

EDITORIAL

DOES EVOLUTION QUALIFY AS A SCIENTIFIC PRINCIPLE?

WHAT THIS ARTICLE IS ABOUT

This editorial is a response to a statement signed by leading biologists affirming evolution as a principle of science. The statement, published recently in the Humanist, asserts that evolution qualifies exceptionally well as a principle of science. A survey of the scientific literature indicates that this is not the case. Fundamental disagreements center around questions of whether or not evolution can be tested by the same criteria used for other scientific theories. Many feel that evolution should be treated differently than ordinary science. This would also exclude it from qualifying as a bona fide principle of science.

The *Humanist*, an official publication of the American Humanist Association and the American Ethical Union, recently (Jan/Feb 1977) published a statement affirming evolution as a principle of science. The statement, signed by 163 scholars, most of whom are biologists in leading universities of the United States, was prepared for distribution to major public school districts in the United States. Among its sponsors are such notables as Isaac Asimov, Linus Pauling, and George Gaylord Simpson.

The statement points out that “all known forms of life including human beings developed by a lengthy process of evolution.” This broad perspective on evolution is what Kerkut (1960, p 157) calls the “general theory of evolution,” in contrast to the “special theory of evolution” which deals with small variations in organisms such as have been observed in nature and the laboratory. The statement in the *Humanist* also indicates that the principle of biological evolution meets “exceptionally well” the criteria demanded by science of being “*firmly established...on rigorous evidence*” and that in recent years more confirmation of the principle of natural selection and adaptation as proposed by Darwin and Wallace has continued to accumulate. The statement further asserts that “creationism is not scientific,” while evolution is “strictly scientific.”

On the other hand there has been an ongoing debate within the scientific community, largely among individuals who believe in evolution, about the validity of evolution as a scientific principle. The statement published in the *Humanist* suggests that under the pressure of current criticism leveled at evolution, basic scientific values may be overlooked or given secondary place over other factors.

Much of the debate regarding the validity of evolution revolves around the elementary notion that science explains things on the basis of cause

and effect. Simply stated, given certain conditions, certain results can be expected. This feature gives science its predictive qualities. For instance the statement “a magnet attracts iron” can be tested and used to predict what will happen when the two are near each other.

Hans Reichenbach in *The Rise of Scientific Philosophy* (1951, p 89) emphasizes the necessity of a predictive quality for science:

A mere report of relations observed in the past cannot be called knowledge; if knowledge is to reveal objective relations of physical objects, it must include reliable predictions. A radical empiricism, therefore, denies the possibility of knowledge.

The concept of predictability and subsequent testability has prompted the noted scientific philosopher Karl Popper to further emphasize that if an explanation cannot be adequately tested, it is not scientific. The concept must be testable (i.e., falsifiable) to qualify. Any kind of explanation will not do; it must be amenable to a testing process. If it survives testing, it can qualify. In our magnet example, we might propose that objects of only a certain color (and not a magnet) attract iron. If a red magnet were found to work, we could further test the notion by using a wooden block of the same color as the magnet and thus disprove the color theory. Popper in his book *The Logic of Scientific Discovery* (1968, p 40) is emphatic on the matter of falsification. He states:

But I shall certainly admit a system as empirical or scientific only if it is capable of being tested by experience. These considerations suggest that not the verifiability but the falsifiability of a system to be taken as a criterion of demarcation.

The idea that a genuine scientific idea must have the consistency that gives it predictive value, and the potential for falsification, has received a great deal of attention during the past few years among scientific philosophers and evolutionists. There is very little disagreement with this aspect of science as enunciated by Popper, and there is genuine concern as to how to apply this principle to the theory of evolution. The unrepeatable or untestable events postulated for evolution are not amenable to evaluation on the basis of consistency and prediction. Thus the concept of evolution as a principle of science is being questioned at a most fundamental level. Does it really qualify as a scientific principle? Some examples of deficiencies follow.

The concept of natural selection by survival of the fittest is the basic evolutionary mechanism. This concept does not qualify as a scientific principle, since fitness is equivalent to survival. Here we have a case of circular reasoning; no consistency or predictive value can be tested. According to this idea, organisms have survived through the evolutionary process because they are better fit, and the way one tells they are better fit is that they survive. A number of evolutionary scholars have labeled the principle of survival of the fittest a tautology (e.g., Waddington 1957,

Eden 1967, Peters 1976). Popper (1963) attacks the unfalsifiable nature of the concept and concludes:

If, more especially, we accept that statistical definition of fitness which defines fitness by actual survival, then the survival of the fittest becomes tautological, and irrefutable.

The concept of survival of the fittest of itself does not necessarily imply any evolution. Would not the fittest survive, whether they evolved or were created? The noted evolutionist Mayr (1976, p3) speaks of “an all-powerful natural selection.” Platnick (1977) wonders if there is any difference in this kind of explanation as compared to that of an all-powerful Creator.

Some evolutionary biologists are of the opinion that it is not necessarily the fittest that survive through the evolutionary process, but those that are best adapted to the requirements of evolution. Others have emphasized that survival of the organism is not as important as its fecundity. In both cases the problem of predictability remains. In a symposium volume celebrating 100 years of Darwinism the prominent geneticist Waddington (1960, p 385) evaluates the matter of fecundity. He states:

Natural selection, which was at first considered as though it were a hypothesis that was in need of experimental or observational confirmation, turns out on closer inspection to be a tautology, a statement of inevitability although previously unrecognized relation. It states that the fittest individuals in a population (defined as those which leave most offspring) will leave most offspring.

Another problem associated with the untestability of evolutionary theory is that the theory explains too much. Grene (1959) points out that “whatever might at first sight appear as evidence against the theory is assimilated by redefinition into the theory.” Evolutionary theory is broad enough to accommodate almost any data that may be applied. Two ecologists Birch & Ehrlich (1967) emphasize this. They state:

Our theory of evolution has become, as Popper described, one which cannot be refuted by any possible observations. Every conceivable observation can be fitted into it. It is thus ‘outside of empirical science’ but not necessarily false. No one can think of ways in which to test it.

No matter what is observed, there usually is an appropriate evolutionary explanation for it. If an organ or organism develops, it has positive survival value; if it degenerates, it has negative survival value. If a complex biological system appears suddenly, it is due to preadaptation. “Living fossils” (contemporary representatives of organisms expected to be extinct) survive because the environment did not change. If the environment changes and an evolutionary lineage survives, it is due to adaptation. If the lineage dies, it is because the environment changed too much, etc. Hence the concept cannot be falsified. Platnick (1977) states that this type of

situation “makes of evolutionary biologists spinners of tales, bedtime storytellers, instead of empirical investigators.”

A few scientists (e.g., Williams 1970, 1973; Ball 1975, Ferguson 1976) have tried to show that evolutionary theory can predict. Their attempts, however, are concerned with the small changes of the special theory of evolution instead of the general one which is at issue and which is the main subject of the declaration published in the *Humanist*. These small changes do not prove large ones as Grene (1959) points out:

By what right are we to extrapolate the pattern by which colour or other such superficial characters are governed to the origin of species, let alone of classes, orders, phyla of living organisms?

The question of the testability of the general theory of evolution remains.

Basic textbooks of biology usually illustrate evolution using the concept of homologous structures. Here we have another example of circular reasoning that would not pass the prediction test for science. Homologous structures are defined as comparable parts of different life forms that have a common evolutionary origin. The forelimbs of a salamander, crocodile, bird, bat, whale, mole and man all have the same basic bone structure and are considered homologous. Similarity does not necessarily imply evolution. A student commenting to an evolutionary professor put it aptly: “They find a muscle in an animal and give it a name; in another animal they find a muscle in a similar position and give it the same name and then call it evolution.” Darwin himself used the argument of similarity of structure to support evolution.

Lee (1969) points out that the argument is logically invalid:

He [Darwin] argued that morphological similarities were due to common descent and yet offered no further really acceptable evidence for common descent save morphological similarities. A circular piece of reasoning if there ever was one.

Hull (1967) makes the same complaint:

It is tautological to say that homologous resemblances are indicative of common line of descent, since by definition homologous resemblances are those resemblances due to common line of descent.

The same difficulty reappears when evolutionists attempt to classify living and fossil organisms so that their evolutionary relationships are revealed. One might select, for example, the group of invertebrates which most closely resembles the chordates and place the two groups near each other in a classification scheme. The classification is then often used as evidence for an evolutionary relationship.

Several widely divergent schools of thought have developed regarding the kinds of characteristics that are most important in determining evolutionary relationships. As a result opinions as to whether Popper’s criteria of falsifiability can be satisfied also differ widely (e.g., Bock 1973, Wiley

1975). Perhaps the soundest conclusion expressed by a number of scholars is that from a practical standpoint the process of evolution is too complex and past events too unknown to permit a meaningful reconstruction of evolutionary phylogenetic patterns (Manser 1965, Barker 1969, Lee 1969, Platnick 1977). Orians (1973) and Slobodkin (1968) admit it is very difficult. An alternative is to adopt the view expressed by the prominent evolutionist Ernst Mayr (1976, p. 411) that classification of organisms is an “art.” This would remove the problem altogether from the arena of science.

This brings us to another point: a number of scientists and scientific philosophers in attempting to reconcile the lack of rigor in evolutionary theory compared to current scientific standards have proposed that evolution be treated differently. This, of course, tends to alienate it from science and from being a “principle of science” as proposed in the *Humanist* statement. Such views have been proposed by Beckner (1959), Scriven (1959), Smart (1963), and Manser (1965), while Barker (1969) and Flew (1966) propose that evolution is more closely related to historical studies than to typical science. Ruse (1973) on the other hand suggests that evolutionary events are subject to the same scientific principles that apply to most of science. Platnick (1977) in the journal *Systematic Zoology* is still more emphatic:

Evolutionary biologists have a choice to make: either we agree with Mayr that narrative explanations are the name of the game, and continue drifting away from the rest of biology into an area ruled only by authority and consensus, or we insist that whenever possible our explanations be testable and potentially falsifiable and that evolutionary biologists rejoin the scientific community at large.

The concept of creation does not appear to meet the criterion of falsifiability any better than evolution. Science is not at its best when dealing with unique past events, whether these be considered as evolution or creation. Therefore it is surprising to find a statement signed by more than 120 scientists stating that creationism is “a purely religious view” while evolution is labeled as “strictly scientific.”

The controversy over whether or not evolution is a scientific principle has reached beyond the scientific community. In his article entitled “Darwin’s Mistake,” published in *Harper’s Magazine*, Bethell (1976) states his belief that Darwin’s theory “is on the verge of collapse.” The jurist Macbeth (1971) in his book *Darwin Retried* presents a long list of illogical arguments employed in support of evolution. He does not defend creation, yet states that “Darwinism itself has become a religion” (p 126).

The statement in the *Humanist* affirming evolution as a principle of science has the support of many influential scientists; yet a review of the literature of both science and the philosophy of science reveals significant doubt regarding its validity. In view of this, it is sobering to think that so many scientists should affirm, in a public statement to be sent to public schools, that evolution is a principle of science that meets “exceptionally

well” the criteria of science which are based on “rigorous evidence.” Apparently this is not the case at all. Evolutionists need to re-examine their thinking and re-evaluate their claims.

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