Popper on Darwinism

W. D. Russell-Hunter, in his letter (17 Apr., p. 281) commenting on William J. Broad's excellent article on the recent creation-evolution trial in Sacramento, California (News and Comment, 20 Mar., p. 1331), suggests that Karl Popper in a letter to *New Scientist* (*1*) has recanted the following in *Unended Quest* (*2*):

> From this point of view the question of the scientific status of Darwinian theory—in the widest sense, the theory of trial and error-elimination—becomes an interesting one. I have come to the conclusion that Darwinism is not a testable scientific theory, but a *metaphysical research programme*—a possible framework for testable scientific theories.

I think, however, that one must carefully read the fairly detailed development of Popper's ideas in *Unended Quest* and fully appreciate the cautious wording of his "recantation" in *New Scientist*.

In the former work Popper did not deny "scientific character" to Darwinism, although he reiterated that "it is therefore important to show that Darwinism is not a scientific theory, but metaphysical" (*3*). He went on to aver that "its value for science as a metaphysical research programme is very great, especially if it is admitted that it may be criticized, and improved upon" (*3*).

In his letter to *New Scientist*, Popper does admit that the "historical sciences . . . can very often be tested by deriving from them testable predictions or retrodiction" (*1*). This is certainly true for some of the "testable scientific theories" which have been developed within the framework of the Darwinian "metaphysical research programme." But it is not true of the general theory of evolution, the hypothesized common descent of all life which Darwin repeatedly identified as the idea which must be preserved at all costs in order to extirpate from the minds of scientists and nonscientists those dual concepts which he so intensely hated, that is, divine intervention and special creation.

The failure of evolutionary theory to make testable predictions is widely acknowledged, as Broad pointed out. As for retrodictions, can they provide the basis for crucial testing or for conclusive falsification of the general theory of evolution? The answer is no. Failure to find some type of retrodicted data can always be explained away, and often has been. Popper did not affirm in his letter to *New Scientist* (and I predict that he never will), "Darwinism is a falsifiable theory of empirical science." And I suspect that very few evolutionary scientists themselves believe this to be so in their heart of hearts.

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1. K. Popper, *New Sci.* **87**, 611 (1980).
2. _____, *Unended Quest* (Open Court, La Salle, Ill., 1976), p. 168.
3. _____, *ibid.*, p. 172.

When I learned from Broad's article that the creationists claim support from Sir Karl Popper for their claim that Darwin's theory of natural selection is not science, I wrote to Sir Karl, whom I have known ever since common Vienna days. He promptly sent me a copy of his paper, "Natural selection and the emergence of mind" (*1*), with a reference to page 344, where he marked the following passage in the margin:

> The fact that the theory of natural selection is difficult to test has led some people, anti-Darwinists and even some great Darwinists, to claim that it is a tautology. . . . Since the explanatory power of a tautology is obviously zero, something must be wrong here. . . .
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> I mention this problem because I too belong among the culprits, influenced by what these authorities say. I have in the past described the theory as "almost tautological" and I have tried to explain how the theory of natural selection could be untenable (as is a tautology) and yet of great scientific interest. My solution was that the doctrine of natural selection is a most successful metaphysical research programme. It raises detailed problems in many fields, and it tells us what we would accept of an acceptable solution of these problems.
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> I still believe that natural selection works in this way as a research programme. Nevertheless, I have changed my mind about the testability and the logical status of the theory of natural selection; and I am glad to have an opportunity to make a recantation.

and later Sir Karl sums up:

> The theory of natural selection may be so formulated that it is far from tautological. In this case it is not only testable, but it turns out to be not strictly universally true. There seem to be exceptions, as with so many biological theories; and considering the random character of the variations on which natural selection operates, the occurrence of exceptions is not surprising.

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1. K. Popper, *Dialectica* **32**, 344 (1978).

Fraud, Science, and Safeguards

The article by William J. Broad on fraud and the structure of science (News and Comment, 10 Apr., p. 137) was timely but perhaps a bit too bearish on the current state of morality in research. Any deliberate fudging of the data for personal aggrandizement is to be deplored whenever it occurs; however, given the huge increases in the number of persons doing research, I do not think that the relative frequency of instances of fraud has increased. My guess would be that the safeguard mechanisms are working adequately and that the relative frequency is, if anything, lower than in earlier periods. It would, of course, be good to have accurate data.

A corrective perspective is to view fraud in science in the context of fraud in other areas of endeavor, especially commerce and the professions. When placed in the context of escalating malpractice suits and the clamor for consumer protection agencies and legislation, and the sorts of incidents that have produced these trends, one must conclude that scientists have managed to maintain high ethical standards in a society where personal integrity as a cherished virtue is rapidly disappearing. It is to be hoped that the response of the scientific community to lapses of honor among researchers can serve as a model and an inspiration for other areas of endeavor to "clean up their act." It is easy to lose perspective when one focuses exclusively on individual acts of fraud and to come up with recommendations for corrective measures which may not, in fact, be needed or useful. If something "ain't broke," don't fix it. It is not clear that the standards of scientists need fixing beyond regular maintenance.

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A paper by B. Miller (*1*) sheds an interesting light on the self-correcting mechanism of science referred to by Broad. Miller describes how an arbitrary adjustment of the data was made in a well-known investigation of turbulent flow in pipes (*2*). This was not a case of fraud. The report had a table giving the actual measurements of velocity and position and a second table and two curves giving the adjusted results in dimensionless form but did not mention the adjustment or its rationale.

Although this is one of the most widely cited references in the field and the data