

2. *secular change*—descendants of some organism vary slightly from the parent population, due to a selective process. (Example—bacterial resistance to antibiotics.)
3. *speciation*—descendants of some organism vary, due to a selective process, sufficiently from the parent population, or two or more descendant populations vary sufficiently from each other, that they are classified as belonging to different species, or genera, or families.
4. *phylogeny*—as speciation, but the populations are sufficiently different to be classified as belonging to different orders, classes or phyla (Divisions, in plants).
5. *origin of life*—the first living things arose by *purposeless and undirected processes* from nonliving matter. Although some sort of natural selection might have been involved in bringing this about, it is not certain that there was any such selection, or, if there was, that it was by the same sort of mechanisms that might have been responsible for, say, speciation.
6. *origin of everything*—the universe exists as a result of *purposeless and undirected processes*.

There are, of course, Christians (and others) who believe that all or most of the types of evolution listed above did not happen. As Alters pointed out, there are also many who don't reject all of these types of evolution.

Why, then, is "people's acceptance or rejection of evolution generally [reported at] close to a 50% rejection rate?" (Alters, p. 103). One reason is exactly that all six definitions are lumped together as one phenomenon, described as evolution, or *Darwinism*.

Unfortunately, lumping all of the categories together as if they were one phenomenon makes clear communication difficult or impossible. Christians, scientists, educa-

tors and reporters have all done this. Usually they do it because they don't know better, or haven't thought about it. Sometimes, it appears that lumping all these phenomena together as one has been a deliberate attempt to deceive.

Alters says that *Christianity Today* selected *Darwin's Black Box: The Biochemical Challenge to Evolution*, by Michael Behe (New York: Free Press: the use of "Darwin's" in the title is an example of unfortunate lumping) as its book of the year for 1997, and wonders why the book of the year was not about a subject such as "... how to get to Heaven, how to live a better Christian life, or about witnessing. . . ." (p. 103). If evolution, encompassing all of the meanings listed above, is taken as a fact of science, then Christianity has a serious problem with that science. *If the universe came about solely by natural processes, undesigned and unguided by any supernatural being or beings, then either God (or gods) is not very important, and can be ignored, or there is no such God (or gods). Furthermore, the claim that the universe arose in that way is not a falsifiable (or verifiable) scientific claim, but a belief statement.* If the usual presentation of evolution claims that the universe, and life, came about by solely natural processes, it is no wonder that Christians are not comfortable with the ideas of evolution, or that a book criticizing that claim was selected as book of the year by a Christian magazine.

Actually, Behe has no quarrel with much of the usual presentation of evolution:

... I have no reason to doubt that the universe is the billions of years old that physicists say it is. Further, I find the idea of common descent ... fairly convincing, and have no particular reason to doubt it. (p. 5)

What he does quarrel with, and the fundamental reason that many Christians have problems with evolution as too often presented, is

the claim that the initial conditions, and all the processes, that led to the present state of living things were entirely undirected and unguided. Behe's thesis is that some of the biochemical mechanisms that make life possible are so complex, and portions of them are so interrelated, that chance, alone, could not have brought all of them into existence. He believes that some of them were *designed*. Most Christians believe in a designer, and reject paradigms that exclude one, or seem to.

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Reactions to Creationism Series Vary

Dear Editor:

It may be argued that the creationists are taking a new course in their activities; they are now

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increasingly emphasizing the supposedly negative moral implications of Darwinism, instead of trying to find its scientific weaknesses. Such a change of emphasis in the anti-evolutionary strategy is understandable, bearing in mind their recent unsuccessful attempts at representing creationism as a science, which are described in the sixth part of the history of the confrontations between evolutionists and creationists in the USA which has been published in this journal (Moore 1999). Indeed, it would appear that this was the main line of attack on Darwinism which was employed by B. Crosslin (1999) in his reaction to the above-mentioned articles.

It would appear that defense from such attacks will be one of the major tasks for evolutionists in the future. In that respect it might be profitable to introduce to students, at high school and university levels, as well as to the general public, the basics of ethics

inspired by Darwinism. In recent years Darwinism has had a profound influence on ethics. This relatively new current in ethics opened up new perspectives in the understanding of moral behavior not only between humans but also towards animals and nature in general. Indeed, one of its main characteristics is the expansion of the boundaries of morality, so that it encompasses not only humans but other living species (see, among many others, R.D. Ryder's *Speciesism*, J. Rachel, *Created From Animals: The Moral Implications of Darwinism*, P. Singer's *Animal Ethics: A New Ethics for Our Treatment of Animals*). Evolutionary ethics itself has become very influential and even introductory books on ethics, such as D.D. Raphael's *Moral Philosophy*, discuss its main propositions. Once an elementary knowledge of Darwinian ethics is acquired all arguments concerning the supposed negative moral

implications of Darwinism would become senseless.

Furthermore, it would be even more profitable if educationalists could not only teach ethics based on Darwinism, but also encourage students to get involved in some of the numerous ongoing projects which are based on it, such as, for example, the Great Ape Project (see Cavaliere and Singer's *The Great Ape Project* for details). In that way they would not only learn more about Darwinism and its deeply humane implications, but it would enable them to make the world around them better.

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Dear Editor:

I have really enjoyed *The American Biology Teacher*. I could always count on finding new approaches to old concepts and new labs for new concepts to fill my curriculum and excite my students, introducing them to the wonderful world of biology. I could, that is, until the last couple of years. I am tired of reading about your crusade against creationism. You have beat it into the ground and frankly I have read enough. It seems that the A.B.T. has become your personal platform from which to carry on your monthly vendetta against creationists. Over half of the May issue was devoted to evolution. Frankly there is a whole lot of biology out there that you are overlooking. Please get a life and get

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back to the rest of biology or I will put my dues to better use.

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Dear Editor:

Recently, *ABT* has published a useful and laudable series of articles concerning the evolution/creation controversy. The strength of the creationist argument—such as it is—would be considerably weakened by an observed and incontrovertible instance of speciation in a mammalian species or, in creationist language, by a transformation of kinds. To be maximally effective such speciation events should meet at least the following criteria:

1. It should be the production of a new mammalian species because (a) such speciation would be more dramatic and easier for a lay person to assess than the production of a species in some other taxon and (b) meet most easily and

clearly the notion of transformation of a “kind” since “kind” among mammals seems to be loosely synonymous with “species” rather than some ill-defined, higher taxonomic category.

2. The process should be observed and carefully documented from beginning to end.
3. The usual biological species concept, including non-interbreeding of the new with the old species or interbreeding without fertile offspring, should be the criterion for speciation since (a) it is the biologically most relevant in this case and (b) it is most widely accepted by creationists. A changed external phenotype would be helpful but not essential.
4. Only those forces generally said to operate in the course of evolution (random mutation, natural selection, sexual selection, genetic drift, etc.) or their simple laboratory substitutes (induced random mutation,

artificial selection, etc.) should be used so that the process resembles an evolutionary event as closely as possible.

All this may be a tall order. However, with our currently fairly good and increasing knowledge of mouse genetics, it should not be an impossible one. The successful completion of such a research enterprise would not only bear heavy fruit in the evolution/creation debate but also yield valuable insights into the evolution process at its most critical level.

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Teachers Should Clarify Terms

Dear Editor:

Drs. Dubowsky and Hartman Jr. made a fine argument in favor of “no universally accepted definition of terms.” (*ABT*, April 1999) It is an argument that teachers and sci-

SPECIAL NABT MEMBER BENEFIT INCLUDED WITH THIS ISSUE ...

The second edition of *Science & Creationism*,
compliments of
the National Academy of Sciences.