EVOLUTION & DEVELOPMENT 7:4, 273–275 (2005)

Editorial: Stand up for evolution

Rudolf A. Raff

Department of Biology, Indiana University, Bloomington, IN 47401 USA

Correspondence (email: raffr@Indiana.edu)

> On any other view, the similarity of pattern between the hand of a man or a monkey, the foot of a horse, the flipper of a seal, the wing of a bat, &c., is utterly inexplicable. It is no scientific explanation to assert that they have all been formed on the same ideal plan.
>
> Charles Darwin, *The Descent of Man* (1871)

> . . . this revolutionary view of life now stands as one of the most firmly established generalizations of science . . . It ill befits the American people, four generations after Darwin published his epochal discovery, to turn their backs on it, to pretend that it is unimportant or uncertain, to adopt euphemistic expressions to hide and soften its impact, to teach it only as one alternative theory . . .
>
> Hermann Muller (1959)

> "In any public school instruction concerning the theories of the origin of man and the earth which includes the theory commonly known as evolution, a board of school directors may include, as a portion of such instruction, the theory of intelligent design. Upon approval of the board of school directors, any teacher may use supporting evidence deemed necessary for instruction on the theory of intelligent design."
>
> Pennsylvania House Bill 1007 (2005)

In the past few months, there have been many reports in the press of attempts in small American towns and in states like Pennsylvania to force the teaching of an alternative to evolution in public school biology classes. Efforts to promote creationism are hardly new in US public education. However, creationists have expanded the scope of their activities even further. The refusals of Imax theaters in public science museums to show science documentaries that take an evolutionary position is something new, as is the sale of a book in National Park bookshops that presents a creationist interpretation of the grand canyon as formed in Noah's flood. There are also a couple of important novel occurrences that indicate that creationism is being more aggressively pushed. These may come to impact not only science teaching in public schools, but even in the universities, which have till now remained relatively immune.

Most conflicts about the teaching of evolution have come from a conservative religious dislike of Darwinism as atheistic and harmful to the morals of society. The belief that evolution denies the literal truth of the Bible and therefore must be factually wrong has produced the old-fashioned kind of creationism that denies an Earth older than a few thousand years, and demands that life was created a few thousand years ago in just the same forms as they exist now. Despite the attempts of "young Earth" creationists to pretend that their views constitute a kind of "creation science," they have not been able to get this construct accepted by the courts, which have recognized that creation science is thinly papered over religious belief based on the creation story of the first book of Genesis in the Bible.

With the growing political influence of the religious right in America has come renewed pressures to give creationism at least equal time to evolution in our science classrooms. The familiar old-line biblical creationists have not disappeared, nor has the underlying religious motivation for "creation science," but as the courts have made it difficult for explicitly biblical creationism to gain a foothold in schools; creationism has adapted and has been re-formulated in a new guise, so called intelligent design (ID). ID brings a renewed challenge because it rejects the young Earth approach and literalism, and claims to be science. Its novel mode of attack is on the methodological naturalism of science, the operating principle that effects in the natural world have natural causes, which ID decrees to be incorrect. ID claims to offer a scientific method to demonstrate the existence of an "intelligent designer" in the origin of life, and holds that a designer must be incorporated into the way science interprets complex phenomena. ID stakes its claim as science on a single line of evidence, evidence for design. And indeed, this is the *only* line of evidence that creationists can plausibly claim as scientific, once the strictly overtly religious interpretations of old style creation scientists are stripped away. ID writers have not produced any empirical research to demonstrate design (Pennock 1999; Forrest and Gross 2004). However, they have presented an elaborate model for how design can be recognized in nature (critically analyzed by Perkah 2004). Basically, it represents a dressed-up version of William Paley's famous early nineteenth century example of the watch lying in the path, in which we can recognize design when we see it. We can thus logically reason along the lines that a machine has a designer, living organisms are like machines in their improbability and functional patterns, and therefore living organisms must have a designer.

In his critique of the assertion of design in nature, Shanks (2004) summarizes the evolution of intelligent design arguments. He makes the important point alluded to in the quotation above that Darwin had the revolutionary thought that organisms were not purposely designed machines, what Shanks calls the "illusion of intelligent design." To Darwin, organisms reflect not intelligent design, but the operation of natural selection, which works mindlessly on heritable variation among individuals. This is a hypothesis that is consistent with scientific practice in seeking natural causes that can be tested. ID constitutes a species of "lazy science" in that one can avoid hard work on difficult problems by claiming that an intelligent designer did it, and moving on. ID has another component at its core, the deployment of the "Wedge Strategy" propounded by Philip Johnson (reviewed by Forrest and Gross 2004; Shanks 2004). The narrow end of the wedge says that molecular systems and cells are too complex and irreducible in organization to have evolved, opening doubt about a naturalisitic interpretation of their origins (e.g., Behe 1996). This conversation seeks to divide opinion about the possibility of design in nature, and implies that this is a viable debate among equal and opposite scientists. As the wedge widens, the idea of a designer is introduced, and finally, at the wide end of the wedge, the identity of the designer is revealed as the Christian God. For the purposes of the science classroom, the concept of design is sufficient, and creation has re-entered the education system in a secular guise. The pressure to teach ID is rapidly growing on school boards and teachers.

For a nation that needs citizens who can think rationally about crucial technical and scientific issues, this is serious enough. For evolutionary biologists in universities, ID makes essentially no impact either in the content of science or in academic teaching, but another force has targeted the academe, and it might well have a very unpleasant impact. This is the current effort by a group called Students for Academic Freedom, which has succeeded in having "Academic Bill of Rights" bills introduced into several state legislatures this year. Obviously, these measures are largely aimed at humanities and political science faculty, but have a clear impact on evolutionary biologists as well. To sample the not so subtle flavor of the intent behind this move, consider the March 23, 2005 report (Vanlandingham 2005) of the University of Florida's paper *The Independent Florida Alligator* on an interview with the legislator who introduced the bill (which, on March 22, was passed by the Florida House committee considering it). The law is intended to give students who think their beliefs are not being respected legal standing to sue professors and universities. Florida State Representative Dennis Baxley is quoted as saying, "Some professors say, 'Evolution is a fact. I don't want to hear about Intelligent Design, and if you don't like it, there's the door,' " citing the teaching of evolution as an example of when he thought a student should sue. Suppression will have come into the heart of our research universities should such ironically named "Academic Freedom" measures pass. I don't know of any current explicit threat to research in evolutionary biology. However, the strictures that politics has put on federal funding of stem cell research should serve as a warning that strictures on funding evolution are not necessarily outside the envelope.

We must become more active in opposing creationist attacks on science education, and there is much to do. Forrest and Gross cite a 1993 survey that found "half of all Americans who have heard of evolution lack even an *approximate* notion of what it means." There is a deep repugnance in many people to the idea that they are related by descent to the other creatures of the world—especially the hairy ape-like ones. ID appeals to the public because it affirms a belief in a designer that they know is God, and says that he can be introduced into science in an enriching way. Science modified this way is seen as more attuned to a moral and not mechanistic universe. We have to do a better job in informing our fellow citizens that science is the best tool we have for understanding the physical universe, and that it does its work by asking questions that reveal natural processes and mechanisms that can be replicated.

Let us be clear that we are not attacking people's personal religious faiths. Discussions need not enter into arguments over the existence of God or into a denigration of religion. Many religious people, including successful scientists, do not find their faith undermined by evolutionary biology (Collins 2003).

There are a number of things that we can do as scientists. First, learn about ID. I know that reading about creationist views and methods is distasteful and time consuming, but it is impossible to oppose a highly sophisticated political effort if you don't. Second, let us not play into the hands of ID propagandists. For instance, be careful about using teleological words to describe biological entities in our teaching and writing. Calling cells "machines that do X," or describing biological structures as "well designed to do Y" will be duly cited in ID propaganda as one more biologist-supporting design.

Third, we need to reach out. Reaching out includes making sure that our departments adequately teach evolution as an integral part of undergraduate courses. It includes talking with the public on events such as Darwin Day or other public discussions of evolution. It includes working with high school science teachers, who after all bear far more pressure from their communities than we do. It includes inviting local media to public events centered on evolution, as well as letting our state and congressional representatives know that creationism is a threat to the quality of American science. We need to engage in discussions with our classes, school board meetings, and other venues on why ID is not science, and that it has never produced results from research predicated on its loudly announced principles, because they are sterile in formulating testable hypotheses. We should be urging the adoption of meaningful science teaching standards in schools.

Our discussions should inform the public that the natural world has been most successfully understood in the 400 years of the scientific enterprise by seeking natural laws for natural phenomena. People should be told of the success of scientific research in their lives. Medicine, television, aircraft, weather forecasting, and so much else are rooted in scientific research that has sought natural rules and validated them by application to practical problems. Evolution is a part of that successful tradition. It is through evolution that we can understand the history of life on Earth, the development of form in ontogeny, and the meaning of genomic information. In addition, evolution, not design, is the only way to understand the peculiar quirks that exist in organisms, such as the sub-optimal orientation of the photoreceptor cells in the human eye or the large amounts of apparently useless repeated DNA in our genome. Understanding evolutionary mechanisms has crucial practical roles in such problems as in acquisition of resistance to antibiotics by bacteria that cause serious disease, or the origins of novel forms of disease like flu. Vague appeals to a designer or claims that living systems are somehow "irreducibly complex" preclude real investigation, and cannot produce results that go beyond the initial assumption that a designer was responsible. Yet, this is precisely what the proponents of teaching ID want us to do in our schools and universities.

It is time for biologists to again stand up for evolution or to stand by and let the Enlightenment be withdrawn from our culture, and the integrity of science wither away.

REFERENCES

Behe, M. 1996. *Darwin's Black Box: The Biochemical Challenge to Evolution*. Free Press, New York.

Collins, F. S. 2003. Can an evangelical believe in evolution? *Int. J. Frontier Missions* 20: 109–112.

Darwin, C. 1871. *The Descent of Man and Selection in Relation to Sex*. John Murray, London. p. 27.

Forrest, B., and Gross, P. R. 2004. *Creationism's Trojan Horse: The Wedge of Intelligent Design*. Oxford University Press, New York.

Muller, H. J. 1959. One hundred years without Darwin are enough. *The Humanist* 19: 139–149.

Pennock, R. T. 1999. *Tower of Babel. The Evidence Against the New Creationism*. MIT Press, Cambridge.

Perkah, M. 2004. *Unintelligent Design*. Prometheus Books, New York.

Shanks, N. 2004. *God, the Devil, and Darwin. A Critique of Intelligent Design Theory*. Oxford University Press, New York.

Vanlandingham, J. 2005. The law could let students sue for untolerated beliefs. *The Independent Florida Alligator* Gainsville. March 23, 2005 online edition.