinct roles of men and women—are the foundation of civilization. From both perspectives, it is usually assumed that those with the contrary view are short-sighted and selfish. The difficulty, however, lies in the assumption that there is a single answer to the question of the appropriate role of each sex.

In socially stratified cultures as diverse as medieval Europe and traditional India, it was customary for men and women to have different political rights and privileges; in many hunter-gatherer societies, the two sexes have roughly equal status. While some might use these differences as evidence of cultural relativism, they can readily be explained as responses to the social and physical environment. Since similar differences in gender roles are found in other species, a naturalistic approach can explain why some cultures invest equally in males and females whereas others treat the two sexes quite differently (Dicke-mann, 1979; Alexander, 1917).

To assume that there is a single “logic” of male and female social and political roles, without reference to time and place, is contrary to evolutionary biology (Kitcher, 1985). While it would be absurd to claim that the practices of the caste society of traditional India should be a guide in Western industrial democracies, it is equally unwarranted to dismiss all social norms unlike our own as based on ignorance and vice. It is understandable enough that people describe their own customs as “natural,” but this label does not justify the imposition of universal ethical criteria on others living in very different circumstances. Such ethnocentrism is all the more suspect today because contemporary doctrines of equality are suited to a market economy and have been used to extend the power and wealth of capitalist societies at the expense of the “third world.”

Moral or political doctrines that are in one’s own benefit cannot be forced on others contrary to their self-interest without thereby using an ostensibly “true” theory as an instrument of power. This caveat applies not only to theological

intolerance and dogmatism, but to the a priori ethical reasoning that has become philosophically stylish since Kant. The “categorical imperative” seems to provide an appealing foundation for a rational ethics. Insofar as it is impossible to define a norm of behavior without reference to circumstance, however, ethical abstractions ultimately enshrine parochial customs and interests in a rationalist garb.

One example should suffice. Rawls’ celebrated *Theory of Justice* (1971) proclaims that a rational norm must be one that could be adopted behind a “veil of ignorance.” Like the Kantian categorical imperative, Rawls’ principle of justice requires that the individual be unaware of his circumstances in life. At one level, this could be described as an approximation of the effects of natural selection on future generations: since none of us can predict the exact social situation of our grandchildren, each has an interest in establishing cultural norms that would not favor some classes or groups against others. The restatement of Rawls’ principle in this form indicates, however, that it applies to social situations in which rapid social mobility is considered normal—and even there, only over the long run. In day-to-day behavior, context matters; to treat everyone in exactly the same way would make all forms of reciprocity immoral. No primate behaves toward others as if it is behind “a veil of ignorance”; inclusive fitness theory shows us that reciprocal altruism—and hence what Axelrod (1983) calls the “TIT-FOR-TAT” strategy—is more reasonable on naturalistic grounds than an a priori ethics ignoring the past behavior of others.

It is worth noting, in fact, that ethical doctrines postulating a priori or rationally defined universals tend to be enunciated by males. As Carol Gilligan (1983) has shown, women are more likely than men to insist that concrete circumstances should qualify abstract moral rules. While formal definitions of rights and duties are appropriate in some areas—such as legislation that will be binding on an entire society across generations—they cannot be taken as the only mode of ethical reasoning without imposing a style of judgment contrary to evolutionary principles and inconsistent with the practice of many humans. A naturalistic ethics must consider differences of time and place, and therefore provides an alternative to both religious and philosophic dogmatism.

C. Relative Objectivity and Moral Reasoning

That both moral relativism and doctrinaire universalism are unsound is an easily resolved paradox. The human brain tends to code concepts in binary pairs (up/down; in/out; right/left); many cultural norms reflect linguistic or symbolic systems in which such mental structures are embedded (Levi-Strauss, 1958, 1962). Although ethical theorists often engage in similar antinomies, there are other logical and mental structures besides simple dualism (cf. Plato, *Sophist*). To comprehend the world in a way that transcends the limits of one’s

own time and place, it is necessary to use conceptual tools like the Socratic dialectic.

In contemporary physics, no measurement is “true” without reference to the point in space and time from which it is made. Water boils at a different temperature at sea level and on a mountain top. When it is 3:00 PM in New York, it is noon in San Francisco. Such obvious propositions seem to be forgotten as soon as moral principles are at issue. On the one hand, people pretend that their own cultural standards are universally true; on the other, the discovery of historical or cultural differences is used to demonstrate that ethical principle is merely a question of subjective preference.

“Relativity” and “relativism” do not mean the same thing merely because the words are similar. In the sciences, objectivity can be attained only by abandoning the pretense that a human can be in the position of a divine observer whose judgments were true without qualifications of time and place. One might wish to have the power of the invisible but omniscient narrator of a nineteenth century novel; alas, such is not the situation of any living being. The closest approximation to truth accessible to us, whether in science or in ethics, presupposes the qualification of principles in terms of the domains to which they apply and the perspective from which they are uttered.

Historicists and Marxists are fond of emphasizing this principle, using the relativity of things to show that alternate theories or customs are time-bound. Evolutionary biology teaches us that all living species are organized in ways that depend on the past as well as on the present. Unlike historical determinists, however, biologists do not imply that the process of change is one of improvement or that we can necessarily predict the future (Ruse, 1986; Alexander, 1987). A new naturalism, like contemporary physics, leads to moral reasoning that is based on “relative objectivity”: truths that depend on time and context are nonetheless truths.

Ethical judgment depends on the point of view of the observer as well as on the action being observed. Traditional religious and ethical doctrines often recognized this elementary fact. Indeed, only since Kant, whose ethics imply a degree of rationality once attributed to God alone, have philosophers pretended that truly universal standards of right and wrong could be discovered by unaided human reason. It is time to adopt a humbler way of judging affairs.

III. HUMAN NATURE

The new naturalism described here requires profound changes in our attitude toward both science and morality. Although these ideas will be highly controversial, advances in the life sciences force us to reconsider what is meant by human nature. Now that biology is capable of explaining the mysteries of thought as events in the central nervous system and the differences of human

culture as adaptations to the environment, traditional doctrines of human nature are at odds with contemporary science. We will have to abandon one or the other.

Humans have a nature, but it is complex and changing. Societies are responses to the social and physical environment, but they are virtually never in stable equilibrium. Because humans use speech and language to supplement the genes as a means of encoding and transmitting information, contradictory intentions and behaviors are ubiquitous in any human society; to mitigate the resulting conflicts, political life is natural to our species. Social conflict can therefore never be “solved,” nor can “perfect” human institutions be invented.

Differences in judgment are inevitable, for individuals have distinct innate temperaments as well as unique experiences; increasingly, neurological and psychological evidence demonstrates that people have different ways of processing identical information (e.g., Sullivan & Masters, 1988). Such variability in perception and judgment is clearly an adaptive trait, particularly for a species living in varied and changing environments. While few contest this conclusion of an evolutionary approach to human cognition, it has political and ethical consequences.

Different ways of perceiving the same event are not always evidence that one person is “right” and others “wrong.” In the scientific community, propositions are formed in a way that permits disconfirmation of hypotheses and hence a slow but significant process of distinguishing the plausible and accurate statements about the universe. Consensus is more difficult in politics and ethics, where we are forced to judge individual events and to choose specific courses of action before knowing their outcomes. In social life, therefore, the plurality of modes of cognition is a desirable and necessary way of gaining information in an uncertain world.

Unless one human being truly attains supernatural wisdom, it will probably be the case that no single person could provide perfect political or ethical guidance for an entire society. Any understanding of the world—even if based on extensive scientific knowledge—is necessarily limited when applied to a wide variety of individual cases and specific social problems. From this perspective, political systems based on the rule of law seem more in accord with human nature than totalitarian or autocratic regimes. Like the process of informal decision making and consensus in face-to-face bands, political processes associated with republican or constitutional forms of government provide an opportunity for political participation consistent with our social nature; in this sense, evolutionary biology can become the basis of a discussion of that which is “naturally right” or healthy for human societies (Masters, 1986; 1987).

A naturalistic approach to human life leads to a philosophical perspective remarkably like that of Aristotle, for whom an objective analysis of all forms of government showed that “ruling and being ruled in turn” in a mixed regime was a basis for the best regime (*Politics*, VII). On the one hand, observation and

explanation of the different political regimes are possible; on the other, ethical judgment of better and worse can be derived from theoretical reflection on the human condition. The divorce between the human and natural sciences can be overcome, though at the cost of abandoning beliefs and attitudes that have been accepted in the West for several centuries. Rediscovering human nature will change our understanding of what it is to be *human* as well as what is meant by *nature*.

A. *The HUMAN in Human Nature*

Our concept of the species *Homo sapiens* has been marked by unnecessary and indefensible hubris since the Renaissance and, more particularly, since the industrial revolution. With the decline of medieval Christianity and the acceptance of Bacon's projected "conquest of nature" through science, Western civilization set forth to dominate the known world; the very success of these goals led ineluctably to the presumption that human rationality and freedom were the "highest" form of life. As secular interests replaced belief in God as the central force in human affairs, many have come to think of themselves as humans either individually or collectively endowed with divine power (e.g., Halle, 1965).

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 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. Political doctrines that seek to abstract human beings from the natural world cannot be a true representation of our situation.

Philosophers pretend that our reason can be the foundation of an ethical life superior to that of other animals (the "beasts" as it is said). On the contrary, observation of other species and analysis of the human brain leads to the surprising conclusion that morality is usually more a phenomenon of emotion than of reason. All too often, logic and rationality are used to rationalize self-interest; moral feeling is precisely that—the feeling of outrage at injustice, unfairness, or selfishness. Similar responses occur among other animals, forming the basis of a social repertoire that can be analyzed in ethological terms (Hinde, 1982; Sullivan and Masters, 1988). The linguistic and symbolic capabilities of humans make it possible to repress or disguise the feelings we share with other primates. Cultural tradition and individual learning produce error and evil as well as wisdom and truth (Tiger, 1987). From a naturalistic perspective, it is therefore appropriate to lower our assessment of the human condition. Wounded pride may well be a price worth paying for the preservation of life on earth.

B. The NATURE in Human Nature

If Western culture since the Renaissance has overestimated the faculties and dignity of human beings, it has also depreciated nature. In our culture, natural things are all too often merely to be used, controlled, and manipulated to the benefit of transient human desires. In political theory, this attitude is well illustrated by the labor theory of value, shared by such otherwise different thinkers as Locke and Marx: for most moderns, nature provides resources or raw materials—but without human activity, these materials are nothing more than worthless potentialities.

The counterpart of this temper in philosophy is the belief that meaning is solely derived from human thought and language. From 17th century nominalists to contemporary deconstructionists, it is taken for granted that humans are the only source of intention and substantive meaning in the universe. Nature is treated as impermeable and dead matter, without purpose, intention, or intrinsic value comparable to the ideas and goals of men.

Naturalism directly challenges this view of the world. If selfishness and altruism have a meaning for humans, it is because the social consequences of individual behavior are similar for other species. Neither consciousness nor cultural variation are unique to humans (Crook, 1981; Bonner, 1980). Beauty, play, and humor may be highly developed among humans, but their roots are in nature, not in arbitrary convention (e.g., Lorenz, 1970–71; Alexander, 1987).

Those tempted to resist these assertions would do well to reflect on Jane Goodall's prolonged observation of chimpanzees (Goodall, 1986), particularly because of confirmation of so many points by other observers (e.g., de Waal, 1982). Individual self-consciousness, intentionality, laughter, deceit, pity, murder, and warfare have now all been observed among chimpanzees. If these phenomena are at the root of "meaning," then surely humans cannot pretend that meaning itself is absent from the animate world.

Our difficulty in this regard may be more theological than philosophic. Because many seventeenth and eighteenth century thinkers used the observation of natural harmonies to buttress religious belief against secularism, the attribution of meaning to nature was associated in the modern mind with divine intention. Nature could represent purpose if and only if a caring God created the whole with the intention of thereby demonstrating his omnipotence and love to mankind. Such arguments went out of fashion, particularly under the impact of twentieth century physics.

The philosophy of ancient Greece (not to mention many oriental schools of thought) should testify to the existence of alternative ways of relating to nature. Aristotle, for example, explicitly denied the view that meaning and purpose in nature depended on the existence of an intentional supernatural agency or divine principle. As Aristotle puts it (*Physics*, 199b), nature is like "a doctor doctoring himself": natural purpose is immanent in living things, not extrinsic

to them. Animate nature, not inanimate physical processes, can be the fundamental point of reference for humans; what the Greeks called *logos* is more readily seen in the organization of information in all living systems than in physical systems governed by the Second Law of Thermodynamics.

A new naturalism suggests not only that biology replace physics or mathematics as the “queen of the sciences” (Simpson, 1969), but that nature thereby should be revalued as a source of meaning and purpose in the world. While the recent concern for preserving ecological balance and protecting endangered species reflect the beginnings of such a shift, it is not enough to pretend to “manage” natural processes. Confronted by technologies that permit us to produce new species at will, our culture faces—as none before us—the challenge of coming to terms with nature. The potential of realizing the Baconian project, complete with the invention of “new natures,” may be far more horrifying than has yet been realized (Kass, 1971).

C. The Place of Human Nature in the Cosmos

These issues lead us to metaphysics and theology, which are far from the focus of this essay. Since my approach has been intentionally based on secular reasoning, it would be both impudent and unwise to pretend to assess the implications of modern biology for belief in God. No one individual can pretend to know everything; it is surely quite enough to have suggested the renewed importance of questions that were central during past epochs of Western philosophical or religious inquiry.

There is, of course, no doubt that Darwinian biology has been perceived as a direct challenge to revealed religion. The history of the reception of evolutionary principles and the opposition to teaching them in public schools should remind secular or scientifically oriented readers of the pervasive theological issues posed by modern biology. “Creation science,” although clearly not a science as that concept has been used in the West, is obviously a challenge to the biological theories and findings on which a naturalist approach to ethics must rest.

In suggesting that a new naturalism can provide grounds for ethical principles as well as for a more objective science of human behavior, it has not been my intention to attack religion; one can question intolerant dogmatism without implying that all theological beliefs are false. On the contrary, there is little of substance in a naturalist perspective that could not be said to be consistent with many—though not all—religious doctrines. Humility, virtue, the rule of law, respect for others and for the natural world: none of these consequences of a naturalist perspective on the human condition need be viewed as a threat by the religious believer.

It is true enough that a literalist reading of the Biblical account of creation is at odds with evolutionary biology—and, indeed, for the scientific and philo-

sophic temper more generally. But some of the most serious and profound religious thinkers of the Judaeo-Christian tradition have not had difficulty on this score. If St. Thomas Aquinas could reconcile Aristotelian philosophy and Christian belief, surely it is not out of the question that a return to principles like those of Aristotle could be viewed as complementary to religious faith rather than as antagonistic to it. Three principles of meaning have characterized our civilization: science, ethics, and religious belief. It would surely be tragic for Western culture if harmonizing two of these three could only be achieved at the cost of the third.

Since Socrates, political theory has been devoted to an inquiry into human nature and its consequences for social life. Among the Greeks, it was presumed that the knowledge of nature had fundamental implications for a philosophical understanding of the human condition. A return to this element of our tradition is needed, for scientific research can no longer be ignored in the practice of philosophy. The biological sciences must come to the center of our attention if the Socratic injunction "Know Thyself" is to remain alive.

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