

SCIENCE INSIGHTS

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Table of Contents

1. Intelligent Design
2. Politics and Science
3. Girls in Mathematics and Physics
4. Medicine and Multiculturalism
5. DDT and Politics
6. Duh, Really? -- Headline of the Month in *The Science Daily*.

1. Intelligent Design

Editor's Introduction:

Intelligent Design is a controversial subject these days, most recently making the pages of *Commentary* magazine. In its December 2002 issue, *Commentary* ran an article by David Berlinski, entitled "Has Darwin Met His Match?" This was followed in the March 2003 *Commentary* by a flood of criticism by experts in the field, and leading the charge was Paul R. Gross. One month later, David Berlinski again entered the fray in his April 2003 essay entitled "A Scientific Scandal," and this again elicited a flood of objections in the July-August 2003 *Commentary*, with Dr. Gross again joining the charge against the article.

Creationism first came to public attention during the famous Scopes Monkey Trial and a series of court cases afterwards. The courts ultimately ended up prohibiting school boards and lower courts from enforcing a biblical view of matters biological in the public schools on the grounds that it represents an establishment of religion prohibited by the First Amendment.

One thing can be said for the kind of creationism which drew this response from the courts: the original form of it makes no pretense to be science, and the refinements of the original creationism still honestly stood up and said that if there were a conflict between science and revelation, science should move over and cede the argument to revelation.

Intelligent design holds itself up to be different: it claims to be science, not revelation, but it maintains that it is the true science that refutes materialist Darwinism, and it demands to be considered alongside the conventional view of natural selection as a competing scientific view. In the article that follows, Dr. Gross argues that Intelligent Design merely poses as a scientific theory, but is in reality a hidden form of creationism.

Dr. Gross is University Professor of Life Sciences emeritus at the University of Virginia. His A.B. degree in Zoology and Ph.D. degree in General Physiology (the precursor of what is now called Cell Biology or Molecular Biology) are both from the University of Pennsylvania. He has received honorary degrees from Brown University and the Medical College of Ohio and is a Fellow of the American Academy of Arts and Sciences. He has taught at New York University, Brown, Rochester, the Massachusetts Institute of Technology, and the University of Virginia. At Rochester he was chairman of Biology and Dean of Graduate Studies, and at MIT he was director of the program in cell and developmental biology. From 1978 to 1988 he was Director and President of the Marine Biological Laboratory, Woods Hole, Massachusetts. At Virginia he served as Vice President and Provost, and he also served as Director of the Markey Center for Cell Signaling and the Molecular Biology Institute. His final administrative role was as director of the Center for Advanced Studies. In addition, he was Trustee and Treasurer of the American Academy for Liberal Education from 1995 to 2003. His research and writing have been in developmental and molecular biology, and more recently he has written about science and culture. He is the author, with Norman Levitt, of *Higher Superstition*, first published by the Johns Hopkins University Press in 1994, and he is a coeditor of *The Flight From Science and Reason*, Johns Hopkins University Press, 1996. He publishes book reviews and journal articles on science education and culture. He is coauthor, with philosopher Barbara Forrest, of the forthcoming *Creationism's Trojan Horse: The Wedge of Intelligent Design*, to be published by Oxford University Press in October, 2003.

Paul R. Gross is obviously well qualified to critique intelligent design, and *Scientific Insights* is proud to present his essay on this subject. For those who want more, his forthcoming book on this subject should be must reading.

JW

Intelligent Design and that Vast Right-Wing Conspiracy

By Paul R. Gross

Because this can't be a treatise and we must be content with only a few pointer-references to a vast literature, I must, before describing the putative science of "intelligent design," establish the background from which it emerges.

Symptoms of Crankhood

Bogus science takes many forms. The aspiring diagnostician has a choice of sources, ancient and modern, for help in recognizing it. Thus the student of science-obfuscation may distinguish among the works of (sincere) crackpots, persistent cranks, science-illiterates, honest but grossly incompetent practitioners with a fixed idea, and qualified but sham practitioners of science, in it for money or sectarian glory. Recent symptom-lists for these pathologies come from two accomplished physicists.

From Robert L. Park, we have “The seven warning signs of bogus science” (at <http://chronicle.com/weekly/v49/i21/21b02001.htm>), a meditation on the Supreme Court’s landmark effort (*Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 1993) toward insuring the admissibility of expert science testimony, and the inadmissibility of bad, tendentious, or bogus science. Park identifies seven warning signs of the shams that the Court wants judges, as gatekeepers, to disallow. Two of these are especially relevant to the new creationism, which dubs itself “Intelligent Design Theory.”

1. “The [self-identified] discoverer,” Park explains, “[who] says that a powerful establishment is trying to suppress his or her work...that the establishment will...stop at nothing to suppress discoveries that might shift the balance of wealth and power in society.” And,

2. “The discoverer must propose new laws of nature...”

As a convenience for serious investigators, mathematical physicist John Baez has fashioned a Crackpot Index. A high score on this Index identifies infallibly an invalid scientific claim—one that can confidently be ignored by the working and presumably busy scientist (<http://math.ucr.edu/home/baez/crackpot.html>). The Index is computed on 35 indicators, each with a point value ranging from 1 to 50. The last six indicators, with the biggest point values, are:

“31. 40 points for comparing those who argue against your ideas to Nazis, stormtroopers, or brownshirts” [or the equivalent on the Stalinist-Maoist left—PRG].

“32. 40 points for claiming that the ‘scientific establishment’ is engaged in a ‘conspiracy’ to prevent your work from getting its well-deserved fame, or suchlike.”

“33. 40 points for comparing yourself to Galileo...”

“34. 40 points for claiming that when your theory is finally appreciated, present-day science will be seen for the sham it truly is...”

“35. 50 points for claiming you have a revolutionary theory but giving no concrete testable predictions.”

The new creationism, as any competent reader of its voluminous literature discovers, displays every one of these symptoms. Creationist anti-science, directed primarily but not exclusively at evolution and its current expositors, suffered regular and damaging defeats in the courts during the 20th century. The litigation was in response to ceaseless creationist efforts either to eliminate evolution from school science, or to give equal time to some scriptural account of Earth history, or to require strong disclaimers as to the rightness of evolutionary biology. Every legal defeat of anti-evolutionism turned upon the issue of church-state separation. Creationist attacks on science education were easily shown to be religiously motivated, and their proposed alternatives to be

religion, not science. The constitution forbids an establishment of religion: that includes public education. Thus the impediment to creationist sabotage of modern biology has been the unmistakably religious motivation of every disruptive strategy—until now.

The new creationism, like its predecessors, is at base religious, not scientific. William A. Dembski, theologian and mathematician, is currently the leading intellectual of the intelligent design movement. He usually insists, when addressing general audiences, that intelligent design theory is science, not religion, and that it has no connection with religion. But attend now to Dembski in *Touchstone Magazine*, July/August 1999, p. 84:

“Despite its [intelligent design theory’s] implications for science, I regard the ultimate significance of the work on design to lie in metaphysics...”

“The world is a mirror representing the divine life. The mechanical philosophy was ever blind to this fact. Intelligent design ...readily embraces the sacramental nature of physical reality. Indeed, intelligent design is just the Logos theology of John’s Gospel restated in the idiom of information theory.”

Bypassing the Impediment

In the middle 1990s, a strategic plan for bypassing the constitutional impediment was hatched, funded by rightist and religious sources, and given a home within the Discovery Institute of Seattle, Washington. It was the brainchild of Berkeley law professor Phillip Johnson, who had decided, in the course of a mid-life crisis, to (in his own words) give himself to Christ. His plan called for Christian scholars to set aside, for the time being, all biblical literalism and palpable apologetics, and to attack contemporary science directly—as a form of thought crippled by its commitment to “philosophical naturalism,” or materialism.

In this movement there would be no direct mention of God or divine action—thus bypassing the legal barrier to the science classroom. Participants in the work would carry out research to identify and publicize the (assumed) deep flaws in Darwinism. They would *prove* the working of intelligent design in the creation of the world, and—most important—they would convey that good news, by energetic public relations and political activity, into every corner of the culture and every level of local, state, and national politics. This plan was dubbed “The Wedge”: like a small wedge splitting a log when driven into a crack, this combination of research discoveries, anti-evolution public relations, and activist politics, hammered into the cracks in evolutionary biology would shatter it, and with it materialism, restoring a God-centered socio-cultural life. (See for example <http://www.prospect.org/print/V13/22/mooney-c.html>; also Robert T. Pennock, *Tower of Babel: The Evidence Against the New Creationism*. Cambridge, MA: MIT Press, 2000).

In all its elements *except* the most important, the Wedge has prospered. It has almost displaced the creationisms that preceded it: the extreme biblical literalists, the young earth creationists, the old earth creationists, the varieties of “theistic science” that acknowledge the fact of evolution but attribute it to the action of some version of God. The most important element of the program, however, was to be intelligent design science: hard science indicating or proving the failure of

“Darwinism” (by which is meant, among creationists, all of modern evolutionary biology), and demonstrating intelligent design in the origin and structure of the world. Here the Wedge has failed utterly.

No matter: few people, few scientists, even outside the life sciences, understand the modern science of evolution, much less the nit-picking inside and outside it. Of course, few people understand relativity or quantum gravity either, nor can they follow the internecine quarrels within these disciplines; but theoretical physics arouses no passions. What counts in the making of public (including educational) policy is low-level plausibility, repetition, and hardball politics. To the lay mind, especially the mind justly concerned about faith and the state of society, intelligent design has more than enough plausibility. So half a dozen among the fifty states, now, and many more local school districts than that, are embroiled in bitter political fights over evolution in the science curriculum. In all of those, the Wedge is present. To multiple millions of people it seems self-evident that the world was designed by an intelligence, that is, for a purpose.

The creationist Santorum amendment, disguised as a call for “critical thinking” about science (in K-12!), barely missed incorporation into the last federal education bill, but it is still there as an advisory of the joint congressional committee. Wedge regulars mounted a 1960s-style teach-in for members of the Congress of the United States, in Washington. Yet to date, seven or eight years after the initial efforts of the Wedge, not a single research paper on, or clearly related to, the intelligent design hypothesis has been published in the peer-reviewed scientific literature. But again, no matter: millions of people believe what the Wedge publishes in non-science journals, in books mostly from religious houses, broadcasts in talk shows, and announcements in conferences for the faithful.

How, then, do the Wedge advocates explain this failure to produce the new science that was supposed to be its purpose? See Park (1), above on bogus science, and Baez (31—35, above), for the Crackpot Index. Their explanation is a Vast Conspiracy of the world’s scientists to cover up the collapse of Darwinism and to suppress the discoveries of Wedge members! You don’t believe me? Please go to the web sites of the Discovery Institute itself, or of the Access Research Network, or to the productions of Wedge leaders to which I provide a few starting references below, or, for a specific example, to the writings of mathematician David Berlinski in *Commentary*. That respectable cultural-political journal, for mysterious reasons, continues to publish, *sans* competent review, Berlinski’s animadversions on evolution. It does so although he has no visible qualifications in biology or as an evolutionary thinker (see James Downard’s “A Tale of Two Citations,” at <http://www.talkreason.org/articles/Berlinski1.cfm>). In fact, Berlinski has himself, most recently, dismissed the main arguments of the Wedge, retaining however his own cranky certitudes contra Darwinism.

As to Park (2)—the claim of bogus scientists to have discovered new laws of nature—that is made by the Wedge’s William Dembski in his “Law of the Conservation of Information.” The experts have ignored or scorned it (for example, http://talkreason.org/articles/dembski_LCI.pdf; <http://www.talkreason.org/articles/dembski.cfm>). And biochemist Michael Behe, another Wedge leader, in his 1996 book, *Darwin’s Black Box* (New York: The Free Press) compared his argument for “irreducible complexity” to the discoveries of Copernicus and Galileo (Baez 33).

The Scientific Claims

What, then, are the explicitly scientific claims with which the Wedge program encourages the faithful and bemuses parents, school boards, politicians, and otherwise reasonable scholars in the social sciences and the humanities who lack more than a cursory understanding of modern evolutionary theory. There is one general claim with five subsidiaries, each identified with one or more Fellows, advisers, or associates of the Center for Science and Culture, a branch of the Discovery Institute in Seattle, Washington. The subsidiaries fall into two groups: negative (as regards evolutionary biology) and positive (as regards intelligent design). The general claim is familiar: it is the ancient argument from design for the existence of God, last resurrected by the Reverend William Paley, in England, in 1802 despite its having been rather soundly thrashed by David Hume in 1748. The explicit aim of the Wedge is to rehabilitate this argument—that the world, life within it, is too complex and obviously purposeful to have happened by chance, hence it must have been designed and created miraculously. In fact the explicit aim is to modernize ecstatic, nineteenth-century natural theology, and with it to defeat “the mechanical philosophy” of modernism.

Here now I list the subsidiary claims, name some of their principal Wedge spokesmen, and indicate briefly the reasons why they are inconsequential. I provide pointer internet addresses and other references at the end of each. Each site provides links to the large literature on the issue from the Wedge itself and its supporters and from the scientific community.

Negative claim: Intelligent design advocates claim that in the Cambrian “explosion” of about 540 million years ago, nearly all the *phyla* of modern animals appeared at the same time, giving the lie to the key Darwinian principle of slow, gradual change—descent with modification. To them this indicates that something quite different was going on, possibly special creation *ex nihilo* of the animals and their body plans. The Wedge’s point man for this has been Paul Chien, a marine biologist and self-described anti-Darwinist Christian; but others have contributed to the argument. Chien has no qualifications in paleontology; he has published no research in the field and has frankly acknowledged, when interviewed, his amateur status. Nevertheless he has cultivated, on behalf of the Wedge, the Chinese paleontologists working on the remarkable Precambrian and Cambrian fossils of Guizhou Province.

The Cambrian explosion argument is false. “The same time” means, in fact, a time-span of about ten million years. The *relative* rapidity of the Cambrian adaptive radiation is of great interest in paleontology; but no paleontologist of stature believes that the *phyla* arose *ex nihilo*. There were multicellular animals on Earth long before the Cambrian period, and there were unicellular ancestors of those multicellular animals, worldwide, at least 2.5 *billion* years ago. Darwinian “gradualism” never required that all evolutionary change proceed at a constant slow rate. What interests contemporary students of the Cambrian is the trigger(s) for the radiation from Precambrian ancestors that left few or no fossils to their multiform descendants in the Cambrian seas. See as an example a recent book review by the preeminent student of the subject, Cambridge Professor Simon Conway Morris, in *American Scientist Online*, July-August 2003 (<http://www.americanscientist.org/>). More references and links below.

Negative claim: There is an “irreducible complexity” (IC) of structures and biochemical systems at and below the cellular level. This is Lehigh University biochemist Michael Behe’s variation of Paley. Behe’s claim is that the internal machinery of cells is massively complex; each IC object is functionally dependent upon all its parts. If one part is missing, there can be no function. Therefore, he argues, they cannot have evolved from simpler precursors via Darwinian selection. Behe’s examples of IC subcellular objects include biochemical processes, such as the blood clotting cascade, and extended molecular structures such as flagellae.

There are a few key howlers in this argument, which was published in trade-book form in 1996. Since then they have been pointed out in dozens of reviews and in responses from working evolutionists to Behe’s argument and to his entirely inadequate replies to critics. But there are in the scientific literature—and have been for sixty years—examples of such systems as Behe identifies: structures and processes that *have* clearly evolved (a) from simpler, less complex biochemical precursors that function in the same way, more or less, and (b) even from simple precursors with different functions than those of the contemporary structure or reaction pathway under study. (See, for a beautiful current example, “Origin and evolution of circadian clock genes in prokaryotes,” by Volodymyr Dvornyk and others, in *Proceedings of the National Academy of Sciences*, 100 (5): 2495-2500, 2003). If systems such as (a) and (b) exist, then a purportedly IC system is not IC in the sense Behe requires, and his argument against biochemical evolution collapses. A comprehensive discussion, with dozens of links pro-IC (from the Wedge) and con-IC (from everybody else), can be found at “Behe’s Empty Box” (<http://world-of-dawkins.com/Catalano/box/behe.htm>). See also a typically devastating review of *Darwin’s Black Box* from Brown University biologist—and, incidentally, theist—Kenneth Miller (<http://biomed.brown.edu/Faculty/M/Miller/Behe.html>). Behe’s “discovery” is just the old Argument from Personal Incredulity.

Negative claim: Some of the supposed “proofs” of Darwinian evolution are false or fraudulent. All wedge spokesmen assert or imply this from time to time; but their chief conspiracy theorist is Jonathan Wells. Wells is a member and theologian of the Unification Church. As he tells it, the Rev. Sun-Myung Moon, to whom he refers as “father,” encouraged him to go for a second Ph.D., this one in Biology, after winning his spurs in theology. The purpose was to arm himself to “destroy Darwinism.” His work consists not of doing biology, but of mining the literature for arguments and weaknesses in evolutionary science. These he has assembled, for example, in his book *Icons of Evolution: Science or Myth* (Washington: Regnery Publishing, 2000), as supposed proofs of evolution, taught in the schools, that he maintains are wrong or fraudulent. The book, and the lectures and tracts he produces wherever there are conflicts over science curriculum, are very effective in rousing the furies of parents who care about their children being taught lies.

It is the *Icons* themselves, however, that are wrong and deceitful. Not one of them is about a “proof” of Darwinism. Every one is a comment on material in some few school science textbooks, misstated or grossly distorted by Wells as to origin, significance, and relevance to modern biology. There is no alternative for the reader who cares about this than to read a few of the responses from the literally dozens of experts and science teachers who have dissected Wells’ claims. Good places to start looking are <http://www.natcensci.org/> and <http://www.talkorigins.org/>, searching for “Wells” and “Icons.” In any case, nothing offered by

Wells is in any way useful for judging seriously the strength and significance of evolutionary science.

Positive claim: All modern science is blinded to the breadth of reality by an unjustifiable commitment to naturalism and materialism, whereby it cannot recognize the spiritual element in nature. The naturalism of modern science is no more than a faith. This was lawyer Phillip Johnson's original, and is still his only original, claim. It is bad philosophy. Its basic error is to mistake the methodological naturalism of *natural* science, without which there could be no objective inquiry, for some ontological or metaphysical commitment, which in fact most scientists do not have. The whole argument is artless. See Pennock's *Tower of Babel*, cited earlier, and the collection of essays edited by Pennock, *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives* (Cambridge, MA: MIT Press, 2001).

Positive claim: It is proven by mathematics that "the Darwinian mechanism" alone cannot explain life. This is the work of William Dembski, trained in theology, philosophy, and mathematics. Mathematical and probabilistic arguments against evolution are, of course, nothing new. They have been appearing for more than a hundred years, and one at a time they have been dropped because silly. A favorite current version is the argument from improbability. One shows, because any ordinary protein is composed of a hundred or so amino acids in an ordered configuration, and because the set of possible amino acids numbers twenty, that the probability of the correct set assembling in the proper order by chance is ridiculously small, because the number of possible combinations is ridiculously large—a number larger than the number of electrons in the universe, or some such.

But Darwinism does not teach that evolution is a product of chance, no matter how often creationists insist upon it. The genetic changes (mostly mutations) leading to evolutionary change are (mostly) the product of chance; but evolution via natural selection is the synergistic consequence of mutation and survival, so that only mutations which enhance the survival of the organism survive. This is the opposite of chance.

In any case, the self-assembling protein (or the like) is nonsense: no protein has ever assembled that way. Dembski's arguments are far fancier, though. He posits a "design inference," an algorithmic decision process, by which the investigator may decide among three and only three possible explanations for any "event": regularity (a law of nature); chance; and, by elimination if the first two fail to apply, design. This scheme, by now in a state of bewildering symbolic elaboration with dozens of hedges, and claimed by Dembski to produce no false positives, is the highest reach of intelligent design science. It doesn't and it can't work. A good place to start seeing why is the recent book of physicist Victor Stenger, *Has Science Found God?: The Latest Results in the Search for Purpose in the Universe*. (Amherst, NY: Prometheus Books, 2003, 99-129). Next is the Talk Reason archive, which provides expert analyses of Dembski's works and full linkage to his productions (<http://www.talkreason.org/>). See also the review by mathematician Jason Rosenhouse of Dembski's latest book, *No Free Lunch*, in: (*Evolution* 56(8): 1721-22, 2003), and the point-by-point dissection by Richard Wein (<http://www.talkorigins.org/design/faqs/nfl/>).

Special Theme: Cultural Competence

Insurgent Multiculturalism: Rethinking How and Why We Teach Culture in Medical Education
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ABSTRACT

The author proposes a theoretical orientation for cultural competency that reorganizes common curricular responses to the study of culture in medical education. What has come to be known in medical education as cultural competency is theoretically truncated and may actually work against what educators hope to achieve. Using Giroux's concept of insurgent multiculturalism, she suggests that the critical study of culture might be a bridge to certain aspects of professional development. Insurgent multiculturalism moves inquiry away from a focus on nondominant groups to a study of how unequal distributions of power allow some groups but not others to acquire and keep resources, including the rituals, policies, attitudes, and protocols of medical institutions. This approach includes not only the doctor-patient relationship but also the social causes of inequalities and dominance. Linked to professional development efforts, insurgent multiculturalism can provide students with more opportunities to look at their biases, challenge their assumptions, know people beyond labels, confront the effects of power and privilege, and develop a far greater capacity for compassion and respect.

Table of Contents

From the Editor

Preparing Doctors for a Multicultural World

Michael E. Whitcomb

Acad Med 2003 78: 547-548. Acad Med 2003 78: [\[Full Text\]](#)

Special Theme Articles

Insurgent Multiculturalism: Rethinking How and Why We Teach Culture in Medical Education

Delese Wear

Acad Med 2003 78: 549-554. Acad Med [\[Abstract\]](#) [\[Full Text\]](#)

Confronting "Culture" in Medicine's "Culture of No Culture"

Janelle S. Taylor

Acad Med 2003 78: 555-559. Acad Med [\[Abstract\]](#) [\[Full Text\]](#)

