

DARWINISM: STILL A CHALLENGE TO PHILOSOPHY

by *Franz M. Wuketits*

Abstract: Charles Darwin died in 1882—more than a hundred years ago. His doctrine, however, is still alive. Recently there has been particular interest in his ideas among philosophers. These ideas are indeed a challenge to (traditional) philosophy: To take Darwin seriously means to revise—or even to destroy—some positions in (traditional) philosophy. Among the philosophical disciplines which have been affected by Darwin's ideas are epistemology and moral philosophy (ethics). In the present paper I shall discuss the epistemological and ethical consequences of Darwin's doctrine from the point of view of contemporary philosophy of biology; I shall give a brief outline of evolutionary epistemology and evolutionary ethics which both have caused many controversies.

Keywords: Darwinism; evolutionary epistemology; evolutionary ethics; theory of evolution.

Thomas Henry Huxley, Charles Darwin's famous advocate—sometimes called his bulldog—predicted that Darwin's work “is destined to be the guide of biological and psychological speculation for the next three or four generations” (Huxley [1863] 1960, 144). Huxley's prediction has proved to be true. Indeed, it seems that Darwin's ideas will continue to challenge the next three or four generations and influence future research in the same manner, and to the same extent, as before. Yet there is resistance to Darwin and “Darwinism”¹ partly due to misunderstandings and partly because of many people's aversion to the thesis that humans stem from the animal kingdom. However, there is most convincing evidence from paleontology, anatomy, biochemistry, and other scientific disciplines that man rose from the

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ape. Michael Ruse states it bluntly: "We humans are modified monkeys, not the favored creation of a benevolent God, on the sixth day. The time has therefore come to face squarely our animal nature" (Ruse 1986, 95). Philosophers and theologians can no longer ignore this insight.

In this article I am concerned with two questions: What do Darwin's ideas and the ideas of other evolutionists mean for epistemology? And what do these ideas mean for ethics? Recently there has grown up an evolutionary theory of (human) cognition and knowledge, so-called *evolutionary epistemology*. This epistemology owes vital impulses to Darwin's work. In a sense Darwin himself was an advocate of evolutionary epistemology although he did not use this term. The same is true to so-called *evolutionary ethics*. It is a remarkable fact that both evolutionary epistemology and evolutionary ethics, although they were skeletonized already in the nineteenth century, have affected philosophers particularly during the last ten or fifteen years. And there is growing interest in and massive critique of these doctrines. I hope, without being modest, that this paper can be of some help to those interested in evolutionary epistemology and ethics and that it can stimulate further discussions.

EVOLUTIONARY EPISTEMOLOGY

In his *On the Origin of Species* Darwin wrote: "Psychology will be securely based on the foundation already well laid by Mr. Herbert Spencer, that of the necessary acquirement of each mental power and capacity by graduation" (Darwin [1859] 1958, 449).² More than ten years later Darwin published his *The Descent of Man* (1871) and *The Expression of the Emotions in Man and Animals* (1872). He said: "With mankind some expressions, such as the bristling of the hair under the influence of extreme terror, or the uncovering of the teeth under that of furious rage, can hardly be understood, except on the belief that man once existed in a much lower and animal-like condition . . . He who admits on general grounds that the structure and habits of all animals have been gradually evolved, will look at the whole subject of Expression in a new and interesting light" (Darwin [1872] 1965, 12).

Darwin's view of expressions in humans and animals and his attempt to describe and explain psychic phenomena—be it in the human or in the subhuman world—and even human mental states on evolutionary grounds led to what we can call an *evolutionary psychology*. This kind of psychology includes an evolutionary view of human cognition and knowledge. Hence Darwin's evolutionary psychology was the overture to an evolutionary epistemology.

As Donald T. Campbell, one of the chief proponents of today's evolutionary epistemology, remarks, this is "at minimum an epistemology taking cognizance of and compatible with man's status as a product of biological and social evolution" (Campbell 1974, 413). Moreover, this type of epistemology explains human cognitive abilities as a result of long-term evolutionary processes; *a priori* knowledge (in the sense of Immanuel Kant) is interpreted as evolutionary *a posteriori*; the *tabula rasa* doctrine is refuted—cognition in the individual cannot start from nothing, our individual experiences are based on a long series of experiences made by our phylogenetic ancestors and now laid down in our genome.

Comprehensive volumes have been published on evolutionary epistemology (e.g., Callebaut & Pinxten 1987; Lorenz 1977; Oeser 1987; Plotkin 1982; Riedl 1984; Riedl & Wuketits 1987; Wuketits 1984a) and numerous articles have been devoted to this issue (to name but a few: Bradie 1986; Tennant 1983a; Wuketits 1986). However, those who defend evolutionary epistemology are not in agreement with regard to some particular aspects covered by the term *evolutionary epistemology*, and actually there are different versions of this theory. Despite the differences, we can summarize the basic arguments of evolutionary epistemology.

First, psychic phenomena in animals as well as mental states in humans are based on biological structures and functions. The human mind is a systems property of the human brain; it depends on the specific arrangement of nerve cells. Thus, "mental life" in humans can only be understood by studying its neuro-biological basis.³ This means that organic evolution was the precondition to the development or evolution of psychic and spiritual (mental) phenomena: Cognitive behavior in animals and humans is a result of evolutionary processes, and even human rational knowledge is constrained—at least to a certain extent—by mechanisms of organic evolution.

Second, as most evolutionary epistemologists argue, organic evolution itself can be described as a cognition process or, more precisely, a cognition-gaining process. It might be a truism that any living system accumulates information about its environment or, at least, certain properties of this environment. To this extent, the life of any organism—be it a bacterium or *Homo sapiens*—may be described as an information-increasing process. It is through their "perceiving apparatus" (i.e., the totality of sense organs and mechanisms in the nervous system⁴) that organisms are enabled to accumulate information and, in a sense, to model certain parts of reality. The perceiving apparatus functions in a way analogous to a calculation machine. However, it functions preconsciously: the animals' experiencing the world has

nothing to do with rationality. This apparatus may be called “ratiomorphic apparatus,”⁵ for it operates like a “logic of life,” although it is not to be identified with rational knowledge processes. One of the basic theses of evolutionary epistemology is that the perceiving (ratiomorphic) apparatus in any individual living being is that one, which—among all initial cognitive mechanisms possible—calculates the environment most efficiently, and that natural selection has thus favored those cognitive mechanisms, which have been of certain survival value for the organism. The perceiving apparatus of any organism is the result of long-term evolutionary processes, and in the course of evolution more and more complex sense organs, brains and nervous systems emerged. Evolution itself therefore can be described as a process of numerous experiences (trial and error!), which have been accumulated from one generation to another.

Third, following from the second point, cognition in any individual living system cannot start from nothing. Any individual organism is equipped with experiences made in the past by its phylogenetic ancestors. In other words, any organism is equipped with innate dispositions, which, to a certain extent, may indeed be modified by individual learning, but which cannot be completely wiped out. Innate dispositions to the perceiving apparatus are working like “innate teaching masters” (Lorenz 1977) and consist of a system of “hypotheses,” which are leading the organism’s experience (Riedl 1984). Hence, evolutionary epistemology is at variance with the *tabula rasa* doctrine. Karl R. Popper, who has long argued for a trial-and-error model of knowledge,⁶ makes the point that “the *tabula rasa* theory is absurd”; he writes that “at every stage of the evolution of life and of the development of an organism, we have to assume the existence of some knowledge in the form of dispositions and expectations” (Popper 1972, 71). Moreover, he emphasizes that “knowledge never begins from nothing, but always from some background knowledge—knowledge which at the moment is taken for granted—together with some difficulties, some problems” (Popper 1972, 71). The advocates of evolutionary epistemology indeed suppose that the process of cognition—or cognition gaining—bases on experiences and expectations. To be sure, these are preconscious expectations, because no living system (except for humans) consciously anticipates certain events. However, experiences of many generations in the lineage of a species are laid down in the species’ peculiar genome, and in fact by storing experience (information) any animal is conducted to “expect” certain events as well as certain effects of its own behavior. According to an inborn expectation, namely the “hypothesis of the seemingly true” (Reidl 1984), the probability of events increases with the number of already confirmed expect-

tations. Thus, the evolution of cognition and knowledge is a process closely resembling a cycle of experiences and expectations.

Fourth, according to this view, our innate cognitive apparatus—being a result of biological evolution like the cognitive apparatus of other living beings—can be transcended only by the aid of the apparatus itself: by a repetition and, whenever necessary, a correction of the original procedure. Information processing, therefore, be it at the level of humans or at the subhuman level, is a process of self-regulation and self-correction (Oeser 1987).

Fifth and finally, evolutionary epistemology compels us to revise the Kantian doctrine of the *a priori*. This is not to say that from the point of view of evolutionary epistemology Kant's epistemology is refuted. However, as I have stated previously, what is called *a priori* in the sense of Kant, appears to be *a posteriori* from an evolutionary point of view. The prerequisites of human thinking remain *a priori* for each individual, but they are to be explained as *a posteriori* for the chain of its pedigree. Hence—following what I said above—we can state that any individual living system is equipped with *a priori* knowledge, but that this knowledge is the result of experiences made through many generations.

Of course what I have stated is just a rough formulation of some basic ideas inherent in evolutionary epistemology. However, my point is that this type of epistemology despite its “open problems” is apt to offer new answers to classical philosophical questions and that it helps us to surmount some obsolete philosophical positions. Certainly the reader has recognized that evolutionary epistemology is at variance with dualism. The dualists' argument is that there must be a mind animating the brain or, at least, that mind and brain interact (see Popper & Eccles 1977). The view of evolutionary epistemologists is that mind is a specific property of the brain (see note 3). Furthermore, from this point of view the empiricist's credo is untenable: Our brain is not initially a clean slate or a *tabula rasa*, but it is equipped with innate dispositions, which are the outcome of evolutionary processes.

AN EXTENDED VERSION OF DARWINISM

As I mentioned previously, evolutionary epistemology has grown from Darwin's ideas. Many concepts of modern evolutionary epistemology are indeed Darwinistic. I feel that Darwin would agree to the five points by which I summarized the central ideas of contemporary evolutionary epistemology. However, I also feel that evolutionary epistemology requires a broader foundation going beyond classical Darwinism. Most important contributions to our understanding of evolution came indeed from Darwin's theory of natural selection, but this theory does

not offer a sufficient explanation of some complex evolutionary phenomena, particularly the emergence of cognitive systems.

Consider, for a moment, the notion of adaptation, which is inherent in most conceptions of evolution. Many advocates of evolutionary epistemology argue along the line of an "adaptationism." For example Konrad Lorenz in his classical essay "Kants Lehre vom Apriorischen im Lichte gegenwärtiger Biologie" writes:

We are convinced that the *a priori* is based on central nervous systems which are entirely as real as the things of the external world whose phenomenal form they determinate for us. . . . Just as the hoof of the horse, this central nervous apparatus stumbles over unforeseen changes in its task. But just as the hoof of the horse is adapted to the ground of the steppe which it copes with, so our central nervous apparatus for organizing the image of the world is adapted to the real world with which man has to cope. Just like any organ, this apparatus has attained its expedient species-preserving form through this coping of real with the real during its genealogical evolution, lasting many eons (Lorenz [1941] reprinted in Plotkin 1982, 124).

This is all true, but how to explain adaptation and "adaptability"? In its strict (Darwinistic) sense adaptation is simply the result of natural selection operating on blind mutations and genetic recombination; and natural selection is said to work as an external principle, coming from the environment of the organism. I do not think that the emergence of complex systems such as the vertebrates' central nervous system can be explained by natural selection as a mere outer mechanism. I think that particularly the emergence and evolution of cognitive phenomena can be explained only within a broader theoretical framework considering also "internal mechanisms" of evolution (see Wuketits 1986).

Among modern approaches to an understanding of evolution the systems-theoretical approach deserves our attention (see Riedl 1977; 1979). The systems conception of organic evolution is based on Darwin's ideas, but it has outgrown classical Darwinism by appreciating organismic constraints to evolution. This is not to say that we should refer to any vital forces and similar cryptic principles. By internal organismic constraints to evolution we mean self-regulating principles which characterize all living systems, and we take into account that any organism is a multi-level system whose organizational levels are mutually related. In short, "we must recognize that the unaided environment is not responsible for evolutionary changes" (Wuketits 1986, 202). We have to consider that evolution is not solely constrained by environmental forces, but also by intraorganismic factors, and that the outer (environmental) and the inner mechanisms do not work independently. As Rupert Riedl states it: "The systems conditions which link different levels of complexity to feed-back loops of cause and

effect are responsible for the evolution of life" (Riedl 1977, 358). The result of such arguments is an extended version of Darwinism.

The evolutionary explanation of cognitive mechanisms requires such a comprehensive theory of evolution. It is not enough to say that cognition is just the result of evolution leading to adaptations. Organisms are not simply moulded by their environment(s); evolution is rather a complex process of interactions between organisms and their outer reality. The basis of an evolutionary epistemology therefore is not, and cannot be, an evolutionary adaptationism. Cognition gaining presupposes that any organism is an active system, so that not only does the environment work upon it but also vice versa.

What I am saying, however, does no harm to the heart of Darwin's ideas. Darwin was on the right track, but our view of evolution and its mechanisms has to be changed according to a comprehensive systems-theoretically oriented theory of life.

It might be that philosophers (and particularly epistemologists) are not as much interested in the debate concerning the mechanisms of organic evolution as they are attracted to—or taken aback—by the general conclusions drawn from evolutionary thinking: that cognition is a biological process and that human knowledge is an outcome of processes of organic evolution. Philosophers and theologians cannot ignore such conclusions. If there is—or should be—any progress in philosophy, then philosophers have to take notice of results of evolutionary theory of cognition/knowledge; it is through this theory that things can start to work.

EVOLUTIONARY ETHICS

Consequently one may argue that moral behavior in humans also is constrained by biological factors. Edward O. Wilson, one of the promoters of the "sociobiology movement," writes: "The biologist, who is concerned with questions of physiology and evolutionary history, realizes that self-knowledge is constrained and shaped by the emotional control centers in the hypothalamus and limbic system of the brain. These centers flood our consciousness with all the emotions—hate, love, guilt, fear, and others—that are consulted by ethical philosophers who wish to intuit the standards of good and evil. What, we are then compelled to ask, made the hypothalamus and limbic system? They evolved by natural selection" (Wilson 1975, 1). Is, then, our moral behavior nothing else but a matter of biological, evolutionary constraints which were built upon the limbic system and the hypothalamus?

Darwin was cautious of drawing ethical conclusions from his theory (i.e., the theory of natural selection); and Thomas Huxley even argued

that there is nothing in biological evolution that implied anything about ethics, that is to say about what one ought (or ought not) to do (see Ruse 1982). However, if humans are results of organic evolution (and undoubtedly they are!) then we have good reason to expect that evolutionary theory will tell us something about morality. What we can learn from evolutionary epistemology is, to say it once more, that our cognitive apparatus has developed as a biological system and is thus constrained by biological mechanisms. Consequently, we may assume that our moral behavior, being a particular function of that system, also is a result of evolutionary processes. An evolutionary ethics would then be at minimum an ethics taking cognizance of humanity's evolutionary past and reconstructing the circumstances under which humans have developed through millions of years. (This follows indeed from Darwin's claims.)

Recently there has been great interest in, and critique of, the evolutionary approach to ethics (see e.g., Mohr 1987; Richards 1986; Ruse 1986a, b; and Tennant 1983b, to name but a few authors defending this approach). I begin this discussion with saying what evolutionary ethics is *not*.

An evolutionary ethics cannot tell us what is (ethically) right or wrong. An argument such as "In nature there is struggle for existence and therefore it should be one and it is right/good" would be a pseudo-argument and is untenable on logical grounds. Besides, such an "argument" generates dangerous ideologies. To be sure there is indeed struggle for life in nature, there is egoistic behavior, there is competition, aggression and so on; but this is not to say that we humans *ought* to behave in the same manner. I agree with Antony Flew's argument that Darwin's theory (or any other theory of organic evolution) as a purely scientific theory cannot "by itself entail any normative conclusions (conclusions, that is, about what *ought* to be); because it would not, so long as it remained a purely scientific theory, contain any but descriptive premisses (premisses, that is, about what neutrally *is* the case, or *has been*, or *will be*)" (Flew 1978, 27).⁷ Therefore, whatever the biologist states about evolution, on animal or human behavior, he or she only attains to descriptive statements and not to prescriptions. Where this is not the case, where the biologist confuses *is* with *ought*, there he or she has left the ground of scientific arguments and is going to support ideological claims. An evolutionary ethics is a descriptive discipline and an explanatory theory and not a system of norms (Mohr 1987).

The task of evolutionary ethics, then, is that of a scientific discipline or theory, which reconstructs the genesis and evolutionary development of human moral behavior. Yet evolutionary ethics says nothing about whether or not particular aspects of this behavior are right or

wrong in an ethical sense. We humans have *invented* the notions right (good) and wrong (evil) during social and cultural evolution, which includes religious belief systems, metaphysics, and the creation of values. That means that these categories—right or wrong—are not inherent in nature. Evolutionary ethics can help us to explain why and how and under which circumstances during our evolutionary past such categories were invented, but evolutionary ethics cannot by itself entail normative statements.⁸ As Francisco Ayala states it: “The evaluation of moral codes or human actions must take into account biological knowledge. But for deciding which moral codes should be accepted, biology alone is palpably insufficient” (Ayala 1987, 250).

Here I want to pick up an important distinction: the distinction between *evolutionary* and *evolved* ethics (Tennant 1983b). Evolutionary ethics traditionally is based upon criteria “of value purportedly derived from the evolutionary theory of the origin and proliferation of life on earth” (Tennant 1983b, 290). This tradition has a bad reputation because it led to social Darwinism. On the other hand, an evolutionary theory of the origins and the development of social behavior (including moral behavior) “may account for the evolution *of* ethics, rather than purport to derive an ethical code from the theory of our evolution” (Tennant 1983b, 291).

Hence, an evolutionary ethics does not and cannot support any ethical (moral) codes, but it may indeed help us to understand why moral codes have evolved. By no means one should try to derive moral codes and their justification from principles of organic evolution, from the formula “struggle for life” and, generally, from the “law of the jungle.”

However, the evolutionary approach to ethics has one great advantage and therefore should be taken seriously: To argue that humans and their morality result from evolution means to admit that morality *has evolved* and that moral codes therefore are not fixed for ever as unchangeable categories. The evolution of life generally is not determined (predetermined) by eternal laws, it rather is a “self-planning” process, an “open program” (see Wuketits 1987). Unlike other approaches to explain moral behavior, the evolutionary approach, therefore, does not include any contention that “things are unchangeable” and that the way we act is the best one. Such contentions, legitimating the status quo, have to do with ideological claims and not with ethics; they hamper “progress” in ethics and besides harm humanity. On the contrary the evolutionary approach does not offer any justification of the status quo; it only helps us to understand under which (evolutionary) circumstances human societies developed, and how and why values and norms were created.

Given my conviction that evolutionary ethics prompts us to ask important questions concerning the pathways of human morality, I want to highlight another crucial problem: the explanation of the relation between “objectivity” and “subjectivity” of moral codes. Following Robert J. Richards’s argument, we may suppose that evolution has equipped humans with social instincts, that is, the need to protect offspring, to provide for the well-being of the members of the community, and so on, and that such instincts are instances of the (supreme) principle of heeding the community welfare (including the welfare of oneself) (Richards 1986). Insofar as moral behavior is objective, it concerns not only the individual, but the community, which can exist and survive only if there is a minimum consensus among its members. Any individual within the community can exist and survive only if he or she meets the consensus.

To be sure, on the other hand, morality is subjective: It is a question of the individual’s feelings and sentiments. In my private life I can obey moral principles and construct values which others do not. But listen to the argument proposed by Michael Ruse:

The evolutionist’s claim . . . is that morality is subjective . . . but he/she admits that we “objectify” morality. . . . We think morality has objective reference even though it does not. Because of this, a causal analysis of the type offered by the evolutionist is appropriate and adequate, whereas a justification of moral claims in terms of reasoned foundations is neither needed nor appropriate. Furthermore, completing the case, the evolutionist points out that there are good (biological) reasons why it is part of our nature to objectify morality. If we did not regard it as binding, we would ignore it. It is precisely because we think that morality is more than mere subjective desires, that we are led to obey it (Ruse 1986b, 103).

To support Ruse’s argument I want to stress that it is just because of our drive to survive that we have evolved moral principles. This is not necessarily true to our modern anonymously organized societies, but it was true to the societies of our phylogenetic ancestors. In a nutshell it was of certain survival value to our ancestors to believe that their moral codes are objective even if they were not.

One final point should be made in this context. I have stated above that evolution is an open program and not predetermined like Gottfried Leibniz’ world of a “pre-established harmony.” Hence, our ethical (moral) behavior is not the expression of any eternal principles. I agree with Hans Mohr (1987), Wilson (1975), and others who have argued that some traits of our moral behavior may be derived from archaic behavioral patterns developed millions of years ago. I further agree that there are genetical constraints to social and even moral behavior in humans. However, I do not agree that human morality is just fixed in the human genes.⁹ There is no particular gene which prescribes human actions. Human actions come from decisions in the

human brain and so do moral codes. Human actions are constrained by biological factors, but there are also social and cultural determinants; these determinants cannot be sufficiently explained in terms of organic evolution (Wuketits 1984b).

Nevertheless, the evolutionary approach to ethics is of great importance. It helps us to understand how and why humans evolved as ethical beings, reflecting upon the right and the wrong. To understand the evolution of moral behavior, however, the help of evolutionary epistemology is needed. Both evolutionary epistemology and evolutionary ethics offer a new perspective on humans and their place in the universe. Without commitment to ontological reductionism, the evolutionary view of humans prompts us to reformulate our self-knowledge and thus to rewrite at least parts of the picture we have of ourselves.

CONCLUSION

I cannot pursue the subject further, because here I am only concerned with hinting at the relevance of evolutionary thinking and consequences of this thinking in the districts of philosophy. We should keep in mind, however, that many of the ideas which I have roughly presented in this paper were pursued more than a hundred years ago by Darwin. This is true at least regarding the central ideas of contemporary evolutionary epistemology and evolutionary ethics. In addition, Darwin influenced some other philosophical disciplines such as natural philosophy.

It has been argued that Darwin's competence in philosophy was rather small. That is incorrect, even though Darwin was indeed a naturalist and not a professional philosopher. "It is obvious that he dealt with some difficult problems, both biological and philosophical. Because he was aware of the intricate logical issues with which he dealt, he was able to avoid many of the perennial mistakes which have plagued philosophers and biologists alike" (Ghiselin 1969, 102). That is not to say that Darwin was able to solve all the problems, for instance the problems of epistemology and ethics. Yet through his work much light has been thrown on these problems, and he demonstrated how to pose the right questions.

Today's evolutionary epistemology and evolutionary ethics are indebted to important contributions from Darwin's work. To take Darwin and his message seriously means to accept that both our epistemic and moral activities are part of our very nature. Even today many people do not accept or want to accept Darwin's conclusions. Philosophers, however, cannot pass over these conclusions in silence. Not for a long time yet can we rest our case. The discussion has just begun; let us continue the discussion.

NOTES

1. The term "Darwinism" is ambiguous. On the one hand it means Darwin's genuine scientific ideas, particularly his theory of evolution by means of natural selection; on the other hand, however, it expresses ideological claims similar to those of social Darwinism (which originally was not Darwin's ideal). In the present paper I use the word "Darwinism" in its first sense.

2. It should be remembered that Herbert Spencer applied the idea of evolution to psychology and to the social sciences and that he established a system of what might be called *evolutionary philosophy*.

3. This does not mean that evolutionary epistemologists advocate an ontological reductionism such as: "Mental phenomena are *nothing else but* neurons and neurons are to be reduced to atoms." Mental life in humans is indeed an evolutionary novelty and it transgresses the principles of organic evolution. It cannot be sufficiently explained without resorting to neurobiological research, but we must admit that it is constrained by cultural evolution as well.

4. Unicellular organisms are not provided with sense organs or nervous systems. However, there are particular organelles, which function in a way analogous to organs.

5. The term *ratiomorphic* was coined by the psychologist Egon Brunswik in the 1950s.

6. As Campbell (1974) demonstrated, Popper advocates a selective-elimination model of the growth of knowledge. In his *Objective Knowledge* (1972) Popper uses the term "evolutionary epistemology" and declares himself as an advocate of this type of epistemology. Curiously enough in *The Self and Its Brain* (1977) he supports Sir John Eccles's mysticism, that is to say a mind-body interactionism. However, Popper advocates a particular version of evolutionary epistemology, which explains the growth of scientific ideas via analogy to the evolution (and selection) of living systems.

7. One should keep in mind that ethics as a normative (philosophical) discipline includes—and is built up by—imperatives. Other philosophical disciplines and the sciences consist of descriptive and explanatory systems and do not amount to any imperative.

8. Thus it might be misleading to speak of "evolutionary ethics." When doing so, we should remember that this theory is not normative as is traditional philosophical ethics.

9. Some sociobiologists speak of the "morality of the gene" (see Ruse 1985; Wilson 1975). This cannot mean that genes in themselves exhibit moral behavior, but rather that there are genetical constraints upon morality.

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