

If we are going to deal with ID, we need to give up the old bromide of calling all the opponents of evolution “fundamentalists.” Many friends of evolutionary biology are evangelical Christians, strongly conservative yet understanding of the difference between a scientific hypothesis and a religious doctrine. They are uncomfortable with cavalier fundamentalist bashing because it hits close to home and makes them wonder if they are right to be evolution’s allies.

Finally, I think that no amount of sarcasm and expressions of contempt by supporters of evolution is going to win the day. We need to understand the reasons that so much opposition to evolution exists in the United States, and for that matter why so many associate themselves with conservative, even fundamentalist, churches. A power play to divert anti-evolutionists from their attempt to get ID or scientific creationism or any other idea into the biology classroom will work in the short term, but in the end, long-term solutions to this vexing controversy will require people of good will sitting down and talking ... and what’s more listening ... to the deep hopes and fears that generate such negative feelings about evolution. Mr. Hoekstra’s editorial is not a contribution to that requirement.

Sincerely,

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More on Evolution & Creation

Dear Editor:

Thank you to Cooper (2002) for reminding us that, in addition to

empirical (experimental) science, historical science is also a legitimate part of the scientific way of knowing. A few observations, though, if I may.

Cooper (2002) begins by challenging the following quote by creationist Morris: “Creationists and evolutionists agree on real science – that is, the nature of the present world and how it operates. What we disagree on are our speculations about the past When properly understood, both evolution and creation are outside the bounds of empirical science, and, therefore, are incapable of scientific proof.” The very careful use of words in this passage appears to invite ready misinterpretation.

Both evolution and creation are indeed outside the bounds of empirical science, but for distinctly different reasons. Evolution is not an example of empirical science, but rather historical science, but science all the same. Creation, on the other hand, does not meet the requirements of the scientific way of knowing because it involves notions which cannot be tested/falsified (Popper, 1968), and also because science deals with the natural rather than the supernatural.

Both evolution and creation are also incapable of scientific proof, but again for different reasons. There is no explanation in science that can be proven absolutely correct, because further evidence may refute it. At the same time, there are different types of scientific knowledge, and some knowledge is more tentative than other knowledge (Eastwell, 2002). We are quite certain, for example, that copper is an electrical conductor, but far less certain that an asteroid caused mass extinction of the dinosaurs. When I fly, I really appreciate that the scientific knowledge involved in aeroplane design is quite reliable! As has already been said, creation involves notions that cannot be tested/falsified.

Going even further and linking these considerations with a “therefore,” as in the Morris quote, is inappropriate, because this incorrectly conveys the notion that evolution and creation have a similar lack of scientific standing (Cooper, 2002), though, after acknowledging that scientific interpretations of evidence must be tentative, appears to go too far with “and the conclusion that Darwin was correct is inescapable” (p. 431).

Sincerely,

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References

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- Eastwell, P.H. (2002). The nature of science. *The Science Education Review*, 1(2), 43-48. (www.flexi.net.au/~willdown/scedview.html)
- Popper, K.R. (1968). *The logic of scientific discovery*. New York: Harper Torchbooks.

Facts vs. Theory, Again

Dear Editor:

Becky Bosley’s letter on distinguishing “fact” from “theory” raises several serious issues related to scientific thought. It is ALWAYS true that we can only infer what has happened in the past, or indeed, at any event at which we were not present. This is at the heart of scientific inquiry! There are many ways to gain inference in science, only one of which is direct experimentation (hence the historical sciences of geology, macroevolution, and cosmology march on quite successfully). We also use the power of inference in everyday activities such as

figuring out what our kids have been up to or determining what killed our tomato plants. Inference is an extremely important way of knowing, but it involves acceptance of the idea that the universe is real, understandable, and operates uniformly. For example, Becky was not “there” to witness her start in life from the fusion of an egg and sperm, but nonetheless, she probably accepts that this in fact is how she was conceived. However, it’s just an inference.

A greater problem stems from Becky Bosley’s misunderstanding of evolution (which she shares with many others). Humans (or any other species) cannot be considered “more highly evolved” since all extant species stem from lineages that have spent exactly the same amount of time on Earth. Secondly, she misunderstands the basic tenet of evolution, which is that mutations are random with respect to adaptive value. She might be able to

imagine that humans would be better off reabsorbing the menstrual lining than sloughing it off, or that plants should fix their own nitrogen. However, perhaps mutations that would lead to these traits have not arisen. There are in fact, an infinite number of advantageous traits that species could have, but don’t. It is important to explain to students that organisms do not “get what they need” in evolution, despite our ability to think that they would be better off if they had those traits.

On a final note, “frequent and heavy” human menstruation is well-understood by comparisons among human groups. In societies without modern birth control methods, human females ovulate infrequently, spending most of their lives either pregnant or lactating. Indeed, some women menstruate fewer than 20 times in a lifetime! Thus, it is likely that selection has not acted very strongly on reducing “losses” due to menstruation.

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Correction: Regarding the September 2002 About Our Cover, Walter H. Sakai, Professor of Biology at Santa Monica College and a Research Associate in the Entomology Section of the Natural History Museum of Los Angeles County in California has pointed out that in addition to the Impala, the family Bovidae includes the American Bison, Mountain Goat, Muskox, Bighorn Sheep, and Dall’s Sheep in North America as well as the diversity of ungulates in Africa. Also, Bovidae is a family in the order Artiodactyla, and, contrary to the statement that Impala inhabit the wooded savanna of East Africa, it is found throughout the southern half of Africa below the tropics.

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