

SCIENCE UNDER ATTACK

The Institute for Creation Research (ICR), the California-based headquarters of Young-Earth Creationists, has made another attack on science, this time prompted by articles that appeared in *Elements*. In an essay entitled "Irrational Naturalism," ICR founder Henry Morris attempts to discredit five authors who contributed to *Elements* #3, a special issue on the geochemical origins of life (Morris 2005).

Employing an often-used Creationist approach, Morris revels in the admission by each author that scientists don't yet know all the details of life's origin. George Cody says, "At present there is no complete theory for the origin of life" (Cody 2005). Joseph V. Smith concurs:

"The chemical steps that led to life on Earth remain a matter of speculation" (Smith 2005). Graham Cairns-Smith notes that "It is humbling to think about [the chemical complexity of] bacteria" (Cairns-Smith 2005), while James Ferris notes the interdependence of DNA and proteins and wonders, "Which came first?" (Ferris 2005). And I provided Morris with what is probably the juiciest sound bite of all: "Scientists are still far from understanding the ancient, intricate processes that led to the origin of life" (Hazen 2005a).

Morris's illogical, but oft-repeated, conclusion is that science has failed and that naturalistic explanations of life's origin are therefore bankrupt, both intellectually and spiritually. He calls our efforts "irrational" and "shameful." Citing select Biblical quotations, Morris concludes that "Only the living God can create life!" For anyone familiar with the ICR critique of science, this is unsurprising rhetoric, but it still comes as a shock when the attack falls so close to home.

By selectively excerpting rondo-like admissions that we scientists don't know it all, Morris tells a truth, but not the whole truth. Even a casual reading of the articles in *Elements*, or better yet a more conscientious study of the hundreds of research papers that underlie those brief reviews, reveals that origins research is a vibrant, youthful field. We have a clear outline of life's origin as a sequence of emergent events—the successive emergence of biomolecules, of macromolecules, of self-replicating systems of molecules, and ultimately of molecular natural selection. We now understand how each of these steps adds a degree of complexity to the prebiological system. We have numerous specific examples of these chemical processes, and more details are filled in every week (Hazen 2005b).

Thus, at root, Morris has resorted to the tired old "God in the gaps" argument—that God is to be found in the lacunae of our understand-

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ing. A central problem with this essentially defeatist argument is that as science keeps learning more and the gaps of our ignorance get smaller, then God's presumed role becomes increasingly trivialized (Miller 1999).

A now-classic example of the failure of this strategy is the evolution of whales. Twenty years ago, Morris and his ICR colleagues trumpeted the "failure of Darwin" to explain the evolution of the whale, which

they claimed could not possibly have descended from a land animal (Gish 1985; Haywood 1985). But over the past two decades, paleontologists have unearthed dozens of intermediate, four-legged whale genera, exactly as predicted (e.g. Gingerich et al 1994; Thewissen et al. 2001). Here, as in other cases, the predictions of Darwinian evolution have been confirmed time and time again.

What I find most sad in this pattern of willful ICR misrepresentation is that it is an effort to reject science—to portray science as the enemy of faith. In fact, from my perspective, nothing could be farther from the truth. Science is a way of comprehending that is based on reproducible observations, experiments, and logical inference about the natural world. As such, science can neither prove nor disprove the occurrence of miracles, the existence of God, or whether the universe is imbued with purpose and meaning. Nevertheless, the discoveries of science—the natural laws that describe the workings of the universe, and the scientific theories that explain how the cosmos evolves—can and do inform many people's beliefs about these important topics. Science may be the enemy of deception and misinformation, but it is not the enemy of faith.

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Robert M. Hazen
Geophysical Laboratory
5151 Broad Branch Road NW
Washington, DC 20015, USA
r.hazen@gl.ciw.edu

I found issue 4 of *Elements* very interesting, as I found the other issues. I specially liked the comments by Hochella Jr. and Heaney. They dealt with "hot topics" that surface almost every day here: funding (although we in Argentina are astronomical distances away from the figures that Dr. Hochella quotes) and the competition between different research areas.

I have noticed that there are serious differences between researchers devoted to geochemistry, petrology, mineralogy and related areas (who need "hard" data, often quite costly) and researchers in areas in which they can write wonderful papers using more economical instruments like a binocular microscope and a camera. First, I would like to make it clear that I totally respect other study areas and think that they are very worthy of support. However, if the current trend continues, there will probably be a time in the not-too-distant future when petrologists (or mineralogists) will be relegated because they cannot produce high-quality papers as fast as those in other research areas.

Several things contribute to this situation for researchers in mineralogy, petrology and geochemistry:

- different funding needs depending on the type of study. With some exceptions, no serious journal in our discipline accepts papers that are not based on a number of chemical analyses, from "common" whole rock data to more sophisticated techniques like ion microprobe.
- some sort of "fashion trends" in study areas. Nowadays, almost anything related to global climate change and dinosaurs (just to quote two examples) makes much more noise and is accepted much more easily for publication than the discovery of a new pluton, however interesting it may be.
- there is a constant pressure to publish papers in indexed journals, and to evaluate production based solely on that criterion.