

## LETTERS

### Creationism and Evolutionism

Though not a convinced creationist, I have acquainted myself with modern creationist thinking and consider that Bevan's editorial (29 Sept. 1972, p. 1155) is rather unfair. Bevan seems unaware of the changes in creationist thinking since the early 1900's.

He objects to creationism being taught in schools because it is a "theory of primordial history," but surely evolutionism is also a theory of primordial history, as it is used to explain the origin of species. Any theory of origins is of necessity scientifically unprovable in that it is not capable of being verified experimentally. The best we can do is demonstrate what could have occurred, but not what did occur. However, it is wrong to say that creationism is not subject to any form of testing; like evolutionism, creationism makes postulations about the past history of life which can be checked against the evidence. Thus the evidence can be used to rule out theories, while not being able to prove them. It is at this point that most scientists show their ignorance. Just as evolutionist theories have changed, so have creationist ones. All creationists postulate a polyphyletic origin of life, a view that Kerkut (1), who is not a creationist, has shown to be scientifically tenable. A multitude of "kinds" (2) of animals and plants were created, and these have since undergone speciation. Creationists would predict that the fossil record will show the absence of transitional forms between each of the older, independently created forms. So far creationism fully agrees with the evidence, whereas evolutionists have to have faith in the original existence of the missing transitional forms (3). Creationists differ over whether the original "kinds" of organisms were created simultaneously or over a long period of time. Some still hold that the creative act occurred only tens of thousands of years ago. These points are all open to testing by looking at the fossil record. I consider that those creationist views that accept the antiquity of life and its gradual appearance are just as acceptable in the light of the evidence as is neo-Darwinism, and so should be taught alongside it.

The modern antipathy toward all forms of creationism is partly due to a widespread philosophical prejudice that arises from the a priori nonscientific assumption that there can be no

divine intervention into the workings of the universe and that the scientific method is the only way to truth. However, there are other approaches to truth, and application of the scientific method can only determine whether or not divine intervention might have occurred in a given case, and not whether it can or cannot happen in general. I hope that the "freedom fund" will be used to help free science from this naturalistic influence as well as from undue religious influence.

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#### References and Notes

1. G. A. Kerkut, *Implications of Evolution* (Pergamon, London, 1960).
2. Definitions of this term vary, but no one now equates it with the term "species."
3. See, for example, G. G. Simpson, *The Meaning of Evolution* (Bantam Books, New York, 1971), p. 209.

. . . Of course, every school textbook should explain *both* the theory of creation *and* the theory of evolution; so, of course, should every bible to be printed, sold, or used in all schools or other public offices henceforth. The two theories should be given equal weight and printed, in all new bibles, in parallel columns—the King James version of Genesis on one side, and an explanation of Darwinism on the other. (We are now preparing an explicit yet concise account of the theory of evolution, suitable for printing in bibles and hope to have it ready for consideration by the California State Board of Education before long.)

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During the past decade the concept of paradigms has become increasingly important to the philosophy of science. However, Nicholas Wade's comments on "Creationists and evolutionists" (News and Comment, 17 Nov. 1972, p. 724) suggest that some evolutionists have failed to grasp the relevance of that concept to the debate.

The question of human origins is a concern for all human groups who have consequently produced answers (theories, hypotheses, myths) describing man's origins according to their respective cultural traditions. This point has not been adequately considered in the California debate. As a result a classic confrontation of parties who believe

they have the Truth has developed. They should both recognize that the two versions of creation presented in Genesis and the version of human origins espoused by the evolutionists are merely different paradigms based upon different bodies of culturally biased data. They should then realize that what was once an appropriate explanation of the origin of man for pastoral nomads may not be adequate for the city dwellers of the 20th century. Scientific explanations may not be ultimate, but they have provided our culture's accepted answers for several hundred years.

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It is interesting to note that some biologists are taking an obstructionist position toward the California State Board of Education ruling that the origin of life by natural processes must be taught as a model rather than as dogma. The creationist model may not be scientific, but as a physical scientist I cannot believe that many of the models presented by biologists of the origin of life and the evolution of species are less speculative. It is in the highest tradition of science to allow opposing viewpoints to be heard rather than insisting that only one side be taught in a school textbook. This was the fatal mistake of fundamentalists in the 1925 Scopes trial, and it should not be repeated by evolutionists in the 1970's.

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I read with interest the report by Nicholas Wade on the controversy now raging in California. I believe that the point at issue is viewed in a false perspective, in that the Christian religion and the biblical story are presented as unique carriers of a belief in creation. In the United States, a textbook should at least give an account of the ideas on creation expressed in the religious beliefs of the American Indians, who relate creation to the Great Spirit. Moreover, it would be appropriate to mention that other religions, for instance, Shintoism, Buddhism, Hinduism, and Islam, have their own views on the problem of how the universe originated. Some attention might also be

given to the ideas professed by the ancient Greeks. If this is done, children could be brought to understand that many peoples have thought about the problem, and that the Judeo-Christian tradition is only one amid several others. This would allow a perspective in which to better present the scientific attempts which are made to explore this matter.

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Nicholas Wade mentions the charge that the creationist movement is a "closely coordinated, nationwide campaign supported by rich and powerful backers." This charge is certainly not true. I have been secretary of the Creation Research Society since its founding in 1963 and have not known a single rich or powerful patron. We

maintain a fund for research expenses and another for publication, both of them small. The dues of \$7 a year pay for the *Creation Research Quarterly*. We support no executive secretary, no officer receives pay, and articles in the *Quarterly* are not paid for, although their preparation requires much time.

Personally, I am convinced that discussion of beginnings, although interesting to many people, is not science but philosophy. Science consists of facts that must be organized and interpreted; without a body of observed facts you can have no science. It is evident that there was no one to observe the beginning of the world, hence there can be no *science* of beginnings.

We can study present life processes and make inferences about past developments. We creationists do not object to teaching the inferences of the evo-

lutionists, but as careful scientists we ask to be excused from teaching these ideas as scientific truth.

Vernon L. Grose makes a correct summary when he calls evolution "the case for chance" and creation, "the case for design."

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The report by Nicholas Wade concerning the current debate between the creationists and the evolutionists over the California State Board of Education elementary school science guidelines clearly delineates serious issues that confront the academic and educational community in California. However, because of the tangled web that this controversy is generating, it is important to attempt to keep the record straight on one rather simple point.

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Wade alludes to the role of Seventh-Day Adventists. He notes that one of the conservative members of the state board of education pushing the creationists' position is John R. Ford, identified as a Seventh-Day Adventist. Also, a consultant at the California Department of Education is quoted as stating that "it seems evident the Seventh-Day Adventists . . . have embarked upon a plan to exert considerable pressure" on the creationist side.

These statements standing alone may create the illusion that Seventh-Day Adventists in general support attempts to impose sectarian philosophical positions in science materials. While it is true that, traditionally and historically, the Seventh-Day Adventist Church has supported creationistic views, many younger, professionally trained members of the church are increasingly attempting to move their church's views from a fundamentalistic ethos to what they consider a more mature position.

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#### Joint Effort

An account is given by William D. Metz (Research News, 10 Nov. 1972, p. 600) of new data on the expansion rate of the universe, the distances to galaxies, and the time scale of creation. The work is attributed to me, but has, in fact, been the result of a long and close collaboration with Gustav A. Tammann over the past 10 years. Tammann's immense contribution was fundamental in devising methods by which to measure the distances from nearby galaxies to more remote parts of the expanding universe, where the expansion rate must be calibrated. The results are to be published jointly.

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#### DDT in British Rain

The widely publicized figure of "73 to 210 ppm" of DDT in British rain (10 Dec. 1971, p. 1101) has now been reduced to one one-millionth of that amount by Woodwell *et al.* (Letters, 3 Nov. 1972, p. 450). In support of those

figures, Woodwell cites in his reference 45 two articles, one by Tarrant and Tatton (1) and another by Wheatley and Hardman (2). Each sample of rainwater analyzed by Tarrant and Tatton consisted of a total 3-month sample from a collecting station. They did not say how the water was collected, but one sample "contained two insects," indicating a possible source of contamination. In their samples, the highest DDT residue was 190 parts per trillion (ppt), and the mean for the year at that station was 66 ppt in the 3-month samples. At their other six stations the means were only 53, 30, 46, 61, 49, and 18 ppt, respectively. The analyses reported by Wheatley and Hardman were even lower, the amounts of DDT averaging 3 ppt over areas of agricultural England. These two references were cited by Woodwell *et al.* to confirm high levels of DDT in England's rain and "similar concentrations" in rainfall in the United States. The references, however, did not indicate the high residues alleged by Woodwell *et al.* and did not even contain any data for the United States.

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#### References

1. K. R. Tarrant and J. O'G. Tatton, *Nature* **219**, 725 (1968).
2. G. A. Wheatley and J. A. Hardman, *ibid.* **207**, 486 (1965).

The context of our original article made the use of "ppm" in association with the DDT content of rain in Britain an obvious typographical error. In the sentence following the error there was a reference to 40 parts of DDT residues per trillion parts of water in the meltwaters of Antarctic snows. In the next paragraph we assumed 60 ppt for use in our model. A perceptive reader would have difficulty being misled for long. Our earlier letter corrected the typographical error to parts per trillion, which we stated explicitly to mean parts per 10<sup>12</sup>. Edwards' purpose leaves us puzzled.

The concentrations we cited are from Tarrant and Tatton (1). The earlier data of Wheatley and Hardman (2) showed that residues could be detected in rainwater and provided the basis for Tarrant and Tatton's more comprehensive study. We used total residues, as is commonly done, not simply the data on *p,p'*-DDT cited by Edwards. The 73 ppt we used is the mean of four 3-