REPORTS OF THE NATIONAL CENTER FOR SCIENCE EDUCATION

DEFENDING THE TEACHING OF EVOLUTION IN THE PUBLIC SCHOOLS

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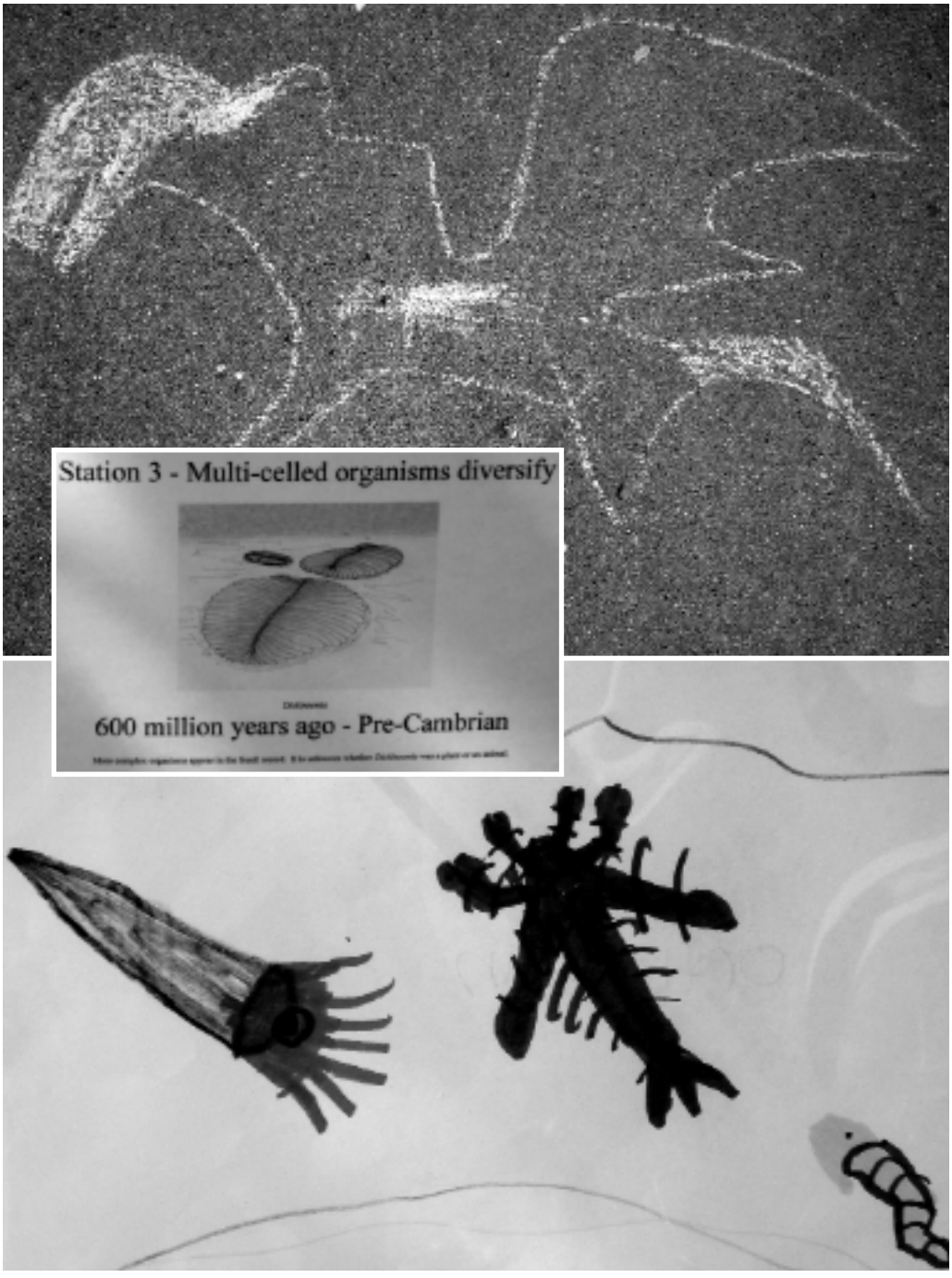
CONTINUES *NCSE REPORTS & CREATION/EVOLUTION*



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NATIONAL CENTER FOR SCIENCE EDUCATION
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Cover: Images from Nick Schweitzer's evolution installation
Photography by Andrew J Petto

FROM THE EDITOR

A key argument we often hear as a justification for introducing anti-evolutionary materials into schools or anti-evolution legislation is the strong public support for "alternative" models. One of the persistent sources of support for that position comes from public opinion polls. Perhaps the best-known poll is from the Gallup Organization, which began polling on creationism/evolution in the early 1980s; this poll has shown almost no significant change in public commitment to evolutionary or creationist positions for almost three decades. However, commentators have regularly remarked on the peculiar way in which Gallup's questions are phrased and wondered to what extent that phrasing might have affected the results.

In this issue, George Bishop examines the creationism/evolution polls themselves. He compares several polls that use slightly different ways of framing the issues. His conclusion is that exactly how these questions are phrased does matter. Rather than tapping some deep, strongly held convictions, the questions seem to evoke different positions on creationism/evolution issues depending on what they ask and how they ask it. So, is support for evolution stronger — or weaker — than polls suggest? Find out inside.

Our centerfold front page also focuses on media issues. Communications professional Martha Heil reminds us that a large proportion of the US public receives its news via television media. Since these reports seldom exceed 60 seconds, it is important for supporters of evolution and good science education to be prepared to provide a short, effective account of their positions and concerns. It takes practice, but everyone who has occasion to speak to television reporters should keep these handy tips in a prominent place for easy access when the media call.

IN THE NEWS

Since our last issue, the NOVA program *Judgment Day* was released and broadcast in *most* markets served by Public Broadcasting stations. There were a few exceptions, as NCSE deputy director Glenn Branch tells us. Despite the predictable flurry of criticism from creationists, the response was strongly favorable, and the program was highly effective in presenting the events of the controversy in Dover, Pennsylvania, and the resulting trial.

There are two notes from Oklahoma. Daniel Dickson-LaPrade reports on a presentation by William Dembski at the University of Oklahoma. This was not a performance "for the books", and we read that the reception to the presentation was not favorable. Phillip E Klebba permitted us to reprint a modified version of his letter to the student newspaper in response to Dembski's presentation. Klebba reminds us that "irreducible complexity" is little more than a catchphrase for "what we cannot explain — yet!" He gives us several historical examples of problems in biology that might have been considered "irreducibly complex" at one time — all of which are now understood entirely in terms of the natural processes that produce them, thanks to the persistent application of scientific method.

We also report on anti-creationist activities across the country and in Europe, where the Council of Europe's Parliamentary Assembly passed a version of its "The dangers of creationism in education" resolution. Back in the United States, NCSE and its allies succeeded in repelling Louisiana Senator Vitter's attempt to insert earmark funding in a spending bill that would support creationist educational "research" in Louisiana.

Two important stories that were breaking while this issue of *RNCSE* was in press. Chris Comer — the head of science curriculum at the Texas Education Agency for nine years — was forced to resign in November 2007 after forwarding an announcement of a talk by Barbara Forrest, a member of the NCSE board of directors who served as an expert witness for the plaintiffs in the *Kitzmiller* trial. And in Florida, where the "e-word" used not to appear in the science education standards, a new set of standards was adopted in March 2008, with the "e-word" front and center. We'll have more on those stories in the very next issue of *RNCSE*.

RNCSE 27 (5-6) was printed in March 2008.

ERRATUM

In Charles F Austerberry's review of *Evolution and Christian Faith* (*RNCSE* 2007 Jan–Apr; 27 [1–2]: 49–50), a sentence on p 49 about Kenneth R Miller, Francis Collins, Francisco J Ayala, and Joan Roughgarden was inadvertently altered in the editorial process in a way that changed its meaning: it should have read, "All four are theistic evolutionists who reject 'intelligent design' as well as special creationism" (rather than "as special creationism").

NEWS

Judgment Day: Intelligent Design on Trial

Glenn Branch
NCSE Deputy Director

Judgment Day: Intelligent Design on Trial, a special two-hour documentary about the *Kitzmiller v Dover* case, in which teaching "intelligent design" in the public schools was ruled to be unconstitutional, aired nationwide on PBS at 8:00 PM on November 13, 2007. "*Judgment Day* captures on film a landmark court case with a powerful scientific message at its core," explained Paula Apsell, NOVA's Senior Executive Producer, in a publicity statement. "Evolution is one of the most essential yet, for many people, least understood of all scientific theories, the foundation of biological science. We felt it was important for NOVA to do this program to heighten the public understanding of what constitutes science and what does not, and therefore, what is acceptable for inclusion in the science curriculum in our public schools."

Reviewing *Judgment Day* for the November 8, 2007, issue of *Nature* (450: 170), Adam Rutherford was impressed, not least with the way in which the filmmakers met the challenge of retelling the story. "The makers of *Judgment Day* inject tension with eyewitness accounts from the people of Dover," he wrote, "and home-video footage of raucous school board meetings shows how passionate and divided this small community became. It works: it is inspiring to hear parents and educators, such as Sunday school and physics teacher Bryan Rehm, recount how they refused to be steam-rollered into bringing religion into the science classroom."

"*Judgment Day* gracefully avoids ridiculing intelligent design for the pseudo-intellectual fundamentalist fig-leaf that it is, by simply showing how the protagonists shot themselves in the foot," Rutherford added. Acknowledging that the "intelligent design" movement is still alive in the wake of the trial, he nevertheless concluded, "the *Kitzmiller vs Dover* verdict, matched this September with the outlawing of intelligent design in the UK national curriculum, marked the official neutering of this unpleasant, sneaky movement in much of the western world. *Judgment Day* is just the sort of thoughtful programming that celebrates how sensible people — faithful and otherwise — can use science and reason to combat fundamentalism."

Judge John E Jones III, the federal judge who presided over *Kitzmiller v Dover*, appeared on The NewsHour on November 13, 2007, to discuss the show. Following a clip from the program, Jones discussed his background knowledge of "intelligent design" and evolution, the Establishment Clause and its applicability in the *Kitzmiller* case, the role of the independent judiciary, and the influence of his seminal decision. Jones commented, "It's not precedential outside of the middle district of Pennsylvania, but I thought that if other school boards and other boards of education could read it, they would possibly be more enlightened about what the dispute was all about."

On the same day, NCSE issued a press release (see sidebar, p 5) congratulating the producers of *Judgment Day* for the show's accuracy. "NCSE has been studying the influence of creationism and its assault on science education for the past twenty years," said Eugenie C Scott, NCSE's executive director. "*Judgment Day* accurately portrays the events that led to the legal decision that it is unconstitutional to teach 'intelligent design' in public school science classrooms." The press release also highlighted NCSE's role in the trial, observing that three members of its board of directors testified as expert witnesses for the plaintiffs, and that NCSE's archives provided critical evidence for the linkages between "intelligent design" and previous forms of creationism. (For more on NCSE's role in the trial, see *RNCSE* 2006 Jan–Apr; 26 [1–2].)

For its part, the Discovery Institute attempted to poison the well by offering a series of shrill press releases, not all of which seem to have been carefully considered. One, dated November 9, 2007, took exception to *Judgment Day*'s use of actors to re-enact the testimony during the trial by saying, "First they dramatized the OJ Simpson trial. Then they acted out Michael Jackson's courtroom drama. This time around we have NOVA re-enacting parts of the 2005 Dover intelligent design trial presided over by Judge John E Jones" — thus comparing the proponents of "intelligent design" to alleged murderers and pedophiles, which was presumably not the intention. In any case, the effort was largely wasted: the press releases were virtually ignored not only by the mainstream media, as with the Discovery Institute's similar press release campaign against *Evolution* in 2001 (see *RNCSE* 2001 Sep–Dec; 21 [5–6]: 5–14), but also by the publications and organizations on the political and religious right that are usually receptive to the "intelligent design" movement's message.

Meanwhile, *Judgment Day* continued to receive high praise from reviewers, both in Pennsylvania, where the historic trial took place, and across the

Judgment Day Accurate, NCSE Reports

November 13, 2007 — The National Center for Science Education congratulates the producers of *Judgment Day*, a documentary about the seminal *Kitzmiller v Dover* trial of 2005, for its accurate portrayal of the case that showed intelligent design to be a specific religious viewpoint. *Judgment Day* premiers on November 13, 2007, on PBS stations nationwide.

"NCSE has been studying the influence of creationism and its assault on science education for the past twenty years," said Eugenie C Scott, NCSE's executive director. "*Judgment Day* accurately portrays the events that led to the legal decision that it is unconstitutional to teach intelligent design in public school science classrooms."

NCSE served as a consultant for the plaintiffs' successful legal team in the case, and three members of its board of directors — Kevin Padian, Professor of Integrative Biology at the University of California, Berkeley; Barbara Forrest, Professor of Philosophy at Southeastern Louisiana University; and Brian Alters, Professor of Education at McGill University — testified as expert witnesses at the trial.

Research in the NCSE archives played a crucial role in demonstrating the links between "intelligent design" and previous forms of creationism. "They tried to make an end-run around an earlier generation of legal rulings by switching the word 'creation' to 'intelligent design' in drafts of a creationist textbook," commented Nick Matzke, NCSE's scientific consultant for the Dover plaintiffs and now a doctoral student in integrative biology at the University of California, Berkeley. "We found documents in the NCSE archives which were 'missing links' in this evolution of creationism."

"'Intelligent design' has been judged by both the scientific community and a court of law to be a form of creationism," explained Richard Katskee, assistant legal director of Americans United for Separation of Church and State and co-counsel for the plaintiffs. "It isn't science and it doesn't belong in the science classroom."

On December 20, 2005, Judge John E Jones III ruled that "intelligent design" is "a religious argument. In that vein, the writings of leading ID proponents reveal that the designer postulated by their argument is the God of Christianity ... The overwhelming evidence at trial established that ID is a religious view, a mere re-labeling of creationism, and not a scientific theory. ... It is therefore readily apparent to the Court that ID fails to meet the essential ground rules that limit science to testable, natural explanations. Science cannot be defined differently for Dover students than it is defined in the scientific community."

NCSE board member Barbara Forrest's expert testimony about the history of the "intelligent design" movement played a key role in the ruling. "The 'intelligent design' movement is a direct descendant of 'creation science' and employs virtually all of the arguments and terminology used by earlier creationists. Most important, like earlier forms of creationism, ID is driven by the same religious motives and goals," Forrest commented. "The NCSE archives provided primary sources critical to showing how ID's arguments, ideas, and people simply moved from 'creation science' to 'intelligent design.'" The National Center for Science Education maintains an archive of transcripts, expert reports, legal filings, and other documents related to the *Kitzmiller* trial on a website at <http://www2.ncseweb.org/wp/?page_id=5>.

The National Center for Science Education is a nonprofit organization dedicated to defending the teaching of evolution in the public schools. The NCSE maintains its archive of source material on the history of creationism at its Oakland, California, headquarters. On the web at <http://www.ncseweb.org>.

[*Released on November 13, 2007, and reprinted here with slight alterations. For the original, see <http://www.ncseweb.org/resources/articles/judgment_day.pdf>.*]

country. The *York Dispatch*, one of the two daily papers serving the Dover area, editorially offered (2007 Nov 11), "Thumbs Up to PBS for bringing tribulations of the Dover Area School District to national attention in the two-hour Nova special 'Judgment Day: Intelligent Design on Trial' ... The blatant attempt to introduce religion-based 'creationism' into the public school classroom is detailed along with a recreation of the ensuing battle in a federal courtroom in Harrisburg that resulted in a humiliating defeat for the intelligent design proponents. A reminder that fiddling with public education to impose an individual religious viewpoint is a non-starter, 'Judgment Day' should be required watching."

Reviewing *Judgment Day* for the *Philadelphia Inquirer* (2007 Nov 13), Jonathan Storm praised not only its scientific content but also its objective approach: "Nova, the science show, stoutly defends science against the attack of the surprisingly hard-to-pin-down intelligent-design brain trust. It does use such loaded words as 'claim' and 'so-called' to describe tenets of the supposed theory, but it is surprisingly clear of a 'nyah-nyah, we won' tone. That makes this significant program more accessible to all." He also quoted Judge Jones as saying, "If you glibly embrace intelligent design, or if you're in that 48 or 50 percent who believe creationism ought to be taught in school, I hope [you] will watch this."

It was as a legal drama that *Judgment Day* struck Rob Owen, writing in the *Pittsburgh Post-Gazette* (2007 Nov 12). Describing the program as "a fascinating and gripping look at the trial and both sides of the issue," Owen wrote, "I

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didn't know much about so-called 'intelligent design' theory beyond its name and a sense that it's synonymous with creationism. So I went into the film willing to be persuaded that maybe there's some validity to 'intelligent design'. If there is, those in favor of ID failed to prove it. And failed miserably. That's what makes 'Intelligent Design on Trial' such a thriller. As a legal exercise, the pro-evolution team presents a slam-dunk case; in the end, even a defense attorney says his losing side received a fair trial."

In *The New York Times* (2007 Nov 11), Cornelia Dean admired the scientific content of *Judgment Day*, commenting, "the program as a whole recognizes that there is no credible scientific challenge to the theory of evolution as an

Associated Press

explanation for the complexity and diversity of life on earth. And it shows how witnesses attacked two of the central premises of intelligent design — that there are no 'intermediate' fossils to show one creature morphing into another (there are) and that some body parts are too complex to have formed from the modification of other body parts (not true)." She added, "But viewers also learn a more important lesson: that all science is provisional, standing only until it is overturned by better information. Intelligent design, relying as it does on an untestable supernatural entity, does not fall into that category."

Elsewhere, the *Cincinnati Post*'s reviewer (2007 Nov 13) wrote, "Leave it to the respected PBS science show 'NOVA' to put some common sense back into the often hysterical debate over whether intelligent design is science or religion — and remind us that Darwin's theory of evolution is a solid one that should be taught in science classes." The *Deseret News*'s reviewer (2007 Nov 13) described the program as "captivating," and quoted Judge Jones as saying, "I think there's a lesson here for communities and how they elect their school board members." And the *Oregonian*'s reviewer (2007 Nov 13) wrote, "'Judgment Day' offers an admirably compact and methodical presentation of the sides in the debate. It should be highly useful in years to come."

Finally, writing on Salon (2007 Nov 13), Gordy Slack, the author of *The Battle Over the Meaning of Everything* (San Francisco: Jossey-Bass, 2007; reviewed in *RNCSE* 2007 May–Aug; 27 [3–4]: 43), looked forward from the trial, explaining that although "intelligent design" aspired to be a big tent under which creationists of all stripes were welcome to shelter, "Judge Jones' [s] decision was like a lightning strike on the big top, sending many of the constituents running home through the rain." He ended by quoting NCSE's executive director Eugenie C Scott's warning: "Evolution remains under attack ... If creationists have their way, teachers will eventually just stop teaching evolution. It'll just be too much trouble. And generations of students will continue to grow up ignorant of basic scientific realities."

Despite the general acclaim for *Judgment Day*, residents of Memphis, Tennessee, were not able to watch it on the regular, analog, channel of WKNO, the local PBS affiliate. A locally produced documentary about World War II was aired instead. The Memphis *Commercial Appeal* (2007 Nov 15) quoted a spokesperson for the station as explaining, "We had plans to do our local programs to honor veterans this week during Veterans Day. We thought Tuesday night was a good spot for local programs of this nature, and we were concerned about the controversial nature of the ... program as were 15 percent of the top 50 public television stations in the country."

Although *Judgment Day* was aired on WKNO's digital broadcasts, the station's failure to air it on the regular channel elicited complaints; the spokesperson for the station would not disclose how many. The *Commercial Appeal* quoted one disgruntled viewer, NCSE member David O Hill, as saying, "I really appreciate what service they do, but when they step out of line like this it violates the whole premise of what NPR and PBS stand for nationally ... This was an historical review of an important judicial decision in America, and they chose not to do it." Trained as a biologist, Hill added, "Evolution is as important a building block to biology as atomic theory is to chemistry and gravitation to physics." The station promised to air *Judgment Day* in January 2008, "with a local follow-up to discuss the various views on the show."

Judgment Day is over, but its generous website (<http://www.pbs.org/wgbh/nova/id/>) remains, featuring interviews with Kenneth R Miller on evolution, Phillip Johnson on "intelligent design," and Paula Apsell on NOVA's decision to produce the documentary; audio clips of Judge John E Jones III reading passages from his decision in the case and of various experts (including NCSE's Eugenie C Scott) discussing the nature of science; resources about the evidence for evolution and about the background to the *Kitzmiller* case; and even a preview of the documentary. Teachers will be especially enthusiastic about the briefing packet for educators, the teacher's guide, a two-session on-line course, and a number of lesson plans. And the complete show is available for viewing on-line there as well; it was also released as a DVD in February 2008.

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A Victory over "Intelligent Design" in Oklahoma

Daniel Dickson-LaPrade

I first heard that William Dembski was going to visit the University of Oklahoma quite by accident from one of my technical writing students. I was astonished. People still pay the honoraria of "intelligent design" (ID) advocates even after *Kitzmiller v Dover*? Apparently, they do, and after two phone calls I found out who was doing the paying: Trinity Baptist Church. On a "Note from the Elders" on its website, I read that they viewed the expense as a "gospel investment" — part of their attempt "to penetrate the university campus with the gospel," especially the science departments. "In case you are wondering, these departments and their teachings are not friends of Christianity."

I quickly contacted every faculty member in our zoology and botany/microbiology departments with news of Dembski's upcoming visit on September 17, 2007. Several of these faculty members — many of them affiliated with the group Oklahomans for Excellence in Science Education — worked with me to put together a game plan.

We wrote an advertisement which was to appear in the OU student paper on the day of Dembski's arrival. In this ad, we listed several points showing, first, that evolution is not inherently atheistic, and second, that ID is not a scientific enterprise. Since we put the ad through several drafts to maximize its effectiveness, and since we had to turn in the ad two business days before it was to run, we only had about 48 hours to collect donations to cover the expense of the ad and signatures to appear beneath it. We had expected to get enough money for a half-page ad, along with perhaps a hundred signatures. Instead, we collected 180 signatures and ample money for the ad to cover a full page.

On the morning of Dembski's appearance, our ad was augmented by a guest column on the opinion page by OU biologist Douglas Mock, author of *The Evolution of Sibling Rivalry* and *More than Kin and Less than Kind*. Mock's column argued against ID, while a pro-ID counterpoint column was written by a journalism major.

Dembski's presentation

Dembski's talk was held in an auditorium in our student union. Students posted at the building's entrances were passing out copies of mathematician Jeffrey Shallit's expert report in the *Kitzmiller v Dover* trial. In this brief document, Shallit takes Dembski to task for using flawed and nonsensical methodology which has not been utilized by real scientists and mathematicians. Outside the door of the auditorium, the local Christian bookstore had a table of books for sale by various ID advocates, including several titles by Dembski himself. A pamphlet recycling old ID arguments was also provided.

As the last of the auditorium's 407 seats were filled, an announcer told us that Dembski's talk would last for about an hour, after which there would be an open question-and-answer session. Two microphones had been set up for this purpose. On the screen was Dembski's first slide — a quotation from our full-page advertisement about how ID proponents "refrain from publishing their results in peer-reviewed math and science journals."

Dembski began by saying that no one had ever taken out a full-page ad against him before, and spent the first five or ten minutes of his presentation trying to refute our point about ID's lack of peer-reviewed publications. As though this helped his refutation, he posted a list of eight such peer-reviewed publications — most of which had nothing to do with ID methodology. The remainder of Dembski's presentation had all the usual examples and analogies (the bacterial flagellum, Mount Rushmore, the motorcycle engine), as well as stills and clips from films like *This is Spinal Tap* and *Dumb and Dumber*.

Having taught college-level writing classes for several years, and having been a trainer in the corporate world before that, I can tell when a speaker has carefully honed a presentation to razor sharpness and when a speaker is coasting along based on past acquaintance with the material. As far as I could tell, Dembski was phoning in his presentation. This became particularly apparent when Dembski reached the one-hour mark that should have ended his presentation. He began to skip some slides and to skim others. Finally, having gone over on time by fifteen minutes, he skipped virtually all of his last dozen slides to get to his conclusion.

After this, the question-and-answer period started. As lackluster, rushed, and incomplete as the presentation itself was, the question-and-answer period went even more poorly for Dembski. I was first in line to question, and I began by pointing out that there were several tenured science faculty in the room who had, by themselves, exceeded the peer-reviewed publication output for the entire ID movement. A zoology professor pointed out that Dembski had provided no positive evidence for ID and that his analogies for the complexity of living systems were very shabby ones. Then, in the highlight of the evening, a microbiologist on our faculty pointed out numerous errors and distortions in Dembski's treatment of the bacterial flagellum. In all, some 25 or 30 questioners grilled Dembski over the course of more than two hours, most of them undergraduates and grad students. Only two of the questioners were supportive of ID.

I had expected Dembski's talk to get a warm reception, and for many people to be fooled into thinking that ID was a worthwhile scientific enterprise. Instead, the the room had almost a carnival atmosphere. Dembski was heckled repeatedly for evading questions and responded to this heckling with further evasion. The audience laughed and applauded often and at length when a questioner put Dembksi on the spot. As one of our professors with the Oklahoma Biological Survey later told me, "No one could have come away thinking that it was anything but a complete disaster for Dembski."

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The lasting impression

This disaster continued even after Dembski finally went home. In the week after his presentation, the OU student paper published one opinion letter by me, another by a zoology professor, and a guest column by the same microbiology professor who took Dembksi to task for his misrepresentation of the bacterial flagellum (*see p 8*). During this same period, not a single column or letter to the editor in support of ID appeared in the school paper.

All in all, our preparations were successful, and Dembski's visit to the University of Oklahoma did the "intelligent design" movement more harm than good. There is no doubt in my mind that if all presentations by ID proponents went as poorly as Dembski's did and if evolution supporters can organized and coordinate their efforts, then the support for the "intelligent design" movement would simply evaporate.

[*See the September 2007 entries on the blogs* ERV *(<http://endogenousretrovirus.blogspot.com/>) and* Ontogeny *(<http://mattdowling.blogspot.com/>), as well as the blogs linked on the September 22, 2007, entry of* The Panda's Thumb*. Trinity Baptist Church's website hosts (at <http://www.trinitynorman.org/clientimages/32056/idbooklet9-07.pdf>) a copy of a pamphlet entitled "Design versus Dogma: A Brief Introduction to Intelligent Design", which was distributed before Dembski's talk.*]

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"Intelligent Design" Reflects Human Ignorance

Phillip E Klebba

The fundamental premise of "intelligent design" is the existence of "irreducibly complex biological systems".The idea is that certain natural phenomena are just too complicated to originate by spontaneous, stepwise evolutionary processes. But this argument reduces to another basic principle, aptly illustrated by William A Dembski's widescreen Rorschach test (the face of a cow), which was passed by only a handful of individuals in the large audience [at Dembski's September 17, 2007, talk at the University of Oklahoma, entitled "Why Atheism is no longer Intellectually Fulfilling]: the powers of human perception are strongly biased by experience and strictly limited by cognitive ability.

It is ironic that excellent examples of this point derive from the rich history of evolution theory itself. Dembski was correct when he noted that Charles Darwin (in *On the Origin of the Species*, 1859) had no idea of the mechanisms that underlie the process of natural selection that he described. For Darwin, the molecular explanations of organismal evolution were irreducibly complex. It remained for Gregor Mendel's description of inheritance (in *Experiments on Plant Hybridization*, 1866, which became widely accepted about thirty years later) to provide a conceptual framework for the genetic processes that permit natural selection. But Mendel himself had no understanding of the nature of the genetic material.

Again, the irreducible complexity of the subject reared its head and kept science at bay until new technology allowed Rosalind Franklin, James Watson, and Francis Crick to reveal the structure of DNA (for which Watson and Crick won the Nobel Prize in 1953). Still, the organization of nucleic acids into discrete units of information that may be turned on, turned off, and transposed into molecular machines, was beyond their descriptions. It fell to Seymour Benzer, and to François Jacob and Jacques Monod (who shared the Nobel Prize in 1965) to unravel this next piece of irreducible complexity, nearly completing the explanation of the molecular biological and biochemical mechanisms beneath evolutionary change. However, one thing unknown to them was the process of mutation in eukaryotic DNA, that was clarified by Barbara McClintock's studies of gene transpositions (for which she won the Nobel Prize in 1983).

Hence, irreducible complexity is more appropriately called "human ignorance", which retarded the progress of this particular scientific field for over a hundred years. No biologist or biochemist argues that we understand all the mechanisms of nature. Clearly we do not. However, we need not look to "intelligent design" for the explanation of these puzzles, but rather await the progress of human technology and knowledge. It is no accident that these leaps of human understanding win Nobel prizes, the peak of intellectual recognition.

It is relevant to this point that Dembski's education, although extensive (BA, psychology; MS, statistics; PhD, philosophy, University of Illinois, Chicago; PhD, mathematics, University of Chicago; MDiv, Princeton Theological Seminary) does not qualify him to discuss the main subject of his lecture: biochemistry and molecular genetics. Certainly part of his failure to understand the irreducible complexity of biological systems derives from his lack of training in this field.

For example, the evolutionary relationships that led to the bacterial flagellar motor (the poster organelle of irreducible complexity for proponents of "intelligent design") are now well-known among scientists studying the biochemistry of bacterial cell envelopes. In brief, the flagellar assembly, which propels bacteria through fluid environments, consists of a long, hollow polymeric filament, a basal body that holds the filament in the cell membrane system, and a molecular motor complex containing a stator and rotor that turn the filament around and around when it is energized (by proton-motive force). When multiple filaments on the cell surface simultaneously spin in the counterclockwise direction, they form a twirling bundle of filaments that pushes the bacterium forward.

Dembski and at least one biochemist (Michael Behe, Lehigh University) assert that this molecular assembly of about fifty proteins is too complicated to originate by natural selection. In reality, a number of precursors to the complete flagellar assembly are known, that provide

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the stepwise development of novel functions, that when juxtaposed together lead to a selectable trait. The emergence of the flagellar motility system involves a progression from (i) pili (a hollow nonrotatory polymeric filament anchored in the bacterial outer membrane, which promotes adherence to surfaces), to (ii) type-III secretory systems (the needle-complex, a hollow, non-rotatory filament anchored by a complete basal body, through which bacteria inject toxins into host cells), that acquired (iii) the proton-motive force-driven rotational capability of the ATP synthase motor (a primary source of energy generation), and (iv) sensory and regulatory systems that determine the direction and the duration of cell propagation. Each individual system, by itself, has survival benefits for the cell; when combined, one by one, they provide a stepwise path to the development of a new advantageous trait: the ability to swim toward something desirable (such as high concentrations of sugars) and away from something noxious (such as high concentrations of acid). This adaptive evolutionary progression is simple and logical, but unfortunately it is not understood by Dembski and his colleagues. (For more information about this subject, please consult MJ Pallen and NJ Matzke, "From *The Origin of Species* to the origin of bacterial flagella," *Nature Reviews Microbiology* 2006; 4: 784–90.)

After considering his academic qualifications, I attended Dembski's lecture with the expectation that I would hear a serious theoretician consider the logical and scientific aspects of an important topic, the origins of biological systems on planet earth. As someone who understands the biochemistry that was the main subject of the lecture, I was surprised to find the discussion much less substantive than I anticipated. It was a bit more like the questions of a teenager than the insights of a philosopher.

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[*A version of this article appeared in* The Hub*, the student newspaper of the University of Oklahoma, 2007 Sep 20.*]

David Vitter

The Rise and Fall of the Vitter Earmark

Glenn Branch
NCSE Deputy Director

"Sen David Vitter, R–La., earmarked $100 000 in a spending bill for a Louisiana Christian group that has challenged the teaching of Darwinian evolution in the public school system and to which he has political ties," reported the New Orleans *Times-Picayune* (2007 Sep 22). Buried in the Senate Appropriations Committee's version of the appropriations bill for the departments of Labor, Health and Human Services, and Education was a provision allocating funds to the Louisiana Family Forum (LFF) of Baton Rouge "to develop a plan to promote better science education."

In a written statement, Vitter explained, "This program helps supplement and support educators and school systems that would like to offer all of the explanations in the study of controversial science topics such as global warming and the life sciences." The *Times-Picayune* added, "The money in the earmark will pay for a report suggesting 'improvements' in science education in Louisiana, the development and distribution of educational materials and an evaluation of the effectiveness of the Ouachita Parish School Board's 2006 policy that opened the door to biblically inspired teachings in science classes."

Adopted in 2006 with the backing of the LFF, the Ouachita Parish School Board's policy permits teachers to help students to understand "the scientific strengths and weaknesses of existing scientific theories pertinent to the course being taught;" "biological evolution, the chemical origins of life, global warming and human cloning" are the only topics specifically mentioned. A local paper editorially described it as "a policy that is so clear that one School Board member voted affirmatively while adding, 'but I don't know what I'm voting on'" (*Monroe News-Star*, 2006 Dec 3; see *RNCSE* 2006 Nov/Dec; 26 [6]: 8–11).

Although the Ouachita policy reflects the stealth creationist campaign of "teach the controversy," the LFF is not always so coy. The *Times-Picayune* reported: "Until recently, its Web site contained a 'battle plan to combat evolution,' which called the theory a 'dangerous' concept that 'has no place in the classroom.' The document was removed after a reporter's inquiry." (That document was written by Kent Hovind, the flamboyant young-earth creationist who is currently serving a ten-year sentence in federal prison for tax evasion and obstruction of justice; see *RNCSE* 2006 Jul/Aug; 26 [4]: 12–3.) The LFF also distributes "addenda" for science textbooks that promote various creationist claims, including the "irreducible complexity" of the bacterial flagellum and flood geology.

Writing in the New Orleans *Times-Picayune* (2007 Sep 26), columnist James Gill took Vitter to task for his proposal. The Louisiana Family Forum, Gill observed, "has said the theory of evolution 'has no place in the classroom' and has blamed Charles Darwin for Hitler, Stalin and Pol Pot." "The Web site," he added, "leaves no doubt that they would ban evolutionary theory altogether if they could; there is no incentive to give equal billing to what they see as heresy."

Concerned about Vitter's earmark, a coalition of more than thirty religious, civil rights, education, science, and advocacy organizations, spearheaded by Americans United for Separation of Church and State and including NCSE, sent a letter to every member of the Senate, calling on them to oppose the Vitter earmark. The letter (see sidebar, p 10–1) argued, "Not only would granting federal funding for the LFF's program be unconstitu-

tional, it also would be bad policy that would infringe upon students' religious freedom and undermine their education in the important discipline of science."

People for the American Way (PFAW) sent its own letter opposing the earmark. In a press release dated October 17, 2007, PFAW's Director of Public Policy Tanya Clay House described the earmark as "completely inappropriate," adding, "Sending taxpayer money to a religious group whose mission is to force creationism into public schools as science is a blatant attack on the separation of church and state. Claiming that the money will be spent on improving science education adds insult to injury."

Additionally, NCSE e-mailed its members and friends in Iowa, Pennsylvania, West Virginia, and Mississippi to urge them to lobby Senators Tom Harkin, Arlen Specter, Robert Byrd, and Thad Cochran to remove the Vitter earmark. (Due to their positions on the Appropriations Committee and its Subcommittee on Labor, Health and Human Services, Education, and Related Agencies, these senators were in a position to wield the

Remove Unconstitutional "Creation Science" Earmark from

Dear Senator:

We, the undersigned religious, civil rights, education, science, and advocacy organizations[,] write to urge you to remove an earmark from the Fiscal Year 2008 Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriation Bill's Committee Report. The Fund for Improvement of Education, under Title III, contains an earmark for uses that, if funded, would be blatantly unconstitutional. The earmark would fund curriculum that promotes teaching creationism in the science classroom, even though uniformly prohibited by federal courts.

The requested funding would go to the Louisiana Family Forum (LFF) "to develop a plan to promote better science education." According to *The New Orleans Times-Picayune*, the earmark "will pay for a report suggesting 'improvements' in science education in Louisiana, the development and distribution of educational materials and an evaluation of the effectiveness of the Ouachita Parish [Louisiana] School Board's 2006 [science curriculum] policy."[1]

The Louisiana Family Forum's mission is … "persuasively [to] present biblical principles in centers of influence," including schools.[2] One way the LFF seeks to accomplish its mission is by advocating for teaching creationism in the science classroom. For instance, the LFF played a leading role last year in Ouachita Parish, Louisiana School Board's adoption of a "science curriculum policy"[3] that "opened the door to biblically inspired teachings in science class."[4] The policy uses a creationist ploy — "teaching the controversy" — that allows teachers to point out the alleged "weaknesses" of evolutionary theory. This is despite the fact that courts have consistently held this tactic to be unconstitutional and that "the scientific consensus around evolution is overwhelming."[5] Constitutional and scientific issues aside, underwriting LFF's study of this questionable "science curriculum policy" for which it has already been a vigorous advocate is a dubious use of federal funding, to say the least.

Another LFF strategy in its quest to bring creationism to science class is promoting creationist "addenda" (deceptively called "evolution addenda") that public-school teachers can use to supplement state-approved science textbooks. One such addendum, published by the LFF as a "Fact Sheet," promotes discredited arguments from both the young-earth and intelligent-design creationist movements.[6] Among other constitutional problems, the addendum substitutes biblical explanations for scientific ones by attributing the "billions of fossils" on Earth to "violent floods in the past" and by questioning whether chemical origins of life happened "accidentally" or "by purely natural processes." Moreover, alluding to supernatural explanations undermines modern scientific methodology, in which scientists seek natural rather than supernatural explanations.[7]

This addendum was written by Dr Charles H Voss, a retired electrical engineering professor and close ally of the LFF. Voss is also vice president of the young-earth creationist Origins Resource Association (ORA), which is devoted to bringing creationism into science classes.[8] Voss has written similar, equally problematic, addenda for Louisiana's state-approved biology textbooks. They are available at his website, TextAddOns.com, to which the LFF posts a link. He authored an ORA "pamphlet outlining Scriptural and scientific arguments showing that God did NOT use evolution as His method of creating."[9] His addenda are clearly among the "improvements" in science education and "educational materials" for which the LFF advocates — and for which the US Constitution forbids taxpayer funds to be spent. There is no doubt that the LFF's intent is to bring creationism into science classrooms with federal taxpayer dollars.

The federal courts, including the US Supreme Court, have consistently and repeatedly held that creationism in all its variations ("creation science," "young-earth creationism," "intelligent design," and other anti-evolution doctrines) cannot be taught in the public schools. In *Epperson v Arkansas*,[10] the Supreme Court struck down a state statute prohibiting the teaching of evolution in public schools, explaining that "the First Amendment does not permit the State to require that teaching and learning must be tailored to the principles or prohibitions of any [religion]."[11] Subsequently, in *Edwards v Aguillard*,[12] the Supreme Court invalidated a Louisiana statute requiring the "balanced treatment" of evolution and "creation science" in the public schools. The Court declared the law unconstitutional because its "preeminent purpose ... was clearly to advance the religious viewpoint that a supernatural being created humankind."[13]

Other courts have similarly invalidated public schools' attempts to teach thinly disguised religious beliefs regarding the origins of life.[14] Most recently, the court in *Kitzmiller v Dover*, joined by local, national, and international media, recognized that the school board in Dover disserved the students, parents, and teachers in the community by dragging them into a "legal maelstrom, with its utter waste of monetary and personal resources."[15] Federal funding of the LFF's efforts to introduce creationism in public-school science classrooms will similarly harm the religious liberty of students and their families. As the Supreme Court has explained, the "preservation and transmission of religious beliefs and worship is a responsibility and a choice committed to the private sphere," for "religious beliefs and

greatest influence on the final form of the bill.)

The protests were apparently heeded, for Vitter withdrew the earmark on the Senate floor on October 17, 2007, even while insisting that the money was not aimed at promoting creationism and describing the concerns as "hysterics." According to the Congressional Record, Vitter said:

> The project, which would develop a plan to promote better science-based education in Ouachita Parish by the Louisiana Family Forum, has raised concerns among some that its intention was to mandate and push creationism within the public schools. That is clearly not and never was the intent of the project, nor would it have been its effect. However, to avoid more hysterics, I would like to move the $100 000 recommended for this project by the subcommittee when the bill goes to conference committee to another Louisiana priority project funded in this bill.

Senators Tom Harkin (D–Iowa) and

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religious expression are too precious to be either proscribed or prescribed by the State."[16] Parents — not schools — have the right to direct the religious upbringing of their children. Our nation is becoming more and more religiously diverse and Louisiana's students and their families reflect this diversity. One specific religion's view of the origins of life should not be taught to the exclusion of others. Doing so sends the message to those who disagree "'that they are outsiders, not full members of the [school] community, and an accompanying message to adherents that they are insiders, favored members of the [school] community.'"[17]

Finally, federal funding of the LFF will weaken rather than strengthen science education. "Creationism, intelligent design, and other claims of supernatural intervention in the origin of life or of species are not science because they are not testable by the methods of science."[18] Including these religious ideas in science classes "compromises the objectives of public education"[19] and negatively affects students. Teaching creationism "threaten[s] ... students' understanding of the biological, physical, and geological sciences" and "deprive[s] students of the education they need to be informed and productive citizens in an increasingly technological, global community."[20] The scientific literacy of students is at risk, which in turn puts our nation's competitiveness and ability to continue to achieve major advances in technology and public health at risk.

Not only would granting federal funding for the LFF's program be unconstitutional, it also would be bad policy that would infringe upon students' religious freedom and undermine their education in the important discipline of science.

We urge you to remove this harmful and unconstitutional earmark.

Sincerely,

American Association of School Administrators
American Association of University Women
American Civil Liberties Union
American Humanist Association
American Institute of Biological Sciences
American Jewish Committee
American Jewish Congress
Americans for Religious Liberty
Americans United for Separation of Church and State
Anti-Defamation League
Baptist Joint Committee for Religious Liberty
Biological Sciences Curriculum Study
Center for Inquiry
Colorado Evolution Response Team
Disciples Justice Action Network
Equal Partners in Faith
Jewish Council for Public Affairs
Kansas Citizens for Science
National Center for Science Education
National Council of Jewish Women
National Education Association
National Science Teachers Association
Oklahomans for Excellence in Science Education
Organization of Biological Field Stations
Protestant Justice Action
Secular Coalition for America
Sikh Council on Religion and Education
Society for the Study of Amphibians and Reptiles
Society for the Study of Evolution
Texas Faith Network
Texas Freedom Network
The Herpetologist's League
The Interfaith Alliance
Union for Reform Judaism
Unitarian Universalist Association of Congregations
Women of Reform Judaism

1 Bill Walsh, *Vitter Earmarked Federal Money for Creationist Group*, New Orleans Times-Picayune, Sept 23, 2007, at 1.

2 <http://www.lafamilyforum.org>

3 <http://www.opsb.net/downloads/forms/Ouachita_Parish_Science_Curriculum_Policy.pdf>

4 Walsh, *supra*.

5 *Science and Creationism: A View from the National Academy of Sciences* (2d ed. 1999), <http://www.nap.edu/html/creationism/appendix.html>

6 <http://www.lafamilyforum.org/site100-01/1001014/docs/origin~1.pdf>

7 *Science and Creationism*, <http://www.nap.edu/html/creationism/evidence.html>

8 <http://originsresource.org/>

9 <http://originsresource.org/pubs/didgod.pdf>

10 393 US 97 (1968).

11 *Id* at 106.

12 482 US 578 (1987).

13 *Id* at 591.

14 *See Freiler v Tangipahoa Parish Bd of Educ*, 185 F3d 337, 348 (5th Cir 1999) (striking down an oral disclaimer casting doubt on evolution and referring to "biblical" alternatives), *cert denied*, 530 US 1251 (2000); *Peloza v Capistrano Unified Sch Dist*, 37 F3d 517, 522 (9th Cir 1994) (holding that a science teacher was properly required by his school district to teach evolution and refrain from discussing his religious views); *Daniel v Waters*, 515 F2d 485, 491 (6th Cir 1975) (striking down statute requiring schools teaching evolution to devote equal time to other theories, including Biblical account of creation); *Kitzmiller v Dover Area Sch Dist*, 400 FSupp. 2d 707 (MD Pa 2005) (holding that intelligent design, an "untestable alternative hypothesis grounded in religion" cannot be taught alongside evolution in the science classroom, nor can evolutionary theory, "well-established scientific propositions," be misrepresented); *Selman v Cobb County Sch Dist*, 390 F Supp 2d 1286, 1312 (ND Ga 2005) (striking down a textbook disclaimer sticker telling students that evolution is "just a theory"), *vacated and remanded by* 449 F3d 1320 (11th Cir 2006); *McLean v Ark Bd of Educ*, 529 F Supp 1255, 1258-64 (ED Ark 1982) (holding that teaching creation science in public schools unconstitutionally advances religion).

15 *Kitzmiller*, 400 F Supp 2d at 765.

16 *Lee v Weisman*, 505 US 577, 589 (1992).

17 *Santa Fe Indep Sch Dist v Doe*, 530 US 290, 309-310 (2000) (quoting *Lynch v Donnelly*, 465 US 668, 688 (O'Connor, J concurring)).

18 *Science and Creationism*, <http://books.nap.edu/html/creationism/conclusion.html>

19 *Id.*

20 Am Assoc for Advancement of Sci, *Statement on the Teaching of Evolution* (Feb 16, 2006),<http://archives.aaas.org/docs/resolutions.php?doc_id=443>.

[See <http://www.au.org/site/DocServer/2007-10-17_Letter_re_Vitter _ Earmark_-_Final.pdf?docID=2041> for the original.]

Arlen Specter (R–Pennsylvania), the floor managers of the appropriations bill, accepted Vitter's proposal and agreed to move the funds to a different project in Louisiana when the bill is in its conference committee.

Barry Lynn of Americans United for Separation of Church and State, applauding the removal of the earmark in a press release dated October 18, 2007, commented, "If [Senator] Vitter's aim was to improve science education in Louisiana, I have to wonder why he did not direct these funds to a scientific group or a museum." He added, "Boosting science education is an odd task for a religious group."

"Senator Vitter's defense of the earmark is obviously disingenuous, given the Louisiana Family Forum's record of fighting tooth and nail against evolution education," commented NCSE's executive director Eugenie C Scott. "But I'm glad to see that, with the removal of his earmark, public funds are not going to be misused to miseducate the children of Louisiana about the science of evolution."

Not all fears were allayed, however. The Baton Rouge *Advocate* reported (2007 Oct 20) that Vitter wanted to redirect the funds of the earmark to science and computer labs in Ouachita Parish schools, which prompted Barbara Forrest — a native of Louisiana and a member of NCSE's Board of Directors — to worry, "The money is just being moved around ... All the signs indicate that it could be used for its initial purpose." Representatives of People for the American Way and the ACLU echoed her concern.

In a subsequent letter to the *Advocate* (2007 Oct 25), Forrest contended that the redirection of the funds to Ouachita Parish was suspicious, given the LFF's support of the stealth creationist policy there. Quoting LFF Director Gene Mills's statement that the LFF "wasn't disappointed with the funding change and encouraged Vitter to redirect it," she remarked, "Given LFF's alliance with the Ouachita Parish School Board, we should take him at his word," and warned, "The LFF will make sure this battle doesn't go away."

But Forrest's concerns were overtaken by events. Shorn of the Vitter earmark, the appropriations bill passed the Senate, proceeded through a conference committee, and was ultimately vetoed, on November 13, 2007, by President Bush.

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The History of Life as a Walk in the Park

Andrew J Petto

A recurring theme for science educators is how to make the vastness of the history and diversity of life "real" for students. In their classrooms, they devise clock models, modified calendars, and even use 1000-sheet rolls of toilet tissue to emphasize the deep history of life on earth and the variety (and success) of the many forms of life that have appeared during that time.

In the fall of 2007, artist J Nicholas Schweitzer set up an installation in a public park in Madison, Wisconsin. The installation consisted of fifteen signposts depicting significant events in the history of life with illustrations of life forms that emerged and flourished in association with certain "milestones" — for example, the emergence of the first plants and animals onto land or the first appearance of primates. In addition, the stations are spaced in such a way so that the distance between them is in proportion to the amount of time that passed between the milestones. So, for example, the distance representing the one billion years from the formation of the earth to the first record of unicellular life is about half as long as the distance between the first unicellular life and the diversification of multicellular organisms almost two billion years later in the late Precambrian.

A park visitor stops to consider Station 6: Reptiles Become Dominant, 270 mya, as viewed from Station 5: Plants and Amphibians Come onto Land, 400 mya

For those familiar with the exhibit "A Walk Through Time" created in the 1990s at Hewlett Packard by Sidney Liebes and his colleagues (Liebes and others 1998), Schweitzer's installation recalls the value in adding the "kinesthetic" dimension to the learning experience. It is almost as though having to travel in space and take time to reach the next milestone in the history of life imparts a deeper appreciation for the length of time between events.

Although the "Walk Through Time" exhibit was about twice as long — extending for about a mile — it consisted largely of displays to view and read. Schweitzer's exhibit added two significant dimensions to the approach that Liebes and colleagues pioneered. First, each station contains both a cover page created by the artist *and* several illustrations composed

Rendition of Station 5: Plants and Amphibians Come onto Land, 400 mya, by a student at Van Hise Elementary School, Madison WI.

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View of the last 400 million years of the installation showing containers for sidewalk chalk for inspired viewers to use

by students at Van Hise Elementary and Velma Hamilton Middle Schools in Madison. The children's renditions show their engagement in the materials and their creative responses to the idea of the evolution of life. Perhaps the most interesting are the drawings at the last station of the installation where children speculate artistically to create their answers to the question: "What's next?"

A second added dimension is an invitation for those experiencing the exhibit to stop and draw their own impressions on the sidewalk next to the exhibit. Schweitzer provided a container with several large sticks of sidewalk chalk for this purpose. During the several visits that I made to the exhibit, there were always fresh drawings — and it may be serendipity that the chalk used to make the drawings was itself made from the preserved remains of organisms featured in some of the installations' stations. One of these visitors' drawings can be seen on the cover of this issue.

Exhibits of this type are temporary, so there will soon be no trace of the installation. But the work of the children who were a part of the exhibit and the drawings on the sidewalk alongside the installation both clearly show how successfully this artist connected the idea of evolution and the deep history of life on earth with several audiences. This exhibit certainly makes it clear that innovative, creative ways of helping children (and the general public) engage and understand evolution are valuable — even without a giant carnivorous dinosaur or a fossil hominin to excite and amaze. Schweitzer's exhibit, by contrast, was almost contemplative in tone, inviting the viewer to stop and commune for a while with ancient life forms that lived in a world we can only imagine.

[*For readers not able to view Schweitzer's exhibit in person, there are photos of the exhibit available on-line at <http://www.uwm.edu/~ajpetto/Rennebohm/Rennebohm.htm>. There are two virtual tours of the original "Walk Through Time", which lack the kinesthetic dimension of walking the history of life, but show the main graphics and text and give some of the history of the Walk. Visit <http://conexions.org/wtt/walk_menu/3700.html> or <http://www.globalcommunity.org/wtt/walk_online.shtml> to take the virtual Walk>.*]

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Creationism in the Russian Educational Landscape

Inga Levit, Uwe Hoßfeld, Lennart Olsson

Two symbolically connected events took place in different parts of the world in 2007. In the United States, Petersburg, Kentucky, was the site of the newly created "Creation Museum", while at approximately the same time a federal court in St Petersburg, Russia, tried a case in which a school girl, Maria Schreiber, demanded that the ministry of education must allow an "alternative" to evolution to be taught in high school biology classes. The St Petersburg case would not deserve much attention, if it did not reflect the tensions which have accumulated in Russian society after the breakdown of the USSR in 1991.

Even though most *RNCSE* readers think of creationism as a North American phenomenon, advocates of so-called "scientific creationism" are currently very active worldwide. This movement was imported to Russia after perestroika. Important books in the American and Western European "scientific creationism" tradition have been translated into Russian. In Russia, representatives of both the Russian Orthodox Church (ROC) and of some Protestant churches advocate creationism, even though both confessions arrive at this position independently and remain faithful to their theological doctrines. The ROC (to which 58% of the Russian population belongs) has no officially declared position towards "scientific creationism". The latter plays no significant role in official theological discourse, but unofficially remains a significant part of the Orthodox theological landscape. The ROC, of course, has a strong centralized organization, but Protestant denominations have also founded creationist centers throughout the former Soviet Union.

The story of the St Petersburg case began as Maria Schreiber went to court to force the Ministry of Education to allow an "alternative" to evolution to be taught in high school biology classes (Levit and others 2006). The journal *Gazeta.ru* (2006 Oct 27) reported from the court that one issue was the textbook used for senior high school biology, *General Biology* by Sergei Mamontov, in which the biblical creation story was called a "myth". Schreiber (through her lawyer Konstantin Romanov, a remote descendant of the last Russian Tsar, Nikolai II) demanded an apology from the author and from the

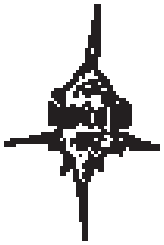
Inga Levit holds a PhD in religion studies and is the Chair of Science of Religion at the Herzen Russian State Pedagogical University in St Petersburg. Her scientific interests include religious anthropology, religious fundamentalism and bioethics.

Uwe Hoßfeld is a historian of science and head of the biology teacher training centre (AG Biodidaktik) at the Friedrich-Schiller-Universität in Jena, Germany. His research interests include the history of evolutionary biology and physical anthropology, and biology and religion.

Lennart Olsson is a zoology professor at the Friedrich-Schiller-Universität in Jena, Germany. His research is focused on developmental and evolutionary biology, and he also writes on the history of biology.

Ministry of Education. In a comment, Andrei Fursenko, the Russian Minister of Education and Science, expressed his support for the creationists in that he welcomed the teaching of "alternative ideas" in school (*Rosbalt*, 2007 Jan 3).

The defense pointed out that Mamontov's textbook does in fact mention creationist concepts, such as the ideas developed by the French comparative anatomist Georges Cuvier (1769–1832) in the early nineteenth century. It was also pointed out that the textbook corresponds to the secular nature of the Russian educational system in that it does not contain religious teachings and that a scientific theory by its very nature cannot hurt religious sensibilities. Even though the court turned down Maria Schreiber's complaint on February 21, 2007, it is clear that the St Petersburg case shows many similarities to the recent lawsuits in the US. In both countries, creationists have attacked a secular school system because they wanted "alternatives" to evolution to be taught. In both cases the courts have prevented the integration of biblical stories into the teaching of science in school, and thereby defended the secular nature of the state school systems.



However, unlike in the US, where criticism of evolution and demands for "equal time" for the biblical creation story in schools are articulated mostly by evangelical groups, in Russia the traditional Orthodox Church also supported this attack on the secular education system. During the legal proceedings, the plaintiff suggested a replacement for Mamontov's textbook, written from an "Orthodox" creationist position by Sergej Vertjanov (2005), in which the biblical story is presented as an alternative to evolution. And this is just one of a number of "Orthodox" and non-Orthodox creationist textbooks currently on the market in Russia. His Holiness Alexij II, Patriarch of Moscow and All Russia, recently stated in a lecture in the Kremlin: "Those who want to believe that they are descended from apes, should do so, but they should not force their opinion upon others" (*Die Presse.com,* 2007 Feb 6).

"Alternative" textbooks

The publication of creationist literature in Russia was pioneered by Protestant churches, which serve only about 2% of the Russian population. In the 1990s translations of several creationist biology textbooks appeared. The publishing house The Protestant alone has translated books by European and American creationists (for example, Gish, Ham, Snelling, Wieland, Morris, Clark, Junker, and Scherer). Most of the books achieve copy runs of about 10 000, which is a lot by Russian standards.

One of the non-Orthodox creationist textbooks published was a translation of a "critical textbook of evolution" originally written in German by Reinhard Junker and Siegfried Scherer (1997; see Kutschera's "The basic types of life", *RNCSE* 2006 Jul/Aug; 26 [4]: 31–6). This book repeats some statements from "ordinary" textbooks of evolution, but at the same time calls into question the major claims of modern evolutionary theory. For example, it repeats the creationist conception that microevolution and macroevolution are separate, unrelated processes and that even the most primitive living organisms are so complex that they cannot have evolved by random mutations and natural selection. At the same time, this book, as is characteristic of the works by the "intelligent design" movement targeted at the general public, contains no direct appeals to confessionally determined statements: although the reader is given the impression that science is impotent and incomplete without religious beliefs, specific appeals to particular religious doctrines are difficult to pinpoint.

By contrast, the Orthodox creationist writers, who became active in the second half of the 1990s, have chosen another tactic. They very clearly articulate positions in keeping with Orthodox theology. One of the early attempts to present an Orthodox view on school biology was articulated, for example, by Father Timofej Alferov, whose book bylines simply read "Father Timofej" (Alferov 1996, 1998a, 1998b).

The books were strongly criticized by scientists (for example, Eskov 2000; Borisov 2001; Surdin 2001). In addition to pointing out that the books spread religious ideology in the guise of a science text, the critics also identified many factual errors in the textbooks. This is not surprising, since Alferov, who holds a diploma in thermal physics (in addition to his theological credentials), clearly writes about biological issues from outside his field of competence.

Vertjanov's textbook (2005), presented during the Schreiber proceedings, illustrates the newest generation of creationist textbooks in Russia. The book concentrates exclusively on biology, is well illustrated, and combines "Orthodox" interpretations with quite traditional biological passages. The structure of the textbook copies the structure of secular textbooks and corresponds to Russian educational standards. The difference between "Orthodox" and secular views becomes evident only in the final sentences of each chapter, where one can read, for example, "[the] wonderful properties of the DNA should induce us to think about the Creator" or "biocoenoses [ecosystems] present harmonic systems of organisms, where certain species and communities cooperate wonderfully with the others demonstrating the wholeness and interconnectedness of the blessed world" (Vertjanov 2005: 301). The textbook also includes a supplement with quotations from the Holy Fathers, which can be related to biological problems.

The most outright creationist part of the book is found in chapter 4, which is devoted to the origin of life and includes a section entitled "The Hypothesis of Evolution and the Creation of the World". As in other creationist books, the author argues that there are no "transitional forms" in the fossil record and that there is a "plan of creation" that determines the real course of "evolution". The intention of the chapter is evidently to discredit the theory of evolution and the "materialistic worldview" using both theological and "scientific" arguments. "There are a few qualified biologists who are still convinced of the evolutionary-materialist version of the origin of life" (Vertjanov 2005: 198). Just like his American and European colleagues,

Vertjanov argues that the earth was created in six days. Summarizing the ages of all 23 generations from Adam to Joseph, he concludes that the earth is about 7500 years old. The author also claims, without showing any evidence, that "contemporary science slowly comes to the acceptation of every word of the Holy Bible" (2005: 224).

Like his colleagues from the American Creation Museum, Vertjanov also claims that dinosaurs co-existed with ancient humans. Vertjanov also contributes to the "scientific" description of the world before the Fall when he reconstructs the food chains in Paradise. One of his ideas is that mosquitoes before the Fall obtained necessary hemoglobin from plants (instead of animals), which "should have been very rich in it". Although Vertjanov's textbook was not recommended by the Ministry of Education, it is used both in private schools and in some state schools. For example, it is used in Moscow in the private grammar schools Jasenevo and Saburovo and, as an experiment, in State School Nr 262 (Zheleznjak 2005).

It is notable that Vertjanov's textbook was subject to criticism not only by scientists (Mamontov 2005) but also by some Orthodox theologians. At present, conflicting positions regarding evolution seem to exist within the ROC. So-called "Orthodox creationists" reject the theory of evolution completely based on theological and pseudoscientific arguments. The "Orthodox evolutionists" interpret evolution as the continuation of divine creation. The transition from the lifeless to the living world and from animal to human are interpreted as acts of direct divine creation (Levit 2003, 2006). Even though neither of these schools of thought actually welcomes Darwinism and the theory of natural selection, the difference is that "evolutionists" do not reject evolution, but give it another (partly theological) explanation that would be comparable to the position of many "theistic evolutionists" in the US. The radicals, like Vertjanov, deny the very fact of evolution.

The ROC weighs in

The first author interviewed the archpriest AV Skripkin, who represented the Orthodox Church during the Maria Schreiber proceedings in St Petersburg, to learn more about the position of the Church towards creationism in schools. The archpriest is generally very positive towards the initiative of the schoolgirl and her lawyers. In his view Darwinism is a kind of pseudoscientific mythology. It is responsible for the positivism and progressivism in the modern worldview and therefore also for the anti-human catastrophes of the twentieth century. The problem of Darwinism is not a scientific issue, Skripkin continued, it is a worldview. The choice between creationism and Darwinism is the choice between "divine humanity" and "human animality".

At the same time, Skripkin emphasizes that the Bible never has been, and never will be, a chemistry textbook. There must be a borderline between science and religion and each should do its job. Skripkin, however, welcomes Vertjanov's textbook and maintains that this textbook can be used not only in Orthodox but also in state grammar schools. It is his personal view, Skripkin stressed, because the Church has no ultimate doctrine about this issue.

Skripkin, along with many other Orthodox leaders, wants a high profile of Orthodox religiosity in all schools. In addition to trying to squeeze religious beliefs into the biology classes, the Orthodox Church also tries to make religious teaching compulsory in state schools. The most debated issue in this respect is whether to introduce a new course, "The Basics of the Orthodox Culture", in Russian schools. In 2002 the federal Ministry of Education published a letter to the education departments of the local governments with recommendations on how to establish the new optional course "The Basics of the Orthodox Culture" (Ministry of Education 2002). The course should be taught at all stages of the school system (from elementary to high school) and include issues such as "The Orthodox worldview", "The Orthodox way of life", "God and Creation", "The Natural and Supernatural Worlds", and so on. Proposed test questions include, for example, "What did God create first?" Although this course caused sharp debates in Russian society, it was established in many schools. For example, in 2003, 70% of the schools in the Belgorod region already had the new course in their curricula.

As a reaction to the growing clerical influence on education, ten Full Members of the Russian Academy of Science — including two Nobel Prize winners (Vitaly Ginzburg and Zhores Alferov) — published a letter to President Vladimir Putin that warned against making "The Basics of the Orthodox Culture" a compulsory element of federal education programs (BBC Russian Service 2007). The academicians not only argued that theology is mixed with science, but also pointed out that making such a course compulsory in a multi-confessional country would lead to ethnic tensions.

Indeed, Orthodox creationism in all its forms is confronted not only by atheist movements and scientists, but also by the Muslim communities. Thus Nafigullah Ashirov, chairman of the Moslem Board for the Asian part of Russia, criticized the plans of the Orthodox Church sharply, arguing that it could lead to ethnic conflicts as well.

Conclusions

Our overview of the modern Russian educational landscape reveals several trends relevant to the understanding of creationist movements in modern societies based on science and technology. We distinguish two major types of creationism, which we conditionally label "scientific creationism" and "clerical creationism". The ordinary "clerical" creationism assumes that the entire world and its biological diversity is a result of supernatural activity and thus makes any discussion of natural causes meaningless. "Scientific creationism", in contrast, tries to incorporate religious elements into scientific theories as an auxiliary but unavoidable element of explanation. It is characteristic of this kind of proposals that they include elements immune to any kind of scrutiny or criticism. "Scientific creationism" in

Russia attempts to act in a "confession-neutral" manner as, for example, the adherents of the ID movement do. It is, however, common for authors to propagate a particular religious view in educational texts. The purpose of "scientific creationists" is to "infect" the reader implicitly with the idea that science is helpless when faced with the "ultimate questions" related to the meaning and purpose of life and our existence. Biology, they want to prove, is even incapable of explaining biological evolution, that is, of fulfilling its most fundamental purpose.

"Scientific creationism" initially came to Russia in the form of translated texts by Western Protestant creationists and members of the ID movement. Because the most important creationist arguments are of a universal anti-scientific nature, they are easily converted into any cultural context and were able therefore to influence the Orthodox creationists, who saw them as useful in their doctrinal attack on secular education. They can nevertheless be seen as a part of the international creationist movement and their arguments are directed towards the broadest possible audience.

Encouraged by the successes of the "scientific creationists" and by the growing influence of the Orthodox Church in Russia, the ordinary "clerical creationists" also strengthened their efforts to give Russian education clear confessional colors, thereby changing the educational landscape. The "clerical creationists" apply a different strategy than the "scientific creationists" consisting of two parallel tactics. The first tactic is trying to make religious education with an Orthodox bias part of the *compulsory* curriculum. The course "The Basics of the Orthodox Culture" for ordinary schools is an example of this tactic. The second tactic is intervention into areas of science important for shaping the worldview of modern man. The production of new "Orthodox" science textbooks and participation in the Maria Schreiber trial are examples of this second tactic.

Thus to a certain extent the strategies of the "scientific creationists" and the "clerical creationists" do not contradict each other and can co-exist peacefully in the same educational context as long as they face a common enemy: evolution. Both in Europe and in North America, it is biology — and particularly evolution — that is the primary target of creationism. Since the creation story takes up only a few pages of the Bible, and the rest is the history of the "holy people", one might therefore expect that the main attack would be against secular *historical* education, not against one of the natural sciences. But the crucial role biology, and especially evolutionary theory, plays as part of the modern scientific worldview has made it into an arena for major educational battles.

D James Kennedy dies

D James Kennedy, the megachurch pastor and religious broadcaster, died on September 5, 2007, at the age of 76 in Fort Lauderdale, Florida, according to the *Washington Post*'s obituary (2007 Sep 5). Born in 1930 in Augusta, Georgia, and reared mainly in Chicago, he was managing a dancing school in Tampa when he experienced a religious conversion, leading him to earn a divinity degree from Columbia Theological Seminary in Decatur, Georgia. (He later also earned a master's degree in theology from the Chicago Graduate School of Theology and a PhD from New York University, with a 1979 dissertation on the history of Evangelism Explosion, a program which he himself developed for training laypeople to spread the gospel.) In 1959, Kennedy returned to Florida, where he founded Coral Ridge Presbyterian Church, now housed in a 2500-seat edifice in Fort Lauderdale. He expanded his efforts to the airwaves with the founding of Coral Ridge Ministries in 1974; it is currently claimed to reach three million people across the United States. He also was responsible for Knox Theological Seminary (founded in 1989), the Center for Reclaiming America for Christ (founded in 1996 and disbanded in 2007), which aimed to recruit conservative Christians for grassroots activism, and the D James Kennedy Center for Christian Statesmanship (founded in 1995), which engages in outreach to public servants in Washington DC.

A dedicated young-earth creationist, Kennedy often preached against evolution. In his *Anti-Evolution: A Reader's Guide to Writings Before and After Darwin* (Baltimore [MD]: Johns Hopkins University Press, 1992), Tom McIver describes a 1986 pamphlet based on one of his sermons as "delivered with great confidence and authority, yet ... filled with highly misleading distortions and outright falsehoods." Between 2004 and 2007, the Creation Studies Institute (founded in 1988 by Tom DeRosa) was part of Coral Ridge Ministries. Kennedy also supported the young-earth creationist movement at large, delivering the keynote address at the 1986 International Creationist Conference and serving as the honorary chairman of Answers in Genesis's Creation Museum. Yet he was open to promoting "intelligent design" creationism as well, featuring Phillip Johnson, Michael Behe, and William Dembski on his radio broadcasts, and selling a variety of "intelligent design" material though Coral Ridge Ministries. Kennedy's diatribes commonly emphasized the evil supposedly due to the evolutionary sciences, culminating in the 2006 polemic *Darwin's Deadly Legacy*, a broadcast featuring "14 scholars, scientists, and authors who outline the grim consequences of Darwin's theory of evolution and show how his theory fueled Hitler's ovens." The show was denounced as "outrageous and shoddy" by the Anti-Defamation League, and Francis Collins, who was unwittingly interviewed for it, described it as "utterly misguided and inflammatory".

This is the case in Russia much as it is in the rest of the world. As long as schools teach evolution as a fundamental theme in biology, religious anti-evolutionists will join together as allies in the battle to remove or neutralize it — even when these allies are themselves deeply divided over religious doctrine and theology. Even though the short-term goal of removing evolution causes the coalition to de-emphasize the longer-term sectarian objectives, they are simmering just below the surface and present a clear and present danger to the nature of public education in Russia just as they do in other parts of the world.

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Political Science: Presidential Candidates' Views

Andrew J Petto

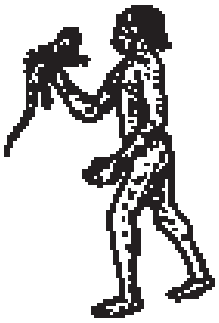
On January 4, 2008, the journal *Science* published a ten-page special report on the views of nine US presidential candidates on a variety of issues that require an understanding and/or application of contemporary scientific research. These nine were considered serious contenders for their parties' nominations in late December — although early results from Iowa and New Hampshire seem to have narrowed the fields even more.

The summary began with a report from Jeffery Mervis describing the way in which the information was collected. In most cases, the summaries were prepared based on the comments made by candidates on the campaign trail and by their political advisors. Mervis also wrote that some of the information came from "colleagues, friends and foes alike, who are familiar with their careers (Mervis 2008: 22). The description of the candidates' positions were listed in alphabetical order by the last name of the candidate.

Two of the more intriguing entries were entitled "Other Republicans" and "Other Democrats", but these contained only the names of seven candidates, three Republicans and four Democrats, without any information on their positions on science policy. By the time of publication, three of the Democratic candidates — Senators Joe Biden and Christopher Dodd, and former Senator Mike Gravel — had withdrawn from the race. Only Dennis Kucinich remained from this group. For the Republicans, there were no positions given for US Representatives Duncan Hunter and Ron Paul, nor for political commentator Alan Keyes.

Most of the candidates tended to be vague on the specifics of their approaches, but there were a few telling indicators. The leading Democratic contenders — Hillary Clinton, John Edwards, and Barack Obama — were positively inclined to increasing funding and placing responsibility for management of scientific research programs with members of the scientific community. Obama, in particular, was described as having an "evidence-based" approach to science-related issues (Bhattacharjee 2008: 28).

Elliott Marshall reported that the Guiliani campaign "successfully discouraged key advisors from speaking to *Science* about specific issues" (2008: 26). Jennifer Couzin reported that Mike Huckabee, despite his stated opposition to



Andrew Petto is editor of Reports of the National Center for Science Education *and member of NCSE's board of directors. He is co-editor with NCSE Supporter Laurie R Godfrey of* Scientists Confront Creationism: Intelligent Design and Beyond*, published in paperback by WW Norton in January 2008.*

evolution, was generally positively inclined toward medical and health sciences, as his actions as governor of Arkansas demonstrated.

In general, the articles avoided simply applying a one-dimensional analysis and describing candidates as either pro-science or anti-science. The individual pieces do a nice job of presenting the candidates' current statements on science issues and policies in the context of their previous statements and actions — in some cases giving a rationale for specific actions on legislation or policy.

The news item by Mervis is available on the journal's website for all readers, but access to the details of the candidates' positions requires a subscription. In many cases, local, regional, or state public libraries offer access for those with a local library card to publications like *Science* through their reference databases.

Candidates' positions

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The Answers in Genesis Schism: No Resolution in Sight

Andrew J Petto

Jim Lippard reported in *RNCSE* at the end of 2006 on a split within the Answers in Genesis ministry that pitted the officials running the affiliate in the US against their counterparts in Australia, where the ministry began (Lippard 2006). Although Lippard reported several efforts between the two factions to negotiate a solution to various issues that divided them, it appears that those efforts have fallen apart yet again.

Creation Ministries International (CMI) — the name of the breakaway group in Australia — published an update on its website in early January 2008 (<http://www.creationontheweb.com/content/view/5563/>). The page — entitled "CMI–AIG: What's the dispute all about?" — details the history of the schism and CMI's complaints against AIG.

However, the most remarkable feature of this update is an index with links to documents on the web that lay out various details of the conflict, outcomes of various investigations and legal actions, and CMI's version of the current state of the dispute.

In contrast to the prominence that CMI has given to the dispute, it is difficult to find any mention of the disagreement on the Answers in Genesis web page. Searching for "CMI" and "Creation Ministries International" at <http://www.answersingenesis.org> returned no results. However, it is possible to get an overview of AiG's position on the conflict by reading through its History page (<http://www.answersingenesis.org/about/history>). This page lacks most of the details about the schism, saying only that there were no differences in doctrinal or scientific positions and that most of the disagreement was over management and operations. It is interesting that the AiG website lists the acronym "CMI" in its history page, but nowhere gives the full name of the Australian organization.

It is clear that this conflict will not be resolved soon, but it seems from the content of the web pages that CMI may be more affected by the split than is AiG. Except for the new details, the current state of the relationship between these two creationist organizations does not seem to have changed significantly over the past year.

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[*Thanks to Jim Lippard for alerting us to the latest events in the ongoing dispute between AiG and CMI.*]

The Great Tennessee Monkey Podcast

A performance of the LA Theatre Works production *The Great Tennessee Monkey Trial* is now available on-line as a podcast. The play, written by Peter Goodchild and based on the transcripts of the Scopes trial in 1925, was originally broadcast by LATW in 1992; it was revived in 2005 to commemorate the eightieth anniversary of the trial. The podcast performance was recorded by WGBH at Harvard University's School of Government on April 9, 2007, and features Ed Asner as William Jennings Bryan and John de Lancie as Clarence Darrow. The complete performance time is about two hours. Reviewing the play in the *Wall Street Journal* (2005 Oct 1), the critic Terry Teachout commented, "the trial itself is heard as it happened, and is all the more dramatic for being true. ... while I doubt it'll change many minds in Harrisburg [where the trial in *Kitzmiller v Dover* was conducted], or anywhere else, it still makes for a thought-provoking show." For the podcast, visit <http://www.wgbh.org/program-info?&episode_id=3374968>.

2008 Release of Science, Evolution, and Creationism

The National Academies Press has announced the release of *Science, Evolution, and Creationism*. The new publication extends the analysis and confirms the findings of the 1999 publication, *Science and Creationism: A View from The National Academy of Science*.

The NAP website describes the new book this way:

> In the book *Science, Evolution, and Creationism*, a group of experts assembled by the National Academy of Sciences and the Institute of Medicine explain the fundamental methods of science, document the overwhelming evidence in support of biological evolution, and evaluate the alternative perspectives offered by advocates of various kinds of creationism, including "intelligent design." The book explores the many fascinating inquiries being pursued that put the science of evolution to work in preventing and treating human disease, developing new agricultural products, and fostering industrial innovations. The book also presents the scientific and legal reasons for not teaching creationist ideas in public school science classes.
>
> Mindful of school board battles and recent court decisions, *Science, Evolution, and Creationism* shows that science and religion should be viewed as different ways of understanding the world rather than as frameworks that are in conflict with each other and that the evidence for evolution can be fully compatible with religious faith. For educators, students, teachers, community leaders, legislators, policy makers, and parents who seek to understand the basis of evolutionary science, this publication will be an essential resource.

Visit <http://www.nap.edu/catalog.php?record_id=11876> for further details on contents, authors, and ordering options.

CALL FOR PAPERS

Special Journal Issue of *Science & Education* **Darwinian Anniversary Year, 2009**

The year 2009 is a double anniversary: 200 years since Darwin was born (February 12, 1809) and 150 years since the publication of *On the Origin of Species* (November 24, 1859). To celebrate this anniversary, a special issue of *Science & Education* will be published.

Researchers working on areas related to Darwinism and evolution education are invited to contribute to this special issue. Conceptual, theoretical, empirical, and position-based manuscripts are welcome. Examples of topics may include (but are not limited to) the following:

- Darwinism in the history and philosophy of science
- Darwin's methodology and theorizing
- Historical treatments of the *Origin*
- Darwinism and politics
- Darwinism and religion
- Current status of evolutionary theory
- Public understanding and acceptance or rejection of evolution, especially in non-Western cultures
- Evolutionary explanations
- Evolution and teleology
- Empirical research in evolution education
- Evolution and the nature of science
- Creationism and "intelligent design"
- Cognitive barriers in understanding evolution
- Rationales and strategies for teaching evolution when it is controversial
- The teaching of evolution in cultures where Darwinism is rejected
- Other appropriate topics

Submission Date: December 31, 2008
Anticipated Publication Date: November 2009

Manuscripts, with abstract, should be submitted for review directly via <http://www.editorialmanager.com/sced/>.

Notification of intention to submit and subject matter is appreciated as it assists coordination and planning of the issue. Questions and inquires should be directed to either of the guest editors:

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UPDATES

California, Roseville: The defendants in *Caldwell v Roseville Joint Union High School District et alia* won a victory in court on September 7, 2007, when Judge Frank C Damrell Jr granted their motion for a summary judgment against the plaintiff, Larry Caldwell. In 2003 and 2004, Caldwell, a lawyer and parent in the Sacramento suburb of Roseville, California, sought to persuade the RJUHSD Board of Trustees to adopt his "Quality Science Education" Policy, which would have called for teaching "the scientific strengths and weaknesses" of evolution (see *RNCSE* 2004 Mar/Apr; 24 [2]: 14–7). In 2005, after his proposals were rejected, he filed a lengthy complaint in federal court against the district, a number of its employees, and two members of the board of education, alleging that his civil rights were violated during the controversy. Caldwell told the *Sacramento Bee* (2005 Jan 16), "You ought to be able to bring a proposal without being treated differently because they don't like what you're saying, or they don't like your religious beliefs." But school board president Jim Joiner, a named defendant in the case, told the *Bee* that Caldwell received plenty of attention from the board and the district, noting that his proposal was discussed at eight separate meetings. Caldwell's suit was publicized by the Discovery Institute, which issued a press release on his behalf and subsequently added him as a guest blogger to its blog, and also by a number of media sources on the religious right (see *RNCSE* 2004 Nov/Dec; 24 [6]: 15–20).

In his decision, Judge Damrell emphasized, "this case is *not* about how biology, including discussions of evolutionary theory, can or should be taught in public schools. … Rather, this case is about whether Larry Caldwell was denied access to speak in various fora or participate in certain processes because of his actual or perceived religious beliefs." Although Caldwell alleged that he was denied such access, in violation of his rights to free speech, due process, and equal production and of the Establishment Clause of the First Amendment, the court found otherwise. Typical of the judge's remarks was: "the court has found that plaintiff has failed to proffer evidence sufficient to demonstrate a triable issue of fact as to any of his constitutional claims based upon this alleged discrimination." The legal defeat in *Caldwell v Roseville Joint Union High School District* is not Caldwell's first; in 2006, he represented his wife Jeanne Caldwell in *Caldwell v Caldwell et alia*, in which she alleged that the Understanding Evolution website endorsed a number of religious doctrines, thereby violating the Establishment Clause of the First Amendment by favoring certain religious groups over others. In that case, the presiding judge ruled that the plaintiff failed to allege that she had federal taxpayer standing, failed to sufficiently allege state taxpayer standing, and failed to establish that she suffered a concrete "injury in fact," which sufficed to justify the defendants' motion for dismissal (see *RNCSE* 2006 Jan–Apr; 26 [1–2]: 4–11).

The *Sacramento Bee* (2007 Sep 13) reported that Caldwell had no comment on his latest legal defeat, referring the *Bee*'s reporter to Kevin Snider of the Pacific Justice Institute (which describes itself as "a non-profit 501(c)(3) legal defense organization specializing in the defense of religious freedom, parental rights, and other civil liberties"), who worked with Caldwell on the case. Snider was quoted as saying, "We're still studying the opinion and haven't made a decision about what we're going to do." He would not comment on whether or not they planned to appeal. For his part, James Ward, who represented the defendants, was pleased by the decision, commenting, "The facts clearly show that the school district bent over backwards and tried very hard to provide Mr Caldwell with an opportunity to present his … proposals in the various ways that were structured for parents to present ideas to the district." Jim Joiner said, "The board and the district gave him special treatment beyond what we would typically give anyone," adding, "I always felt confident that a court would reach that conclusion"; Jan Pinney, a board member who, like Joiner, was also a named defendant in the case, agreed, observing, "He had more time before the board than anybody has ever had in my 12 years on the board." Pinney also described the lawsuit as "sour grapes" on Caldwell's part and as a waste of time, remarking, "For two years all our energy was spent fighting this issue."

Florida: Although she was one of the three finalists for the job of Education Commissioner of Florida, Cheri Pierson Yecke was passed over for the job in favor of Eric Smith, senior vice president of the College Board. Yecke is currently K–12 Chancellor at the Florida Department of Education, a job for which she was recruited in 2005 by then-governor Jeb Bush. Before that, she was Commissioner of Education in Minnesota, where she was widely criticized for comments supporting creationism (see *RNCSE* 2003 May–Aug; 23 [3–4]: 5–10); in 2004, she was not confirmed, and thus immediately removed from office, by the state senate (see *RNCSE* 2004 Mar/Apr; 24 [2]: 14–7). Her history followed her to Florida, where, for example, the *Palm Beach Post* story (2005 Oct 9) about her beginning her job there emphasized her support for creationism.

Although Yecke was quoted in that story as wondering "why the Florida reporters are so obsessed with creationism," her own behavior fueled their interest. In June 2007, Wesley R Elsberry (then on leave from NCSE) received a communication from a company called ReputationDefender, requesting on Yecke's behalf that he remove from his personal blog a statement read-

ing, "Yecke had explained in her advance publicity for the hearings [in Minnesota in 2003] that schools could include the concept of 'intelligent design' in teaching how the world came to be." Elsberry's statement was based on a contemporary press report and was later confirmed by a contemporary broadcast (see <http://austringer.net/wp/?p=626> for details).

The *St Petersburg Times* (2007 Jun 27) then reported on Yecke's attempt to revise the record of her comments, writing, "Florida's No 2 education official is tangled in a cyber-tussle with a tiny Minnesota newspaper and a scientist who blogs about the politics of teaching evolution." Yecke told the newspaper that her decision to hire ReputationDefenders was unrelated to her bid to become Education Commissioner: "When you're a public figure, you have to try to manage fact from fiction," she said. According to the *Times*, two of her likely rivals for the post never considered undertaking a similar project.

As the process of selecting a new Education Commissioner continued, Yecke's support for creationism continued to arouse concern. After she became a finalist for the job, the *Palm Beach Post* (2007 Sep 18) editorially commented, "Cheri Pierson Yecke is the kind of candidate to avoid. ... [S]he lost her job as education commissioner in Minnesota, in part because of her willingness to let schools teach creationism as an alternative to evolution. That typifies the ideological bent of Gov Bush's education department, which warped intended reforms."

Illinois: A professor of biology at Olivet Nazarene University, Richard Colling, wanted to express his views about the compatibility of his religious faith with his scientific knowledge and accordingly wrote *Random Designer: Created from Chaos to Connect with the Creator* (Bourbonnais [IL]: Browning Press, 2004). But his views, especially about evolution, were not welcome, as *Newsweek*'s Sharon Begley (2007 Sep 17) reported:

> Anger over his work had been building for two years. When classes resumed in late August, things finally came to a head. Colling is prohibited from teaching the general biology class, a version of which he had taught since 1991, and college president John Bowling has banned professors from assigning his book [which was previously used in "at least one history class, an advanced biology course, and the general biology course"]. At least one local Nazarene church called for Colling to be fired and threatened to withhold financial support from the college. In a letter to Bowling, ministers in Caro [a town in Missouri] expressed "deep concern regarding the teaching of evolutionary theory as a scientifically proven fact," calling it "a philosophy that is godless, contrary to scripture and scientifically unverifiable." Irate parents, pastors and others complained to Bowling, while a meeting between church leaders and Colling "led to some tension and misunderstanding," Bowling said in a letter to trustees.

The local *Daily Journal* (2007 Sep 13) added that, although Colling and the university administration are trying to reconcile, Colling "is still stinging because, he says, the book was a true and honest expression of faith; and one he felt led by God to write. Moreover, he says there is room with the college's mission and policies for such an alternative view — and that no real case has been made to date that his views are inconsistent with those or the teachings of the Church of the Nazarene."

In a previous article about Colling for the *Wall Street Journal* (2004 Dec 3), Begley reported, "In his new book, *Random Designer*, he writes: 'It pains me to suggest that my religious brothers are telling falsehoods' when they say evolutionary theory is 'in crisis' and claim that there is widespread skepticism about it among scientists. 'Such statements are blatantly untrue,' he argues; 'evolution has stood the test of time and considerable scrutiny.'"

Iowa, Creston: A community college instructor at Southwestern Community College in Creston, Iowa, claimed that he was fired for telling his students that the biblical story of Adam and Eve ought not to be taken literally, according to the *Des Moines Register* (2007 Sep 21). Steve Bitterman was teaching a course on Western civilization to students in Osceola over the Iowa Communications Network in which, he said, "I told them it [Genesis] was an extremely meaningful story, but you had to see it in a poetic, metaphoric or symbolic sense, that if you took it literally, that you were going to miss a whole lot of meaning there." Some of the students took offense, and Bitterman was fired two days later. He commented, "I'm just a little bit shocked myself that a college in good standing would back up students who insist that people who have been through college and have a master's degree, a couple actually, have to teach that there were such things as talking snakes or lose their job." But college officials, though declining to comment on the specific reasons for his firing, asserted, "There was no action taken that violated the First Amendment." Bitterman told the *Register*, "As a taxpayer, I'd like to know if a tax-supported public institution of higher learning has given veto power over what can and cannot be said in its classrooms to a fundamentalist religious group ... If it has … then the taxpaying public of Iowa has a right to know. What's next? Whales talk French at the bottom of the sea?" A subsequent report in the *Register* (2007 Sep 25) quoted several students as complaining that Bitterman was crude and offensive; one said, "I think he was trying to start a debate, but it came across as insulting and offended everybody." Bitterman defended his teaching style, explaining, "I certainly take students' viewpoints seriously in the sense that I encourage them to express it, and then I will challenge that viewpoint, regardless of what it is, to see how well they can back it up with reason and critical thought."

National: One of the panelists on "The View" — a long-running daytime talk show on ABC —

bewildered both her audience and her colleagues on September 18, 2007, by declaring that she not only rejects evolution but also is uncertain whether the earth is flat or round. Sherri Shepherd, a comedian and actress who recently joined the show, responded to a line of questioning about her views on evolution by saying, "I'm going to disagree with you anyway because I don't believe in evolution, period. I just think for me — I'm not speaking for anybody else. I just have a faith that is in the Bible. It's in Hebrews 11:1. It says faith is the substance of things hoped for and the evidence of things not seen." Later, Whoopi Goldberg asked her, "Is the world flat?" She responded, "is the world flat? ... I don't know. ... I never thought about it, Whoopi. Is the world flat? I never thought about it." Her remarks prompted a flock of incredulous blog posts and comments in the entertainment news. Shepherd later told *The Tonight Show*'s Jay Leno (2007 Sep 21) that she was rattled by the technicality of the question: "All I heard was, 'how many triglycerides does it take to take Pluto down to the Robitussin when it meets Nyquil on the earth's horizon?' ... That's what I heard 'cause I was nervous." *All Movie Guide* describes Shepherd as "an outspoken and committed, born-again Christian."

National: A dispute over anti-creationist videos posted to YouTube, a popular on-line video site, is resolved now, according to Wired News (2007 Sep 25). The atheist group Rational Response Squad (<http://www.rationalresponders.com>) had posted several videos to YouTube criticizing the claims of the flamboyant young-earth creationist Kent Hovind and his Creation Science Evangelism (CSE) ministry; these videos included footage from CSE's own videos. CSE filed a complaint with YouTube under the Digital Millennium Copyright Act, and YouTube removed the Rational Response Squad's videos from its website and suspended its account. The Rational Response Squad then argued that its use of CSE's videos constituted fair use, and eventually YouTube restored the videos and reinstated its account. Filing a spurious complaint under the DMCA is illegal, and a spokesperson for the Rational Response Squad said that the group plans to take legal action against CSE, whose founder is currently serving a ten-year sentence in federal prison for tax offenses and obstruction of justice (see *RNCSE* 2006 Jul/Aug; 26 [4]: 12–3).

Europe: On October 4, 2007, the Council of Europe's Parliamentary Assembly approved a resolution urging its member governments to oppose the teaching of creationism as science. The resolution, entitled "The dangers of creationism in education," states, "Today creationist ideas are tending to find their way into Europe and their spread is affecting quite a few Council of Europe member states," observing, "The prime target of present-day creationists, most of whom are Christian or Muslim, is education. Creationists are bent on ensuring that their ideas are included in the school science syllabus. Creationism cannot, however, lay claim to being a scientific discipline." Included is "intelligent design," which is described as "the latest, more refined version of creationism" and "presented in a more subtle way."

It was the second time that such a resolution was introduced. A previous version of "The dangers of creationism in education" was produced in response to a proposal (dated October 4, 2006) that described creationism as having "no credibility among the scientific community" and expressed concern "at the possible negative consequences of the promotion of creationism through education". Although the Parliamentary Assembly was scheduled to vote on a corresponding draft resolution, the vote was cancelled on June 25, 2007, on the grounds that the report was "unbalanced" and that it was inappropriate for the Council to address the topic. The report was returned to the committee, which vowed to return the resolution to the Assembly's agenda (see *RNCSE* 2007 Jan–Apr; 27 [1–2]: 4–9).

The approved resolution recognizes the importance of evolutionary theory in the modern world — "Denying it could have serious consequences for the development of our societies. Advances in medical research with the aim of effectively combating infectious diseases such as AIDS are impossible if every principle of evolution is denied. One cannot be fully aware of the risks involved in the significant decline in biodiversity and climate change if the mechanisms of evolution are not understood" — and accordingly concludes, "The teaching of all phenomena concerning evolution as a fundamental scientific theory is therefore crucial to the future of our societies and our democracies. For that reason it must occupy a central position in the curriculum, and especially in the science syllabus, as long as, like any other theory, it is able to stand up to thorough scientific scrutiny."

Acknowledging the religious roots of creationism, the resolution begins by emphasizing, "The aim of this report is not to question or to fight a belief ... The aim is to warn against certain tendencies to pass off a belief as science," and notes that religious leaders (including Pope Benedict XVI and his predecessor Pope John Paul II) have not endorsed creationism. But, the resolution continues, "The war on the theory of evolution and on its proponents most often originates in forms of religious extremism which are closely allied to extreme right-wing political movements ... The fact of the matter, and this has been exposed on several occasions, is that some advocates of strict creationism are out to replace democracy by theocracy."

The resolution ends by calling on the member states of the Council of Europe "to defend and promote scientific knowledge; strengthen the teaching of the foundations of science, its history, its epistemology and its methods alongside the teaching of objective scientific knowledge; to make science more comprehensible, more attractive and closer to the realities of the contemporary world; to firmly oppose the teaching of creationism as a scientific discipline on an equal footing with the theory of evolution and in general resist presentation of creationist ideas in any discipline other than religion; to promote the teaching of evolution as a fundamental scientific theory

in the school curriculum" (internal numbering omitted).

The Council of Europe, as a Reuters story (2007 Oct 4) on the adoption of the resolution explains, "oversees human rights standards in member states and enforces decisions of the European Court of Human Rights." The story adds, "The resolution, which passed 48 votes to 25 with 3 abstentions, is not binding on the Council's 47 member states but reflects widespread opposition among politicians to teaching creationism in science class." A press release about the resolution, a report containing both the draft resolution (see sidebar, p 25) and a memorandum providing a lengthy background discussion and explanation of its provisions, a list of the votes on the resolution, and a video (in French) of a press conference about it, are available on the Council of Europe's website (<http://assembly.coe.int/>).

Sweden: The Associated Press reported (2007 Oct 15) that the Swedish government is drafting rules that "would ban religious elements in subjects other than religion, such as biology". According to Agence France Presse (2007 Oct 15), the rules would apply both to public schools and to independent schools, which also receive funding from the state, but not to private schools. Prompting the rules was a controversy over efforts of the Exclusive Brethren Christian Fellowship, which rejects evolution, to start its own independent religious school. According to the Associated Press, "There are 67 elementary schools and six high schools with a confessional orientation in Sweden, which is a highly secular country. Most of them are Christian. They are outside the public school system, but are governed by Sweden's law on education." But the law is not sufficiently clear about the influence of religious views on the curriculum. The education minister Jan Bjorklund was quoted by Reuters (2007 Oct 16) as saying, "This is naturally brought about by the fact that different viewpoints are being discussed, for instance about the creation of the world — one based on science and one on religious views." And a spokesperson for the education ministry told the Associated Press, "A student shouldn't be able to pass a natural science test by answering that God created the world. We don't think that's OK," Neuman said. The rules, which would require parliamentary approval, are expected to be introduced in 2009.

United Kingdom: The British government's promised guidance on creationism for teachers seems to have arrived. A press release at Teachernet, run by the Department for Children, Schools, and Families, states that "Creationism and intelligent design are not part of the National Curriculum for science" and describes "intelligent design" as "a creationist belief" that "is sometimes erroneously advanced as scientific theory but has no underpinning scientific principles or explanations supporting it and it is not accepted by the international scientific community." The press release adds that "there is scope for schools to discuss creationism as part of Religious Education — a component of the basic school curriculum — in developing pupils' knowledge and understanding of Christianity and other religions."

The press release and a corresponding document entitled "Guidance on the place of creationism and intelligent design in science lessons" (dated September 18, 2007; available on-line via <http://www.teachernet.gov.uk/docbank/index.cfm?id=11890>) were occasioned by a propaganda blitz in late 2006 on the part of a newly formed creationist organization calling itself "Truth in Science", which sent packets of creationist teaching materials to the science heads of every secondary school in the United Kingdom. Subsequently the government issued a series of statements and disclaimers, including a June 21, 2007, statement from the Prime Minister's Office affirming that creationism (including "intelligent design") "should not be taught as science" and promising guidance for schools "in due course." (For background, see *RNCSE* 2007 Jan–Apr; 27 [1–2]: 4–9.)

After explaining the place of science and religious education in the British national curriculum, "Guidance on the place of creationism and intelligent design in science lessons" unequivocally states: "Creationism and intelligent design are sometimes claimed to be scientific theories. This is not the case as they have no underpinning scientific principles, or explanations, and are not accepted by the science community as a whole. Creationism and intelligent design therefore do not form part of the science National Curriculum programmes of study." Presumably with Truth in Science's materials in mind, it recommends, "Any resource should be checked carefully before it is used in the classroom. If resources which mention creationism or intelligent design are used, it must be made clear that neither constitutes a scientific theory."

The guidance document explains that although it is inappropriate to teach creationism, it is not necessarily inappropriate to teach about creationism: "Any questions about creationism and intelligent design which arise in science lessons, for example as a result of media coverage, could provide the opportunity to explain or explore why they are not considered to be scientific theories and, in the right context, why evolution is considered to be a scientific theory. ... Science teachers can respond positively and educationally to questions and comments about creationism or intelligent design by questioning, using prompts such as 'What makes a theory scientific?', and by promoting knowledge and understanding of the scientific consensus around the theories of evolution and the Big Bang."

It also refers to a Religious Education model unit entitled "How can we answer questions about creation and origins?" (available on-line at the Qualifications and Curriculum Authority website: <http://www.qca.org.uk/libraryAssets/media/qca-06-2728_y9_science_religion_master.pdf>), which "aims to deepen pupils' awareness of ultimate questions through argument, discussion, debate and reflection and enable them to learn from a variety of ideas of religious traditions and other world views." When the unit debuted in January 2007, the *Guardian* (2007 Jan 23) commented, "The teaching of ID and

creationism should prove less contentious in this part of the curriculum (although the scientists who argue that ID is a science may be disconcerted), as pupils will investigate and role-play disputes between religion and science, such as Galileo, Charles Darwin and Richard Dawkins."

The guidance document was welcomed by groups in the United Kingdom that support the integrity of science education. Simon Barrow, co-director of the Christian think-tank Ekklesia, welcomed the new guidelines as "an important step forward" in a September 26, 2007, press release, commenting, "Pupils seeking to acquire an understanding of religious and other life stances need to understand how and why fundamentalist world views emerge ... But they also need to know why they are rejected by mainstream theologians and scientists. Likewise, as the government rightly says, creationism and ID have no place in school science classrooms."

Similarly, in a September 27, 2007, press release, Mike Brass, Chairman of the British Centre for Science Education, commented, "We are very pleased that the Government has issued such a strong statement and clear instructions to schools, which should go a long way to prevent children being misinformed," adding, "However, we remain deeply concerned that creationist groups are still being allowed to operate or influence City Academies and similar schools outside the mainstream. The Government should close this loophole immediately."

United Kingdom: The Association for Science Education — a professional association for teachers of science in Britain and around the world, with over 15 000 members — recently issued a statement (available online at <http://www.ase.org.uk/htm/homepage/notes_news/oct2007/ScienceEduc_IntelliDesign_Creationism.pdf>) on science education, "intelligent design", and creationism, reading in part:

> it is clear to us that Intelligent Design has no grounds for sharing a platform as a scientific "theory". It has no underpinning scientific principles or explanations to support it. Furthermore it is not accepted as a competing scientific theory by the international science community nor is it part of the science curriculum. It is not science at all. Intelligent Design belongs to a different domain and should not be presented to learners as a competing or alternative scientific idea. As such, Intelligent Design has no place in the science education of young people in school.

The statement also cautions against presenting "intelligent design" as a case study of a controversy in science, commenting, "Intelligent Design ... cannot be classed as science, not even bad or controversial science," and recommends that "it should not be presented as an alternative scientific theory" if it is presented in religious education classes. The statement cites the Interacademy Panel's statement on the teaching of evolution, to which the Royal Society of London and the National Academies of Science are signatories, as well as the recently issued guidance to British teachers on the place of creationism in the science classroom (see above).

United Kingdom, Lisburn: A local politician sought to convince the city council of Lisburn — a large town adjacent to Belfast — to send letters to secondary schools "encouraging them to teach alternative theories to evolution as the origins of the earth, such as Creation and Intelligent Design," the *Lisburn Ulster Star* reported (2007 Sep 20). Paul Givan of the Democratic Unionist Party told the *Star*, "I have never believed in the theory of evolution and, like many people, believe in the teaching of creation. I believe science points to creation but our schools are teaching a very narrow remit and many exclude alternative theories to evolution. I have asked the Council to write to local schools encouraging them to give equality of treatment to other theories of the origins of life and how the earth came into existence."

A number of Givan's colleagues on the committee in which the proposal was presented were reluctant to interfere with curricula, however; Peter O'Hagan commented, "Were I the principal of a school and I got a letter like that from Lisburn City Council I would throw it in the bin." A spokesperson from the Department of Education for Northern Ireland told the *Star*, "The revised curriculum offers scope for schools to explore alternative theories to evolution, which could include creationism, if they so wish. ... It is, however, a matter for individual schools, taking account of the needs and wishes of their pupils, parents and governors, to decide if they want to include the teaching of alternative theories."

The council voted in favor of the resolution on September 25, 2007, according to the *Lisburn Ulster Star* (2007 Sep 26). "Givan[,] who made the original proposal[,] said he was not suggesting the council dictate what schools should or should not teach but simply pointing out that under the revised curriculum there was an opportunity for alternative theories to be taught," the newspaper reported. Fellow members of the Democratic Unionist Party sided with Givan, including Edwin Poots, Northern Ireland's Minister for Arts and Culture, "who made it plain he was a strong believer in biblical creation"; several reportedly described preventing the teaching of "alternatives" to evolution as a form of fascism.

The *Belfast Telegraph* (2007 Sep 27) editorially protested: "There are enough divisions in Northern Ireland society without more being invented — and given official credence. Religious fundamentalists have every right to state their beliefs, and argue their case for greater recognition, but when they try to impose them on the wider community, which clearly does not share their views and regards them as unfounded, they must be resisted at all costs. Attempts to introduce teaching creationism in public schools — not private — have consistently been rejected as contravening the separation of church and state. Most people, not just humanists, would agree."

THE DANGERS OF CREATIONISM IN EDUCATION

DRAFT RESOLUTION – THE COUNCIL OF EUROPE'S PARLIAMENTARY ASSEMBLY

1 For some people the Creation, as a matter of religious belief, gives a meaning to life. Nevertheless, the Parliamentary Assembly is worried about the possible ill-effects of the spread of creationist ideas within our education systems and about the consequences for our democracies. If we are not careful, creationism could become a threat to human rights which are a key concern of the Council of Europe.

2 Creationism, born of the denial of the evolution of species through natural selection, was for a long time an almost exclusively American phenomenon. Today creationist ideas are tending to find their way into Europe and their spread is affecting quite a few Council of Europe member states.

3 The prime target of present-day creationists, most of whom are Christian or Muslim, is education. Creationists are bent on ensuring that their ideas are included in the school science syllabus. Creationism cannot, however, lay claim to being a scientific discipline.

4 Creationists question the scientific character of certain items of knowledge and argue that the theory of evolution is only one interpretation among others. They accuse scientists of not providing enough evidence to establish the theory of evolution as scientifically valid. On the contrary, they defend their own statements as scientific. None of this stands up to objective analysis.

5 We are witnessing a growth of modes of thought which, the better to impose religious dogma, are attacking the very core of the knowledge that we have patiently built up on nature, evolution, our origins and our place in the universe.

6 There is a real risk of a serious confusion being introduced into our children's minds between what has to do with convictions, beliefs, ideals of all sorts and what has to do with science, and of the advent of an "all things are equal" attitude, which may seem appealing and tolerant but is actually disastrous.

7 Creationism has many contradictory aspects. The "intelligent design" idea, which is the latest, more refined version of creationism, does not deny a certain degree of evolution but claims that this is the work of a superior intelligence. Though more subtle in its presentation, the doctrine of intelligent design is no less dangerous.

8 The Assembly has constantly insisted that science is of fundamental importance. Science has made possible considerable improvements in living and working conditions and is a not insignificant factor in economic, technological and social development. The theory of evolution has nothing to do with divine revelation but is built on facts.

9 Creationism claims to be based on scientific rigour. In actual fact the methods employed by creationists are of three types: purely dogmatic assertions; distorted use of scientific quotations, sometimes illustrated with magnificent photographs; and backing from more or less well-known scientists, most of whom are not specialists in these matters. By these means creationists seek to appeal to non-specialists and sow doubt and confusion in their minds.

10 Evolution is not simply a matter of the evolution of humans and of populations. Denying it could have serious consequences for the development of our societies. Advances in medical research with the aim of effectively combating infectious diseases such as AIDS are impossible if every principle of evolution is denied. One cannot be fully aware of the risks involved in the significant decline in biodiversity and climate change if the mechanisms of evolution are not understood.

11 Our modern world is based on a long history, of which the development of science and technology forms an important part. However, the scientific approach is still not well understood and this is liable to encourage the development of all manner of fundamentalism and extremism. The total rejection of science is definitely one of the most serious threats to human rights and civic rights.

12 The war on the theory of evolution and on its proponents most often originates in forms of religious extremism which are closely allied to extreme right-wing political movements. The creationist movements possess real political power. The fact of the matter, and this has been exposed on several occasions, is that some advocates of strict creationism are out to replace democracy by theocracy.

13 All leading representatives of the main monotheistic religions have adopted a much more moderate attitude. Pope Benedict XVI, for example, as his predecessor Pope John-Paul II, today praises the role of the sciences in the evolution of humanity and recognises that the theory of evolution is "more than a hypothesis".

14 The teaching of all phenomena concerning evolution as a fundamental scientific theory is therefore crucial to the future of our societies and our democracies. For that reason it must occupy a central position in the curriculum, and especially in the science syllabus. Evolution is present everywhere, from medical overprescription of antibiotics that encourages the emergence of resistant bacteria to agricultural overuse of pesticides that causes insect mutations on which pesticides no longer have any effect.

15 The Council of Europe has highlighted the importance of teaching about culture and religion. In the name of freedom of expression and individual belief, creationist ideas, as any other theological position, could possibly be presented as an addition to cultural and religious education, but they cannot claim scientific respectability.

16 Science provides irreplaceable training in intellectual rigour. It seeks not to explain "why things are" but to understand how they work.

17 Investigation of the creationists' growing influence shows that the arguments between creationism and evolution go well beyond intellectual debate. If we are not careful, the values that are the very essence of the Council of Europe will be under direct threat from creationist fundamentalists. It is part of the role of the Council's parliamentarians to react before it is too late.

18 The Parliamentary Assembly therefore urges the member states, and especially their education authorities:

18.1 to defend and promote scientific knowledge;

18.2 strengthen the teaching of the foundations of science, its history, its epistemology and its methods alongside the teaching of objective scientific knowledge;

18.3 to make science more comprehensible, more attractive and closer to the realities of the contemporary world;

18.4 to firmly oppose the teaching of creationism as a scientific discipline on an equal footing with the theory of evolution and in general resist presentation of creationist ideas in any discipline other than religion;

18.5 to promote the teaching of evolution as a fundamental scientific theory in the school curriculum.

19 The Assembly welcomes the fact that 27 Academies of Science of Council of Europe member states signed, in June 2006, a declaration on the teaching of evolution and calls on academies of science that have not yet done so to sign the declaration.

[*See <http://assembly.coe.int/Mainf.asp?link=/Documents/WorkingDocs/Doc07/EDOC11375.htm> for the original, of which the present selection is section A.*]

NCSE NEWS

News from the Membership

Glenn Branch, NCSE Deputy Director

From time to time we like to report on what our members are doing. As the following list shows, they — and we — have a lot to be proud about!

Brian Alters is preparing to wow Canadian science students. According to a September 13, 2007, press release from McGill University, "The Imperial Oil Foundation has pledged $800,000 to fund a five-year McGill University project designed to woo — and wow — elementary and high school students across the country. Led by Dr Brian Alters, Tomlinson Chair in Science Education and Sir William Dawson Scholar at McGill, the Winners of Wonderment (WOW) Lab will research and develop three-dimensional technologies to help teachers generate excitement, interest, inspiration and enhanced learning in mathematics and sciences. The Imperial Oil investment will help equip the new lab with audiovisual, computer and other equipment." A member of NCSE's board of directors, Alters is also the founder and director of McGill's Evolution Education Research Centre.

After J Scott Turner of the State University of New York's College of Environmental Science and Forestry published his op-ed "Why can't we discuss intelligent design?" in the *Chronicle of Higher Education* (2007 Jan 19; 53 [20]: B20), identifying "intelligent design" as "the latest eruption of a longstanding strain of anti-Darwinist thought" and deploring the tendency on the part of academics to "scramble to the courts or the political ramparts to expel it from our classrooms and our students' minds," NCSE members were quick to respond. **David P Barash** of the University of Washington replied, "Intelligent design probably belongs in courses dealing with religion, public policy, contemporary history, and perhaps civics. It does not, however, belong in a science curriculum: Its substance is religion, pure and simple, and that is what the fuss is about." **Greg Laden** of the University of Minnesota answered, "The idea of an intelligent designer has time and again been rejected by science for good reason — based on the preponderance of evidence, combined with the power of well-tested theory — and for decades has resided only in the works of creationists, both overt and covert. So yes Mr Turner, the reaction to the idea of an intelligent designer is a 'hue and cry.' Why would you expect anything different?" And **Nick Matzke**, then still working for NCSE, explained, with reference to the *Kitzmiller v Dover* case, "Intelligent design is not an honest attempt to understand the natural world. It is not as if someone made a stunning new research finding, published it in a scientific journal, and proposed ID as the explanation. Instead, ID arose as a cynical attempt to come up with a newer, vaguer label for creationism." All their letters appeared in the March 9, 2007, issue of the *Chronicle* (53 [27]: B13).

NCSE deputy director **Glenn Branch** was a major source for Liza Lentini's article on creationism "One universe, under God" (*Discover* 2007 Oct; 74–8, 88–90), in which he explained the convenient vagueness of "intelligent design": "First, by not taking a stand on issues that divide creationists, the intelligent design movement hopes to maintain a big tent under which creationists of all stripes are welcome to shelter. Second, by not identifying the designer as God, the intelligent design movement sought to immunize the position from constitutional scrutiny: The idea was to purge creationism of its overt religiosity, so that intelligent design could succeed where creation science failed." Branch also commented on the support that "intelligent design" garners from young-earth creationists, saying, "their thinking, presumably, was that getting intelligent design in the public schools would at least accomplish a lot of what they wanted if not all." In the same issue, **Harry McDonald** (a former president of Kansas Citizens for Science) and **Charlotte McDonald** discussed the fights over evolution education in Kansas, which Harry described as "a symptom of a larger problem in our society ... Science is considered a tool to help convince people to adopt a certain political opinion." Also of the same interest in the same issue of *Discover* is "Back to school," in which **Wes McCoy**, a distinguished teacher at North Cobb High School in Kennesaw, Georgia, interviewed Margaret Spellings, the federal secretary of education (48–9).

C Mackenzie Brown recently published two articles on "avataric evolutionism" — "the idea that ancient myths of Vishnu's ten incarnations anticipated Darwinian evolution" — namely, "The Western roots of avataric evolutionism in colonial India" (*Zygon* 2007; 42 [2]: 423–47) and "Colonial and postcolonial elaborations of avataric evolutionism" (*Zygon* 2007; 42 [3]: 715–47). In the latter, he concludes, "What distinguishes avataric evolutionists is the degree to which, on the one hand, they accept the ancient myths as more literal or more allegorical anticipations of Darwinism, and on the other, how qualified their acceptance of organic evolutionism actually is. ... It would seem that clarification of the many cultural, political, philosophical, and theological issues awaits precisely a resolution of the epistemological issues underlying avataric evolutionism. Only then can the many meanings of *science* (such as higher and lower, or material and spiritual) begin to be disentangled and the insights of the ancient Hindus appropriately contextualized." Brown is Professor of Religion at Trinity University in San Antonio, Texas.

Rodger Bybee, executive director emeritus of Biological Sciences Curriculum Study, contributed a

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How to Talk to the TV Media

Martha Heil

Most people get their news and information about science and technology from TV news, and 44% rely on local TV news as their primary source of news and information.

This means we need to turn to TV news outlets *first* when we have news.

TV stories are:

Shorter (usually about 45 seconds);
More likely to include "balance";
Less likely to include an explanation of the science;
Heavily reliant on visuals; and
More comfortable with anecdotes than data.

The *first* rule of journalism is to get the story fast; the *second* rule is to get it right. Journalists are in intense rivalry with their competitors for breaking news, and in order to get their story in first, they will favor speed over detail.

Your job in this situation is to respond promptly to the media call; this will help ensure that your message is included and accurate information is provided. And a quick response is more likely to make it into the story. Do not worry that the information you have is not absolutely 100% verified and accurate — usually reporters will ask questions that deal with the very basic principles of the situation or of the science. *You know much more than they do* on the topic they are about to put on the air.

TV reporters are often heavily "multitasking" with their story assignments. They may come to you from a completely different situation (such as from a fire or from the police department covering an unrelated story); they are likely to be boning up on your interview as they drive across town. You can easily turn this to your advantage if you have a clear explanation for them why they are here to interview you ("I'm a parent of a child in Dover Senior High School, and I am outraged that my child is being taught that 'intelligent design' is an acceptable alternative to real science.")

A TV crew usually consists of a camera person, a sound specialist, and a producer. TV crews for longer-format shows and interviews may also include coordinators, hosts, or assistant producers. The local TV crew will most likely be coming to you with standard questions (the who, what, where, when, and why of the story) and if you have more to say, you have the opportunity to say it. The best journalists ask at the end of an interview, "Is there anything else I should be asking you about?" This is the time to restate and re-emphasize your message — even if you've said it before. If the interview is wrapping up, and the journalist hasn't asked that question, you should say, "There's something I really want you to understand," and then get your message out — even if you've said it before.

There's a saying in the media: the medium drives the message. This means that for TV, the visuals are the most important. The best-honed statement is not as powerful as the shot of the consequences in action. Think beforehand as the crew comes to your location about how you want to *show*, not just *tell*, your message. Props like books, documents, or pictures can be powerful. Locations like classrooms, school board offices, and churches carry powerful messages about the meaning of the statements you're about to make. A picture, as they say, is worth a thousand words.

The project manager or senior scientist or president of the citizens for science group is not always the best speaker for TV on the topic, even though he or she may be the best writer of op-eds or the best organizer. You know the most enthusiastic person on your team or in the group: the one with elementary school age children, the one who never stops talking about your subject? That's the one to put in front of the TV cameras (After he or she has been prepared with your group's best talking points, of course).

How do you keep your intellectual honesty and say what journalists need? Well, when they say, they're looking for a story, they're not kidding. They want a narrative. They want to show the event in a dramatic way. If you're a scientist, your tendency may be to follow the main trend, not to look for dramatic anecdotes that seem to you unrepresentative of the situation. But there is a way to help the journalist to complete the story: think of a typical example — a parent, a teacher, a student, and then bring that person forward as part of your interview. ("My daughter will be going to this high school next year, and I don't want her science education to be incomplete.")

Keep the Interview Simple

You are not bound by oath, you are not at an oral thesis exam, and you're not giving a talk to your colleagues at a meeting. You are speaking to a reporter, and through her, to the public. Most adults in the US have only high-school knowledge of science and science-related topics. Anything technical that you feel you *must* say, you must say *simply*. In fact, if a reporter does not hear a simple explanation, he may assume you don't know enough about the topic to be speaking on it. Pretend you're explaining to a very interested, bright, ten-year-old.

On points of civic discussion, you should keep things equally simple. Your statements about the problems in your community, on your school board or with science classes, should be just as simple as when you're discussing them with your neighbors. Be conversational and use short sentences.

So, to make a successful TV story:

Use a representative party; for example, a parent from the school system who is unhappy with the policy just passed.

Prepare a short (20-word) explanation of the main point that the reporter should know; for instance, "The policy would hurt our children's schooling because it allows teachers to teach religion in public schools, which is illegal."

Use slogans and "sound bites". Every word counts. Think of the mission of your organization. Think of the simplest phrases you have heard and even jokingly simple ways to sum up the situation.

Use your hands when you talk, and animate your face to carry the message you're conveying. The camera will frame you from just below the shoulders up, so be sure to raise your hands above waist level when using them.

In broadcast situations, assume that everything is being recorded. Don't say anything you wouldn't want to hear later on TV.

Martha Heil has worked as a media relations specialist for the past seven years at NASA's Jet Propulsion Laboratory and at the American Institute of Physics.

Teaching and Learning About Evolution

"We are not blessed with absolute certainty about any fact of nature, but evolution is as well confirmed as anything we know — surely as well as the earth's shape and position (and we don't require equal time for flat-earthers and those who believe that our planet resides at the center of the universe). We have oodles to learn about how evolution happened, but we have adequate proof that living forms are connected by bonds of genealogical descent," Stephen Jay Gould once wrote. For help in appreciating and explaining the evidence for evolution, and the nature of the scientific enterprise of which evolutionary theory is a vital part, NCSE recommends the following books, all of which are now available through the NCSE website: <http://www.ncseweb.org/bookstore.asp> — look in the "In the latest *RNCSE*" section. And remember, every purchase through the web site benefits NCSE!

Illustration by Dave Smith, used with permission of the University of California Museum of Paleontology.

Evolution for tyros

Darwin and Evolution for Kids
by Kristin Lawson
In *Darwin and Evolution for Kids*, Lawson provides a biography of Darwin combined with a sketch of his ideas and their development, along with "engaging and fun activities where children can: make their own fossils using clay, seashells, and plaster; keep field notes as backyard naturalists; investigate whether acquired traits are passed along to future generations; explore the adaptive strategies plants have developed to distribute seeds; observe how carnivorous plants trap and devour their prey; go on a botanical treasure hunt." *Darwin and Evolution for Kids* was selected by National Public Radio's Science Friday as one of the best science books of 2003. For ages 9 and up.

Science, Evolution, and Creationism
from the National Academy of Sciences and the Institute of Medicine
Designed to give the public a comprehensive and up-to-date picture of the current scientific understanding of evolution and its importance in the science classroom, *Science, Evolution, and Creationism* is twice as long as the second edition (published in 1999 as *Science and Creationism*), and teems with new examples of the predictive power and practical importance of evolution. Addressing creationism in its various forms, it concludes, "No scientific evidence supports these viewpoints," and insists, "Given the importance of science in all aspects of modern life, the science curriculum should not be undermined with nonscientific material."

The Top 10 Myths About Evolution
Cameron M Smith and Charles Sullivan
From the publisher: "In this concise, accessible, 'myth-buster's handbook,' educators Cameron M Smith and Charles Sullivan clearly dispel the ten most common myths about evolution, which continue to mislead average Americans. Using a refreshing, jargon-free style, they set the record straight on claims that evolution is 'just a theory,' that Darwinian explanations of life undercut morality, that Intelligent Design is a legitimate alternative to conventional science, that humans come from chimpanzees, and six other popular but erroneous notions. Smith and Sullivan's reader-friendly, solidly researched text will serve as an important tool, both for teachers and laypersons seeking accurate information about evolution."

Evolution 101
by Randy Moore and Janice Moore
Randy Moore and Janice Moore's *Evolution 101* aims, in the words of its publisher, to provide "readers — whether students new to the field or just interested members of the lay public — with the essential ideas of evolution using a minimum of jargon and mathematics." It succeeds marvelously. The reviewer for NSTA Recommends writes, "Seldom is a book so well written and so well researched that it ought to be required reading for every thinking person," adding, "Not only should every high school, community, and university library have a copy of *Evolution 101* but every science teacher in the country should as well."

Teaching evolution

Teaching Biological Evolution in Higher Education: Methodological, Religious, and Nonreligious Issues
by Brian Alters
Reviewing *Teaching Biological Evolution in Higher Education* for the *McGill Journal of Education*, NCSE's deputy director Glenn Branch described the book as "a splendid vade mecum," adding, "Alters provides a wealth of valuable suggestions for teaching evolution effectively at the college level, with

<http://www.ncseweb.org/bookstore.asp>

sensible advice for understanding the misconceptions that students are likely to bring to class. ...Whether creationists are increasingly present or only increasingly visible ... they are definitely on campus, and *Teaching Biological Evolution in Higher Education* should be on the shelf of any instructor who teaches any aspect of evolution at the college level."

Defending Evolution in the Classroom
by Brian J Alters and Sandra M Alters
Defending Evolution in the Classroom is a necessity for anyone concerned with evolution education. The late Ernst Mayr wrote, "This book should be in the hands of every educator dealing with the subject of evolution," and Eugenie C Scott, executive director of NCSE, agreed: "At last a book for teachers to help them cope with anti-evolutionism. Clearly written and filled with practical advice about the underlying religious and scientific issues prompting student questions, *Defending Evolution* should be on every teacher's bookshelf." A member of NCSE's board of directors, Brian J Alters directs the Evolution Education Research Centre at McGill University.

Evolution in Perspective: The Science Teacher's Compendium
edited by Rodger W Bybee
From the publisher, the National Science Teachers Association: "If ever a subject could benefit from a strong dose of perspective, it's evolution. This important new book supplies the necessary insights by bringing together the views of leading scientists, professors, and teachers. Working from the premise that only those students whose schools teach them about the nature of science will truly understand evolution, the collection gathers 12 influential articles first published in the NSTA member journal, *The Science Teacher*. ... This collection comes from, and is developed for, the people on the front lines — educators who deal with the controversy."

Investigating Evolutionary Biology in the Laboratory
edited by William F McComas
In *Investigating Evolutionary Biology in the Laboratory*, William F McComas assembles a host of useful articles that together provide a complete introduction to the strategies and rationales for teaching evolutionary biology in the laboratory, including experiments and exercises. Topics include Foundations of Evolution Education, Examining the Evidence for Evolution, Using the Tools and Principles of Evolution, Variation and Adaptations within Species, Biotic Potential and Survival, Simulating Natural Selection, and The New Evolutionary Synthesis. A long-time member of NCSE, McComas was awarded the Evolution Education Award for 2007 by the National Association of Biology Teachers.

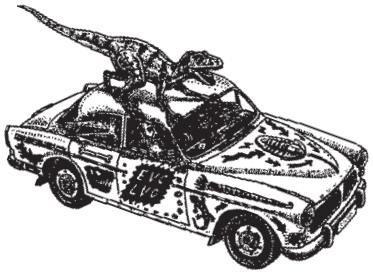
Evolution and the Nature of Science

Science As a Way of Knowing: The Foundations of Modern Biology
by John A Moore
From the publisher: "For the past twenty-five years John Moore has taught biology instructors how to teach biology — by emphasizing the questions people have asked about life through the ages and the ways natural philosophers and scientists have sought the answers. This book makes Moore's uncommon wisdom available to students in a lively and richly illustrated account of the history and workings of life. Employing a breadth of rhetoric strategies — including vividly written case histories, hypotheses and deductions, and chronological narrative — *Science as a Way of Knowing* provides not only a cultural history of biology but also a splendid introduction to the procedures and values of science."

Teaching About Evolution and the Nature of Science
from the National Academies of Science
Published in 1998 under the auspices of the National Academies of Science, which provides authoritative scientific advice to the federal government, *Teaching About Evolution and the Nature of Science* is addressed to "the teachers, other educators, and policy makers who design, deliver, and oversee classroom instruction in biology. It summarizes the overwhelming observational evidence for evolution and suggests effective ways of teaching the subject. It explains the nature of science and describes how science differs from other human endeavors. It provides answers to frequently asked questions about evolution and the nature of science and offers guidance on how to analyze and select teaching materials."

The Nature of Science and the Study of Biological Evolution
from NSTA and BSCS
The Nature of Science and the Study of Biological Evolution, as its title indicates, adroitly interleaves a discussion of the nature of science with a broad perspective on evolution. Consisting of a text for high school students and a CD–ROM for teachers, the material discusses the nature and methods of science, the development of the theory of evolution, seven lines of evidence that converge on evolution, population genetics, natural selection, and primate and human evolution. Both the text and the CD–ROM are imbued with the pedagogical acumen characteristic of the National Science Teachers Association and the Biological Sciences Curriculum Study.

The Creation Controversy & the Science Classroom
by James W Skehan and Craig E Nelson
Consisting of two sections, "Modern Science and the Book of Genesis" by James Skehan and "Effective Strategies for Teaching Evolution and Other Controversial Topics" by Craig Nelson, *The Creation Controversy & the Science Classroom* aims to provide teachers with an understanding of the nature of science and the relationship between science and religion. Brian Alters described Skehan's contribution as "a concise, detail-rich history of some of the relevant issues concerning science and biblical scholarship, with a good relevant criticism of creationism woven throughout," and Nelson's as "to the point, with a great number of useful ideas and strategies packed in a short read."



NCSE on the Road

A Calendar of Special Events, Presentations, and Lectures

Date	April 17, 2008
City	Madison WI
Presenter	Eugenie C Scott
Title	Evolution: The Science Teacher's Dilemma
Event	7th Annual International Bioethics Forum
Time	1:15 PM
Location	BioPharmaceutical Technology Center
Contact	Karin Borgh, karin.borgh@btci.org

Date	May 2, 2008
City	New York NY
Presenter	Eugenie C Scott
Title	[Panel discussion]
Event	Evolution: From the Beginning to Humans
Time	TBA
Location	Rockefeller University
Contact	James E Darnell Jr, darnell@rockefeller.edu

Date	September 16, 2008
City	Boone NC
Presenter	Eugenie C Scott
Title	Why Darwin Matters
Event	Public lecture in Darwin series
Time	7:00 PM
Location	Appalachian State University
Contact	Howie Neufeld, neufeldhs@appstate.edu

NCSE Speakers Available

Name	Eugenie C. Scott
Title	NCSE Executive Director
Contact	scott@ncseweb.org

Name	Andrew J Petto
Title	NCSE Board Member
Contact	editor@ncseweb.org

Name	Glenn Branch
Title	NCSE Deputy Director
Contact	branch@ncseweb.org

Name	Philip Spieth
Title	NCSE Director of Operations
Contact	spieth@ncseweb.org

Name	Joshua Rosenau
Title	NCSE Public Information Project Director
Contact	rosenau@ncseweb.org

Name	Susan Spath
Title	NCSE Public Information Project Director
Contact	spath@ncseweb.org

Name	Peter MJ Hess
Title	NCSE Faith Project Director
Contact	hess@ncseweb.org

Name	Louise S Mead
Title	NCSE Education Project Director
Contact	mead@ncseweb.org

Check the NCSE web site for updates and details — <http://www.ncseweb.org/meeting.asp>.

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guest editorial to *The American Biology Teacher* (2007 Oct; 69 [8]: 454–7) on the 50th anniversary of Sputnik. The Soviet Union's launch of the first artificial satellite in 1957 stimulated a national reform of science education, including the founding in 1958 of BSCS. "The United States must again reform science education," Bybee wrote, "in this case because we are losing our competitive edge in the global economy and must clearly attend to environmental and resource issues because they often underlie economic realities." Of interest in the same issue of *The American Biology Teacher* are **William D Stansfield**'s article "Fuzzy data sets" (458–9), suggesting that students be introduced to data sets involving subjective decisions in order to introduce them to the issues of their reliability; and Jennifer R Robbins and Pamela Roy's article "The natural selection: Identifying & correcting non-science student preconceptions through an inquiry-based, critical approach to evolution" (460–6).

NCSE Supporter **Sean B Carroll** was elected to the National Academy of Sciences, one of the highest honors in the world of science. According to a May 1, 2007, press release from the University of Wisconsin, Madison, "Carroll, an investigator in the Howard Hughes Medical Institute, has been a member of the UW-Madison faculty since 1987. He studies how genes and genetic regulation drive the development and evolution of diverse animal forms and has authored two popular science books on the topic. His work on fruit flies and other insects has revealed some of the key genetic players underlying major events in animal development, such as limb growth and coloration patterns." Also elected to the Academy in 2007 were NCSE members **John G Hildebrand**, Regents Professor and professor of neurobiology, biochemistry and molecular biophysics, entomology, and molecular and cellular biology, and director, Arizona Research Laboratories Division of Neurobiology, University of Arizona, Tucson, and **William E Moerner**, Harry S Mosher Professor of Chemistry, Stanford University.

William A Clemens was presented with the Fellows' Medal of the California Academy of Sciences on November 9, 2007. The Academy's highest honor "is given to especially prominent scientists who have been recognized for their outstanding contributions to their specific field(s) of science." Clemens is Professor Emeritus in the Department of Integrative Biology at the University of California, Berkeley.

Taner Edis contributed "Intelligent design: A blind alley" to Islam Online (available on-line via <http://tinyurl.com/2cygfg>) as part of a symposium on evolution and Islam; also contributing were Peyton West of the AAAS, Mustafa Akyol (a Turkish journalist with ties to the Discovery Institute), and the pseudonymous Islamic creationist Harun Yahya. "Although I am not religious," Edis wrote, "I was born and raised in Turkey, and I continue to be concerned about how the Muslim world is a disaster zone for modern science." With regard to "intelligent design" in particular, he concludes, "Where natural science is concerned, the Muslim world really is a disaster area. Many Muslims are worried about this state of affairs, regardless of whether they are devout or secular in outlook — they correctly perceive that Western accomplishments in science and technology are a key to unwelcome Western military and economic domination of Muslim lands. If the Muslim world is to improve its scientific prospects, can Muslims afford to indulge in ideas like the popular creationism of Harun Yahya? Is it really a good idea to go down a scientific blind alley such as ID?" Edis, who teaches physics at Truman State University, is *RNCSE*'s associate editor for physics and astronomy, and the author of *An Illusion of Harmony: Science and Religion in Islam* (Amherst [NY]: Prometheus Books, 2007).

No fewer than three members of NCSE were among the recipients of 2007's State Professors of the Year Award, bestowed by the Council for Advancement and Support of Education and the Carnegie Foundation for the Advancement of Teaching: **Andrew Fraknoi**, Professor of Astronomy at Foothill College; **John M Lynch**, Honors Faculty Fellow at Arizona State University; and **Dawn J Wright**, Professor of Geography and Oceanography at Oregon State University. According to the award's website, "winners are chosen on the basis of their extraordinary dedication to undergraduate teaching, determined by excellence in the following four areas: impact on and involvement with undergraduate students; scholarly approach to teaching and learning; contributions to undergraduate education in the institution, community and profession; and support from colleagues and current and former undergraduate students." Congratulations to all three!

Reviewing Michael Behe's latest book, *The Edge of Evolution* (New York: Free Press, 2007), in the October 2007 issue of *The New Criterion* (available on-line at <http://www.creationismstrojanhorse.com/Gross_Behe_Review_10.2007.pdf>), the biologist **Paul R Gross** was anything but impressed. After observing that Behe's argument from irreducible complexity in *Darwin's Black Box* (New York: Free Press, 1996) was quickly recognized to fail, he commented, "In response, Behe and the ["intelligent design"] movement shifted ground, first redefining IC in an effort to meet the flood of negation, finally (in effect) by scanting it in favor of more general claims. The Edge of Evolution is Behe's heroic effort to snatch victory from the jaws of defeat." Gross added, "The clear goal is to justify his original claim that the purposeful complexity of life cannot be a product of 'random mutation,' that there must be intelligent design, and (en passant) that ID is the great scientific discovery of our age."

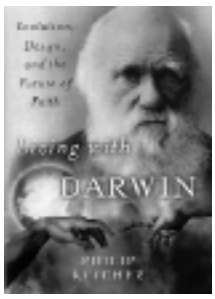
Noting that Behe's arguments have already taken a pounding (see *RNCSE* 2007 May–Aug; 27 [3–4]: 11–14 for descriptions of reviews of **Sean B Carroll, Jerry Coyne**, **Kenneth R Miller**, and **Michael Ruse**; *RNCSE* 2007 Jan–Apr; 27 [1–2]: 38–40 for a review by **David E Levin**, and *The New York Times* Sunday Book Review [2007 Jul 1] for a no-holds-barred review by Richard Dawkins), Gross identified

two kinds of scientific flaws: "errors of the model itself and in the associated calculations, and ... ignoring important conflicting material in the primary literature." He gave three examples: Behe's misunderstanding of a report on the frequency of the malaria parasite's development of spontaneous resistance to a drug; his unwarranted assumption that mutations in the relevant gene would have to be simultaneous; and his neglect of the experimental and theoretical literature on protein evolution — "the book's grand argument ignores the known, frequent appearance, by Darwinian pathways, of protein-protein interactions in small populations. There is a vast experimental and theoretical literature on protein evolution."

Paul R Gross is University Professor of Life Sciences, emeritus, at the University of Virginia, and holds honorary degrees from the Medical College of Ohio and Brown University. He is a Fellow of the American Academy of Arts and Sciences. With Norman Levitt, he authored *Higher Superstition: The Academic Left and Its Quarrels with Science* (Baltimore: Johns Hopkins University Press, 1994); with **Nick Matzke**, he wrote "Analyzing Critical Analysis: The Fallback Anti-evolutionist Strategy" for *Not in Our Classrooms: Why Intelligent Design is Wrong for Our Schools* (Boston: Beacon Press, 2006); and with **Barbara Forrest**, he authored *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004; reissued in paperback with a new chapter on *Kitzmiller v Dover*, 2007).

Paul R Gross

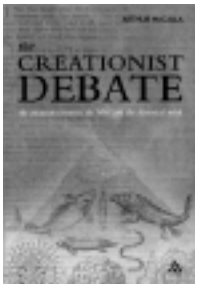
Philip Kitcher's latest book, *Living with Darwin: Evolution, Design, and the Future of Faith* (New York: Oxford University Press, 2006), received a favorable review from James Krueger in *Notre Dame Philosophical Reviews* (2007 Aug 14; available on-line at <http://ndpr.nd.edu/review.cfm?id=10743>). Krueger wrote, "Philip Kitcher again takes up the task of defending evolutionary theory from creationist challenges. In this short, accessible work, he not only hopes to offer such a defense, he also aims to situate religiously motivated objections to evolution within the context of the history of encounters between defenders of evolution and religious believers. The hope is to gain some sense of what the sources of the ongoing controversy are so that we might understand why the debate appears interminable. Overall, the book's historical bent makes it a useful introduction to the topic, and it could help to move conversations about creationism in a more constructive direction, though perhaps not in the way Kitcher intends." A Supporter of NCSE, Kitcher is the John Dewey Professor of Philosophy at Columbia University. He is the author of many books, including the classic critique of young-earth creationism, *Abusing Science: The Case Against Creationism* (Cambridge [MA]: MIT Press, 1982).



The *Orange County Register* (2007 Oct 7) featured a story about **James Hofmann** and his creationism/evolution class at California State University, Fullerton. "Showing — not telling — is the point of 'Evolution and Creation,' Hofmann's long-running seminar on one of science's hairiest debates: evolution vs 'intelligent design.' The first theory — which says that all life evolved from a common ancestor — is the scientific equivalent of the Magna Carta, a guiding principle that undergirds mainstream debate about the origins of man. The second theory, advanced by Christian academics and advocates, argues that life appears to have a purpose for which an intelligent creator — God — is the only possible explanation," the *Register* wrote. "Hofmann makes no bones about where he falls. 'Intelligent design is a very good PR movement but not much else,' he says." NCSE deputy director **Glenn Branch** suggested that creationism survives because of its appeal to fairness, saying, "Americans love fairness ... The idea [by creationists] is that you appeal to these attitudes of openness and fairness, but you do this in the service of a very narrow religious viewpoint that doesn't have any scientific evidence backing it up." "I've been accused on the one hand of overselling creationism," Hofmann told the newspaper, "and on the other hand of [being too critical]. That tells me I'm being fairly even-handed." Yet the effect of the class is to debunk creationism, he added. "It can't help but do that. ... Evolution science is pretty overwhelming."

NCSE Supporter **Lynn Margulis** produced two books recently. The first, *Mind, Life, and Universe: Conversations with Great Scientists of our Time* (White River Junction [VT]: Chelsea Green, 2007), which she co-edited with Eduardo Punset, consists of interviews with various scientists, including Edward O Wilson, **Daniel Dennett**, Sydney Brenner, the late **Stephen Jay Gould**, Richard Dawkins, and Sheldon Lee Glashow. David Baltimore comments, "It is wonderful to hear these scientists respond in their own voices to such interesting questions. A book full of nuggets of wisdom." The second, *Dazzle Gradually: Reflections on the Nature of Nature* (White River Junction [VT]: Chelsea Green, 2007), which she co-authored with her son Dorion Sagan, consists of a series of essays by one or both of them. In his foreword, Roald Hoffmann comments, "In *Dazzle Gradually* we have one of the great iconoclastic biologists of our time, and her son, both excellent writers, firing ideas at us, reflecting, asking questions, making connections. 'Truth's superb surprise' is their gift to us." Margulis is Distinguished University Professor in the Department of Geosciences at the University of Massachusetts, Amherst.

Arthur McCalla contributed "Creationism" to *Religion Compass*, a new journal that "guides students, researchers and non-specialist scholars through the



accumulating body of literature, and navigates the field by laying out the territory, describing divisions and subdivisions of Religious Studies and identifying the major issues within those sections" (2007; 1 [5]: 547–60). In the abstract, he writes, "Creationist opposition to modern evolutionary and geological sciences derives from the attempt of American Protestant fundamentalists to protect the inerrancy of the Bible from the challenges of any and all historical sciences. Creation science is not an independent investigation of the natural world, but rather biblical testimony. Intelligent design, the latest variant of creationism, is better understood as a legal strategy rather than as genuine science. The creation–evolution controversy is at bottom a conflict over the status and authority of the Bible in the modern world. The Creationism with which this article is concerned is the antihistorical ideology associated with American Protestant fundamentalism." McCalla is Associate Professor in the Department of Philosophy/Religious Studies at Mount Saint Vincent University and the author of *The Creationist Debate* (London: Continuum, 2006), reviewed in *RNCSE* 2007 Jan–Apr; 27 [1–2]: 42–3.

NCSE Supporter **Kenneth R Miller** was interviewed in the *Brown Daily Herald* (2007 Sep 19) under the rubric of "science's media darling." Prominently featured, of course, was his role in *Kitzmiller v Dover*, in which he testified for the plaintiffs: "One of the things that happened was that the scientific case — if there ever was one — for this thing called 'intelligent design' just collapsed, literally fell apart. It also became clear that intelligent design is just a re-labeling of what used to be called 'creationism' or 'creation science.'" The interview ended with his bemused take on the aftermath of his appearance on the satirical cable television show "The Colbert Report" (2006 Jan 12; available online at <http://www.millerandlevine.com/talks/colbert.html>): "nothing I've ever done in my whole scientific career has gained me as much credibility among my students as appearing on 'The Colbert Report.' There's no question that one of the reasons I've literally been flooded with lecture and seminar invitations all over the country is because people have seen the segment or heard about it and thought, 'Here's somebody who can go nose-to-nose with Stephen Colbert.' My phone hasn't stopped ringing." Miller teaches biology at Brown University.

Randy Moore and his colleagues Murray Jensen, Jay Hatch, and Leon Hsu published "A scoring rubric for students' responses to simple evolution questions: Darwinian components in *The American Biology Teacher* 2007 Sep; 69 (7): 394–9, in which they present "a scoring rubric that will help teachers evaluate students' understanding of biological evolution." Dividing evolution into four components — variation, genetics, differential survival and reproduction, and change over time — they discuss the rubric and its utility, with a host of examples showing how student answers were scored. "Teaching students the four components of Darwin's theory is an easy and logical introduction to a unit of evolution," they conclude, "but it is important that students can use the rubric to solve novel evolution problems, and not simply recite the key phrases for the four components." Moore, a former editor of *The American Biology Teacher*, teaches biology at the University of Minnesota. Of interest in the same issue is Todd Decker, **Gerald Summers**, and Lloyd Barrow's "The treatment of geological time and the history of life on earth in high school biology textbooks" (401–5), which compares the treatment of geological time and biological events within it in eleven widely used high school textbooks. There is room for improvement, they report: "An accurate view of the geological time scale will enable biology teachers to reduce the number of misconceptions concerning the history of life on earth." Summers teaches biology at the University of Missouri.


Randy Moore

Kevin Padian, the president of NCSE's board of directors, was elected as a Fellow of the American Association for the Advancement of Science in October 2007 "for distinguished contributions to the study of the vertebrate evolutionary adaptations and especially for his leadership in science education," according to an October 26, 2007, press release from the University of California, Berkeley. Padian is Professor of Integrative Biology at the University of California, Berkeley, and Curator at the University of California Museum of Paleontology. He testified for the plaintiffs in *Kitzmiller v Dover*, the 2005 case in which teaching "intelligent design" in the public schools was found to be unconstitutional, and the transcript of his testimony, together with the slides he used, is available on NCSE's website at <http://www.sciohost.org/ncse/kvd/Padian/kpslides.html>. Members of NCSE who were also elected Fellows of the AAAS in October 2007 include **Carl A Maida** of the University of California, Los Angeles; **Sally McBrearty** of the University of Connecticut; **Lawrence M Schell** of the University at Albany, State University of New York; **Sara Stinson** of the City University of New York, Queens College; **Linda D Wolfe** of East Carolina University; **J David Archibald** of San Diego State University; **Tom A Ranker** of the University of Colorado; **Randy W Schekman** of the University of California, Berkeley; **Andrew D Miranker** of Yale University; **Naomi Oreskes** of the University of California, San Diego; and **Adrian L Melott** of the University of Kansas. (Let NCSE know if we overlooked your name on AAAS's list!)

Robert T Pennock reviewed a pair of books for *American Scientist* (2007 Nov–Dec; 95: 528–31): George Levine's *Darwin Loves You* (Princeton [NJ]: Princeton University Press, 2006;

reviewed by Chet Raymo in *RNCSE* 2006 Nov/Dec; 26 (6): 45) and David Sloan Wilson's *Evolution for Everyone* (New York: Delacorte Press, 2007; reviewed by J José Bonner in *RNCSE* 2007 Jan–Apr; 27 (1–2): 36–7). Referring to *Darwin Loves You*, Pennock comments, "The book is erudite and wonderfully interdisciplinary." But he complained of two weaknesses: Levine's failure to present illuminating examples — "He might have profitably spent less time saying what he was going to do and more time actually doing it" — and his fretful self-consciousness, which produces a flurry of caveats that "risks obscuring important insights." *Evolution for Everyone*, on the other hand, "is chockablock with examples, data, thought experiments, and, tellingly, stories — stories about how scientists think and what wonders such thinking can reveal about the world." Pennock teaches at Michigan State University; he is the author of *Tower of Babel* (Cambridge MA: MIT Press, 1999) and the editor of *Intelligent Design Creationism and its Critics* (Cambridge MA: MIT Press, 2001), and he testified in *Kitzmiller v. Dover*. Of interest in the same issue of *American Scientist* is David Kaiser's "The other evolution wars" (518–25), with a page or so on recent attacks on cosmology from young-earth and "intelligent design" creationists; a letter from Homer Jacobson (468–9) asking for a retraction of two passages from a paper of his published in 1955 "because of continued irresponsible contemporary use by creationists"; and a column (466) from the editor, Rosalind Reid, commenting on the co-option of Jacobson's article by creationists and his request for a retraction.

Andrew J Petto was recently in the spotlight at the University of Wisconsin, Milwaukee, when he was profiled by the university's press office (see <http://www4.uwm.edu/about_uwm/news_press/previous_today_at_uwm_detail.cfm?customel_datapageid_11602=143725>). The profile began with a discussion of *Scientists Confront Intelligent Design and Creationism* (New York: WW Norton, 2007), which Petto co-edited with **Laurie R Godfrey**. Petto told the interviewer: "What makes evolution science is the way we acquire and how we apply the information, not the information itself." Petto also called for university scientists to become further involved in education: "Many scientists chose to teach at a university in order to conduct research, which potentially provides a powerful resource for science education ...We really need to be more involved in assuring that our educational mission receives the benefit of this expertise." A senior lecturer in anatomy and physiology at the University of Wisconsin, Milwaukee, and a member of NCSE's board of directors, Petto is also the editor of *RNCSE*.

Jason Rosenhouse reported on the Discovery Institute's conference Darwin and Design, held in Knoxville, Tennessee, in March 2007, for *Skeptic* magazine (2007; 13 [3]: 11–4). His blow-by-blow account also includes a report of his discussion with a couple of fellow conference-goers: "Several themes were clear. First, the two women did not have the slightest interest in anything I was saying. Second, they had complete and total confidence in every word of the Bible, and regarded it as utter impertinence to challenge them on any such point. Third, they had very little concept of what science is or how scientists approach their work. And fourth, they tended to view me as an object of pity, and generally behaved very condescendingly toward me." Rosenhouse teaches mathematics at James Madison University; he also blogs on the creationism/evolution controversy at <http://scienceblogs.com/evolutionblog/>. Also of interest in the same issue of *Skeptic* are NCSE Supporter **Bill Nye**'s tribute to the late Don Herbert ("Mr Wizard"; 10); **Raymond Eve**'s report on a recent AAAS panel on science education and belief in pseudoscience (14–5); a letter from **William D Stansfield** discussing pseudogenes as evidence for common ancestry (17); Avitai Pilpel's "Cosmos and coincidence: Intelligent design theory fails to account for sub-optimal design" (18–9); **Niall Shanks**, Ray Greek, Nathan Nobis, and Jean Swingle-Greek writing on "Animals and medicine: Do animal experiments predict human responses?" (44–51); Frans BM de Waal writing on "Bonobos, left and right" (64–6); Jonathan Gottschall's review of **Frederick Crews**'s *Follies of the Wise* (67–9); **Norman Levitt**'s review of George Levine's *Darwin Loves You* (69–74); and a two-part review of Frank Tipler's *The Physics of Christianity* by Lawrence Krauss (73–4) and Tim Callahan (74–9).

NCSE's executive director **Eugenie C Scott** was featured on "In the Beginning" — a two-part program on religious views regarding creationism and evolution from the BBC World Service. In the first part, Scott interviewed atheist Richard Dawkins, non-theistic cosmologist Paul Davies, old-earth creationist Hugh Ross of Reasons to Believe, theistic evolutionist and Lutheran theologian Ted Peters from the Pacific School of Religion, and young-earth creationist Ken Ham of Answers in Genesis. In the second part, Henry M Morris III of the Institute for Creation Research interviewed atheist David Seaborg, evangelical pastor John MacArthur of The Master's College and Grace Community Church, and evangelical biologist **Margaret Towne**, author of *Honest to Genesis: A Biblical and Scientific Challenge to Creationism* (Baltimore: PublishAmerica, 2004). Toward the end of the segment, Morris traveled to Grand Canyon National Park, where he briefly discussed the history of the canyon with a park interpreter and a Baptist pastor. Finally, Scott and Morris met at the edge of the canyon to share their awe at the canyon's beauty as well as to discuss the diversity of religious reactions to evolution they encountered while conducting their interviews. The whole program is archived on the Templeton–Cambridge Journalism Fellowships in Science & Religion website at <http://www.templeton-cambridge.org/fellows/redfern/publications/2007.03-04/heart_and_soul/>.

Polls Apart on Human Origins

George Bishop

Taking American public opinion polls at face value, one would think the country's scientific establishment faced a never-ending culture war with a Christian army of biblical creationists. "Almost Half of Americans Believe Humans Did Not Evolve" wrote Frank Newport in a June 5, 2006, press release by the Gallup News Service (<http://www.gallup.com/poll/23200/Almost-Half-Americans-Believe-Humans-Did-Evolve.aspx>). A year earlier, on July 6, 2005, the Harris Organization reported that "Nearly Two-Thirds of US Adults Believe Human Beings Were Created by God." Other press releases have told us, "Most Americans Tentative About Origin-of-Life Explanations" (Gallup News Service, 2005 Sep 23: <http://www.gallup.com/poll/18748/Most-Americans-Tentative-About-OriginofLife-Explanations.aspx>).

What are we to believe? Is the great majority of American adults as firmly opposed to Darwin's theory of evolution as the polls have been telling us for years? Or is public opinion on this matter not nearly as settled as many analysts and social scientists have widely assumed? And does the "reality" of public opinion on this subject depend, as with so many other topics, on how the question is asked? Let us take a closer look at the received wisdom.

For nearly a quarter of a century, the Gallup Organization has been painting a pretty familiar portrait of what Americans believe about human origins — and a fairly religious one, at that. Ever since Gallup began asking the question in July of 1982, a remarkably sizable and stable plurality of Americans (44–47%) has claimed to believe in the biblical creation-

George Bishop is professor of political science and director of the Graduate Certificate Program in Public Opinion and Survey Research at the University of Cincinnati. He is the author of The Illusion of Public Opinion: Fact and Artifact in American Public Opinion Polls *(Lanham [MD]: Rowman & Littlefield, 2005).*

Elliott Sober published "Intelligent design theory and the supernatural: The 'God or extra-terrestrials' reply" in *Faith and Philosophy* (2007 Jan; 24 [1]: 72–82). The abstract: "When proponents of Intelligent Design (ID) theory deny that their theory is religious, the minimalistic theory they have in mind (the mini-ID theory) is the claim that the irreducibly complex adaptations found in nature were made by one or more intelligent designers. The denial that this theory is religious rests on the fact that it does not specify the identity of the designer — a supernatural God or a team of extra-terrestrials could have done the work. The present paper attempts to show that this reply underestimates the commitments of the mini-ID [t]heory. The mini-ID theory, when supplemented with four independently plausible further assumptions, entails the existence of a supernatural intelligent designer. It is further argued that scientific theories, such as the Darwinian theory of evolution, are neutral on the question of whether supernatural designers exist." Sober, a Supporter of NCSE, teaches philosophy at the University of Wisconsin, Madison.

NCSE congratulates **Carl Zimmer** for winning a 2007 Communications Award from the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine; he won in the newspapers/magazines/internet category of the prize. A press release issued on October 1, 2007, praised "his diverse and consistently interesting coverage of evolution and unexpected biology," citing in particular:

Carl Zimmer

> "Highly Evolved and Exquisitely Thirsty," "Silent Struggle: A New Theory of Pregnancy," "This Can't be Love," and "Devious Butterflies, Full-Throated Frogs, and Other Liars," published in *The New York Times*; "A Fin is a Limb is a Wing," published in *National Geographic*; and The Loom, a science blog hosted by *Seed* magazine.

Zimmer, along with the winners in the book and television/radio categories, was honored during a ceremony on November 14, 2007, at the Arnold and Mabel Beckman Center in Irvine, California; the award brings with it a $20 000 prize. Zimmer is the author of a number of popular books about biology, including *Evolution: The Triumph of an Idea* (New York: Harper Perennial, 2006), the companion volume to PBS's *Evolution* series; he also received NCSE's Friend of Darwin award for 2005.

ist version of human origins that "God created man pretty much in his present form at one time within the last 10 000 years." Another whopping percentage (35–40%) has avoided this biblical literalist alternative but nonetheless endorsed the theistic supernatural idea that "man has developed over millions of years from less advanced forms of life, but God guided this process, including man's creation." Only a very small percentage (9–13%), however, has accepted the Darwinist, or naturalistic, position that "man has developed over millions of years from less advanced forms of life. God had no part in this process."

Taken as a whole, these monotonously familiar findings would seem to indicate that the American public long ago made its mind up about the fundamental question of human origins, and that it was not likely to change that mind any time soon.

This turns out, however, to be a rather premature conclusion. As with so many other poll topics, what the American public believes about human origins looks now to be much more sensitive to how the question is asked than many observers have so far surmised. Indeed, a conspicuous example turned up in a September 2005 poll conducted by the Gallup Organization itself, in which the wording of its standard question on human origins was changed, evidently to specify more precisely the exact meaning of the creationist or biblical alternative. Presumably this experiment in wording, shown in Figure 1, was done because of suspicions that the standard question was exaggerating the "true" percentage of believers in the Genesis version.

But, alas, the numbers in Figure 1, comparing the results with those for the standard question, tell another tale of unintended consequences. The percentage endorsing the Darwinist alternative was essentially unaffected by the change in wording. But, unexpectedly, Gallup's more precise way of putting the biblical alternative attracted a significantly higher percentage of respondents than it ever had — in fact, a clear creationist majority! At the same time, this manipulation in wording noticeably decreased the percentage selecting the *theistic evolutionist* position to less than a third (31%) — its lowest point in nearly a quarter-century of polling. Furthermore, the difference in the percentage choosing the *biblical creationist* versus the *theistic evolutionist* alternative in the Gallup poll tripled, rising from 7% in a November 2004 asking of the standard question to 22% in the version asked in 2005.

That, surely, was not the intention of the intelligent designers of this experiment. If nothing else, Gallup's telling experiment of unintended consequences suggested that Americans' beliefs about human origins were not quite as stable and psychologically structured as nearly everyone had been assuming for years — a finding replicated in a number of other recent polls on the human origins issue.

The polling results presented here, together with those in

FIGURE 1: STRICT BIBLICAL VERSION ATTRACTS MAJORITY

FIGURE 1A
Standard Question:
Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have developed over millions of years from less advanced forms of life, but God guided this process; or human beings have developed over millions of years from less advanced forms of life, but God had no part in the process; or God created human beings pretty much in their present form at one time within the last 10 000 years or so?

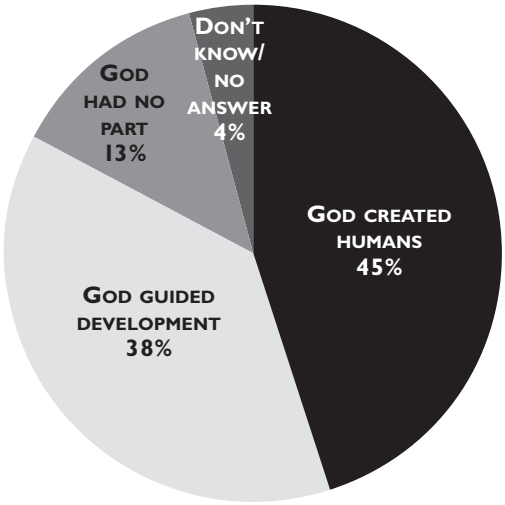
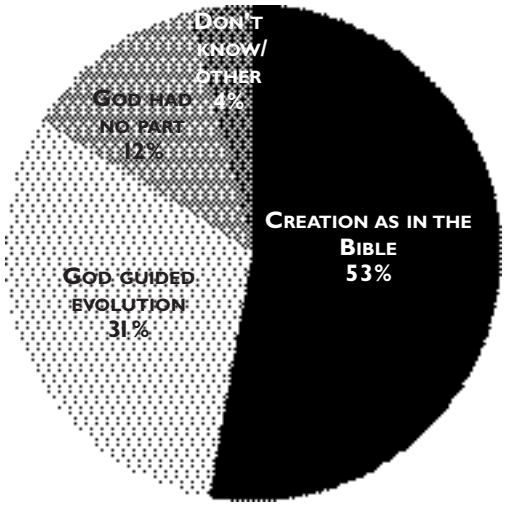


FIGURE 1B
New Version Question:
Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have evolved over millions of years from other forms of life, and God guided this process; human beings have evolved over millions of years from less advanced forms of life, but God had no part in the process; or God created human beings in their present form exactly the way the Bible describes it?

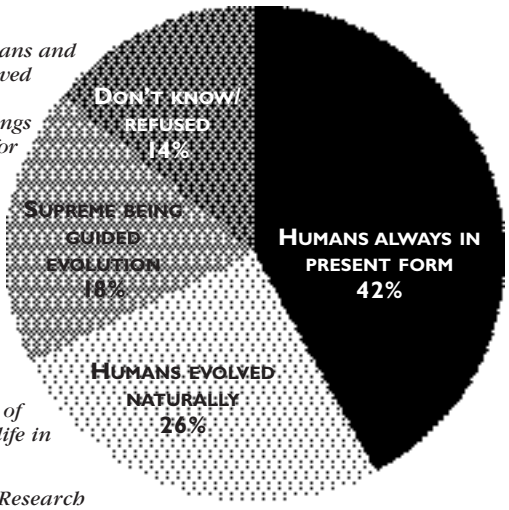


Note: The latest asking of the standard question yielded the following results: God created humans, 46%; God guided development, 36%; God had no part, 13%; Don't Know (DK)/Other, 5%.

Source: Surveys by the Gallup Organization, November 2004 and September 8–11, 2005.

FIGURE 2: NO EXPLICIT MENTION OF GOD

Question:
Some people think that humans and other living things have evolved over time. Others think that humans and other living things have existed in their resent for since the beginning of time. Which of these comes closest to your view? [If evolved] And do you think that humans and other living things have evolved due to natural process such as natural selection, or do you think that a supreme being has guided the evolution of living things for the purpose of creating humans and other life in the form it exists today?



Source: Survey by Pew Research Center, July 7–17, 2005.

Figure 1, tell rather different stories about what Americans believe regarding how human beings came to be; indeed, they are, as we say, "polls apart." Consider the results of the July 2005 Religion and Public Life Survey (<http://people-press.org/reports/display.php3?ReportID=254>) conducted by the Pew Research Center (Figure 2).

Unlike the Gallup Organization's standard question on human origins, which many respondents might well interpret *implicitly* as a question about their belief in God, the questions asked in the Pew poll did not explicitly mention God (*see sidebar, p 41*). First of all, respondents simply had to indicate whether they thought that "humans and other living things have evolved over time," or whether they believed that they "have existed in their present form since the beginning of time." If they thought humans evolved over time, they were then asked to say whether they thought this was due to "natural processes such as natural selection" or because "a supreme being guided the evolution of living things for the purpose of creating humans and other life in the form it exists today."

Asked in this way, 42% of respondents said they believed humans and other living things have existed in their present form since the beginning of time, a figure not that different from what Gallup reported in response to its standard question in 2004 and 2006 (45% and 46%, respectively), in which the wording of the creationist option was somewhat similar. But the Pew estimate of those choosing the biblical creationist position (42%) differed notably from that discovered in the Gallup poll of September 2005 (53%), in which Gallup reworded its description of the creationist alternative to link it more exactly to "the way the Bible describes it."

The Pew Center questions also produced rather different estimates of those believing in the alternatives to the creationist position. Approximately twice as many respondents in the Pew survey endorsed the naturalistic or Darwinist option as did those given the godless-evolution alternative in the Gallup polls. Even more striking, fewer than one out of five respondents in the Pew poll chose the theistic-evolutionist position of humans' evolving under the guidance of God, as compared to nearly a third (31%) in the September 2005 Gallup survey and 36–38% in the 2004 and 2006 Gallup polls.

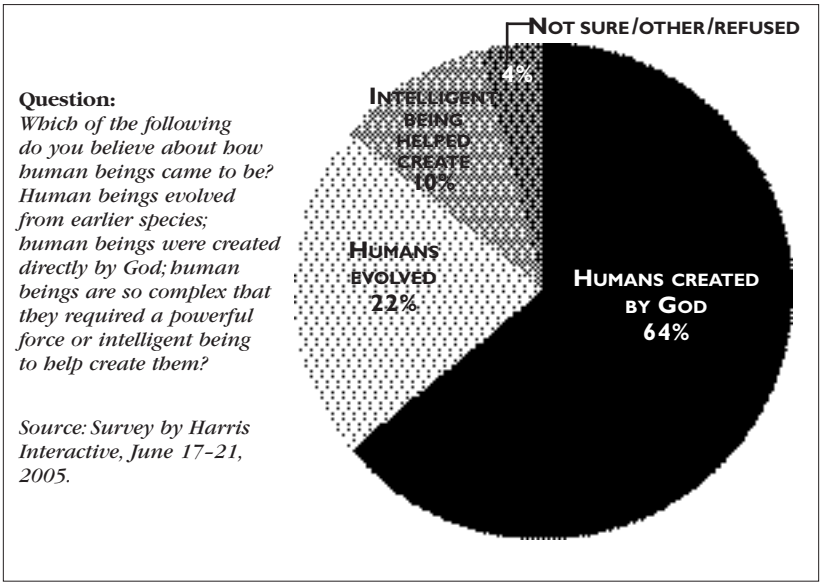
A journalist, politician, or public policymaker looking at one or the other of these conflicting poll results would thus reach rather different conclusions about what Americans really believed about the origins of human life. Examining the Gallup results of September 2005, for example, he or she would most likely think a clear majority of Americans subscribed to the traditional Christian, biblical version of the creation of human beings, that roughly another third believed God had a major role in the process, and that only a very small minority thought humans evolved without any kind of God involved in the process.

In contrast, the same observer spotting the results of the Pew survey might well conclude that, while a definite plurality of Americans appeared to accept the conventional biblical position on human origins, this figure is somewhat lower than what the Gallup Organization has been reporting for the past couple of decades. More importantly, he or she would most likely notice from the Pew survey that the American public has evidently become much more receptive to the idea that human evolution has occurred through the Darwinian process of natural selection, with over a fourth of Americans now choosing that option, as compared to just 10–12% selecting the naturalistic position in previous Gallup polls. Like so many other experiments with the wording of survey questions, the two polls create two different-looking publics — two different social realities (Bishop 2005).

A press release from a third poll conducted by Harris Interactive during the same general time period (June 2005) generated yet another image of what Americans thought about the human evolution issue (Figure 3). According to the headline, "Nearly Two-Thirds of US Adults Believe Human Beings Were Created by God." Beating its polling competitors to the punch, the question asked in the Harris Interactive survey, shown in Figure 3, included an explicit response alternative that tried to capture the "intelligent design" position that had become the focus of national attention in the Dover, Pennsylvania, trial of 2005 (see, for example, the Associated Press, 2005 Dec 20: <http://www.msnbc.msn.com/id/10545387/>).

Framed in this new mode, nearly two-thirds of American adults said they believed in the biblical

FIGURE 3: "INTELLIGENT DESIGN" POSITION OFFERED



literalist position that "human beings were created directly by God." Over a fifth endorsed the naturalistic claim that "humans evolved from earlier species." But, curiously, only one out of ten chose the "intelligent design" proposition that "human beings are so complex that they required a powerful force or intelligent being to help create them." Because this "intelligent-design" alternative was presented immediately after the option that "human beings were created directly by God," many respondents may well have interpreted it as implying a godless "powerful force" or "intelligent being," and thus chose to avoid the implication that they did not believe in God by selecting, as a default, the biblical creationist option.

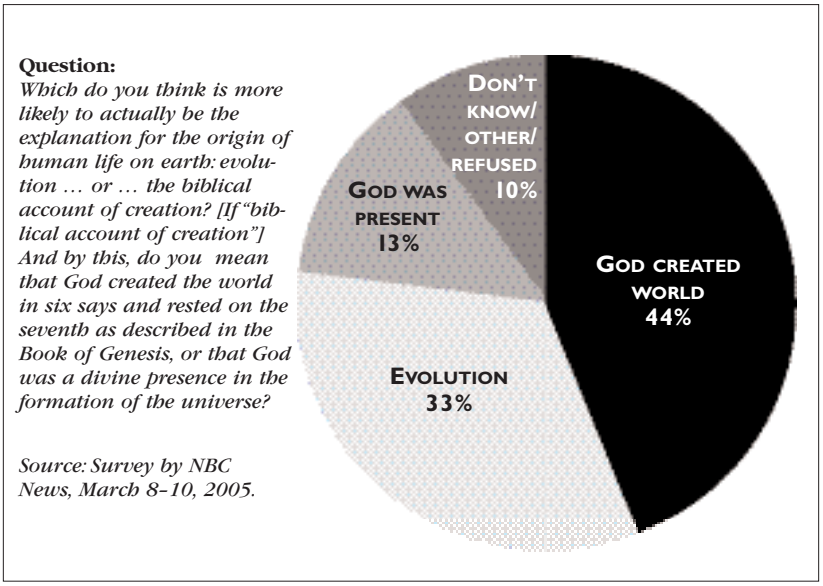
Furthermore, when asked directly in the Harris survey, "Do you think human beings developed from earlier species or not?" 38% said yes, suggesting that the American public might be more accepting of the concept of evolution than the responses to the initial Harris question about human origins would indicate, especially if God were not explicitly mentioned and the word "evolved" were not used.

Another piece of evidence for this question-framing hypothesis comes from responses to a third question asked in the same Harris Interactive survey: "Do you believe apes and man have a common ancestry or not?" Asked in this more scientifically correct way, nearly half of American adults (46%) said "yes" to the idea of a shared ancestry — down from what it was in a 1996 Harris survey (51%), but still fairly impressive, given all the press releases (such as Gallup News Service, 2001 Mar 5, <http://www.gallup.com/poll/1942/Substantial-Numbers-Americans-Continue-Doubt-Evolution-Explan.aspx>) over the years telling us how favorable the public has been towards the biblical creationist account of human origins.

One final piece of evidence from Harris for Americans' unexpected receptivity to evolutionary thought showed up in respondents' reactions to the statement, "Darwin's theory of evolution is proven by fossil discoveries." Nearly half (46%) agreed, either strongly or somewhat, with this supposedly controversial claim in religious-minded America — hardly what one would expect from reading the Gallup polls.

Results from an NBC News poll on beliefs about human origins raise even more doubts about the American public's supposed great resistance to the theory of evolution. Taking special care to clarify what respondents meant when they said they believed in the biblical account of creation, the NBC interviewers asked them the question shown in Figure 4.

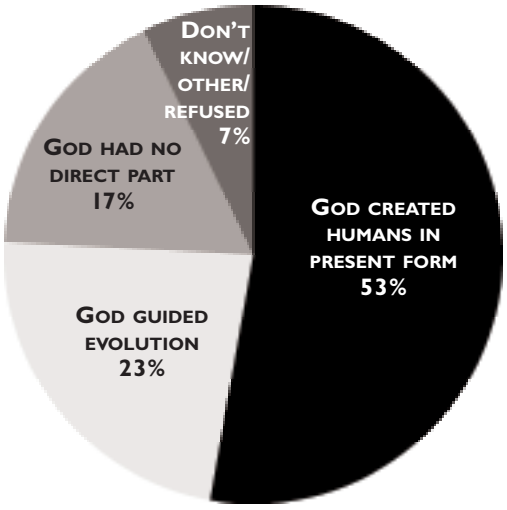
FIGURE 4: GENESIS VERSUS DIVINE PRESENCE?



With the question posed in this manner, 44% said they literally believed that "God created the world in six days and rested on the seventh as described in the Book of Genesis." Only 13% thought God was just "a divine presence in the formation of the universe." But amazingly, some might say, a third (33%) of the respondents chose evolution as the best explanation of human life on earth — roughly triple the average percentage (10.6%) reported in the Gallup polls over

FIGURE 5: Even Minor Changes Make a Difference

FIGURE 5A
Question:
Which of the following statements comes closest to your views on the origin and development of human beings? … Human beings evolved from less advanced life forms over millions of years, and God did not directly guide this process; human beings evolved from less advanced life forms over millions of years, but God guided this process; God created human beings in their present form?



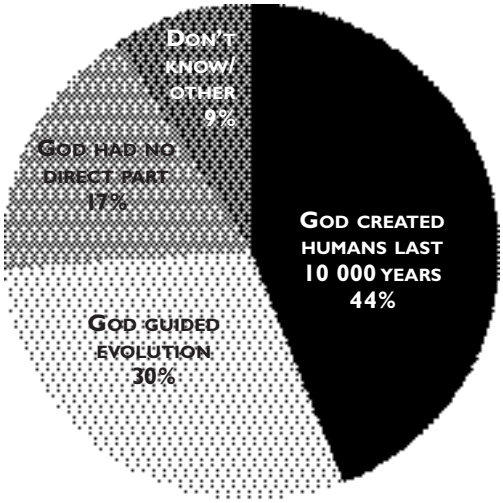
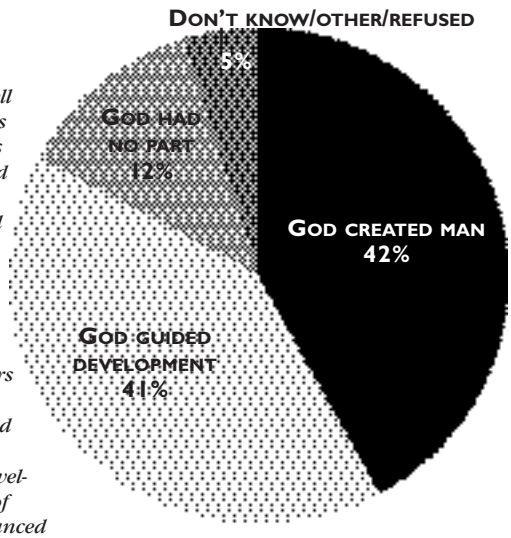


FIGURE 5B
Question:
Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have evolved over millions of years, and God guided this process; human beings evolved over millions of years from other forms of life, but God had no part in this process; God created human beings in their present form within the last ten thousand years?

Source: Survey by CBS News, April 6–9, 2006.

FIGURE 6: Another Messy Complication

FIGURE 6A
Question:
As I read off three statements, please tell me which one comes closest to your views about the origin and development of man. … God created man pretty much in his present form at one time within the last 10 000 years; man has developed over millions of years from less advanced forms of life and God had no part in this process; man has developed over millions of years from less advanced forms of life, but God guided this process, including man's creation.



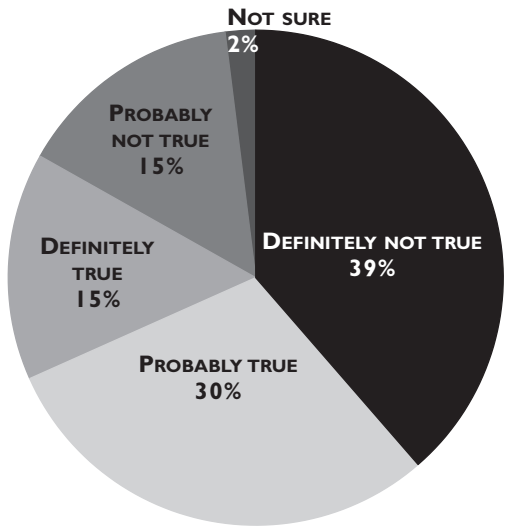


FIGURE 6B
Question:
From the statement I'll read, look at this card and tell me which answer comes closest to your opinion on how true it is … definitely true, probably true, probably not true, definitely not true: Human beings developed from earlier species of animals.

Source: SurvSource: Survey by NORC-GSS, August 18, 2004 – January 4, 2005.

the past twenty to twenty-five years.

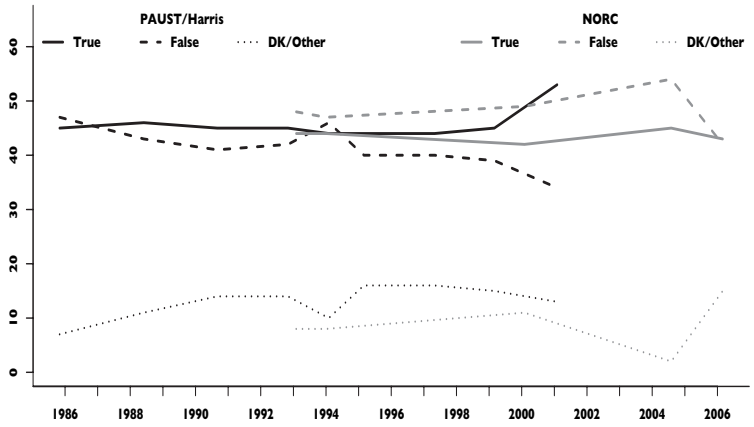
As if all this were not enough, questions on human origins in a CBS News poll provide further evidence that even very minor alterations in how the question is asked can make a noticeable difference in portraying what Americans supposedly believe.

With one version of the question asked by CBS (Figure 5A), a majority of Americans appeared to subscribe to the creationist view that "God created human beings in their present form." But with the other version (Figure 5B), which added the more specific description, "within the last ten thousand years," the seeming majority endorsing the biblical creationist position evaporated.

Adding yet another messy complication to the mix, the National Opinion Research Center General Social Survey (NORC-GSS) in 2004–2005 included an exact wording of the original Gallup question on human origins (Figure 6A). Surprisingly, this replication elicited a noticeably smaller percentage of respondents (42%) who said they believed that "God created man pretty much in his present form within the last 10 000 years" as compared to more recent

FIGURE 7: TREND IN EVOLUTION BELIEF

Question:
From the statement I'll read, look at this card and tell me which answer comes closest to your opinion on how true it is: definitely true, probably true, probably not true, definitely not true. Human beings developed from earlier species of animals.



Source: Surveys by National Science Foundation Public Attitudes and Understanding of Science and Technology (PAUST) 1985–92, 1995–99, 2001; NORC-GSS 1993–94, 2000, 2004; Harris Interactive, 1994.

Gallup replications in 2004 and 2006 (45–46%). Just 12% of the respondents in the NORC-GSS appeared, as in most previous Gallup polls, to endorse the evolutionist position that "man has developed over millions of years from less advanced forms of life. God had no part in this process." But, curiously, when asked in the very next question whether they believed that it was either definitely or probably "true" that "Human beings developed from earlier species of animals," nearly half said yes (Figure 6B)!

This figure suggests there may be three to four times as many American adults who accept the basic premise of the theory of evolution than is typically indicated by the standard Gallup question on human origins.

Furthermore, various polling organizations have asked this last question, which is an exact replicate of the item currently asked in the National Science Foundation project, Public Attitudes and Understanding of Science and Technology (PAUST) (<http://www.ropercenter.uconn.edu/dataacq/nsf_surveys_science_technology.html>). With one notable exception (2001) and minor variations in wording, the trend, shown in Figure 7, looks remarkably stable.

On average (using the median), the percentage endorsing the proposition that "human beings, as we know them today, developed from earlier species of animals" has hovered around 45% for the past *twenty* years. How different an impression of the American public this gives us as compared to the standard Gallup polls of the same era — a result most likely due to differences in mass media coverage favoring press releases via the commercial medium of the Gallup News Service.

Yet another permutation of the question by the Democracy Corps Poll in October 2005 (<http://archive.democracycorps.com/reports/surveys/Democracy_Corps_October_19-23_2005_Survey.pdf>) pitted a PAUST-like alternative about human origins — "Humans evolved from earlier species" — against a Gallup-like creationist alternative, "God created humans in their present form." Presenting these polar alternatives, however, made the American public look lopsidedly creationist, with 60% choosing the biblical stance (Figure 8).

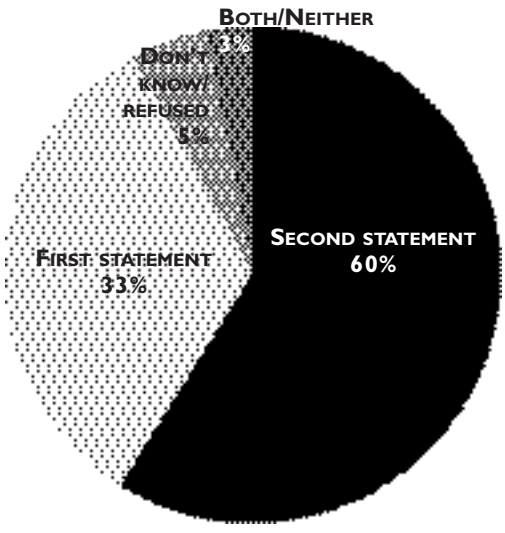
As a final installment, consider the variation of the human origins question asked by the Virginia Commonwealth University (VCU) in its Life Sciences Survey of September 2005 (<http://www.news.vcu.edu/news.aspx?v=detail&nid=1303>). In this case, the question, shown in Figure 9, made no mention whatsoever of the origin of "human life," referring instead to the origin of "biological life".

This sanitizing of the question made but a modest difference. Including a mention of God produced results resembling earlier Gallup polls on human origins, with more than four out of ten respondents telling interviewers they believed "God directly created biological life in its present form at one point in time." Only about a fourth of them, however, subscribed to the theistic-evolutionist notion that "Biological life developed over time from simple substances, but God guided this process." A notable portion also thought that "biological life developed over time from simple substances, but God did not guide this process." So, by characterizing it as "biological life" rather than

FIGURE 8: DEMOCRACY CORPS

Question:
Please tell me whether the first statement or the second statement comes closer to your own views, even if neither is exactly right. … First statement: Humans evolved from earlier species. Second statement: God created humans in their present form.

Source: Survey by Democracy Corps, October 19–23, 2005.



"human life," the VCU experiment may have reduced, somewhat, resistance to the theory of evolution.

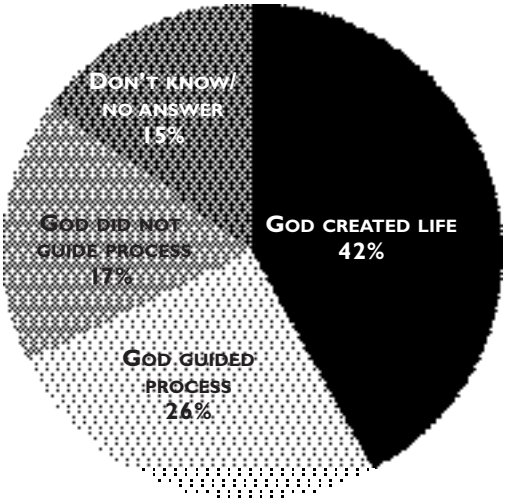
All of this goes to show how easily what Americans appear to believe about human origins can be manipulated by how the question is asked. As we have seen, depending on the wording of the question the percentage of apparent biblical creationists can vary from as little as 42% to as high as 64%; the percentage of theistic evolutionists or believers in "intelligent design" from as much as 41% to as little as 10–18%; and the percentage of Darwinist or naturalistic evolutionists, from as low as 10–13% to as high as 33–46%.

What are we to conclude from these messy results about something as supposedly fundamental as Americans' religious beliefs about the role of God in creating human life? Are Americans poles apart on this perennial "culture war" question, as some would have us believe, or merely polls apart? American public opinion on this matter would seem to be a lot more malleable than we have heretofore suspected.

FIGURE 9: THE ORIGIN OF BIOLOGICAL LIFE

Question:
Which of the following statements come closest to your views on the origin of biological life? Biological life developed over time from simple substances, but God guided this process; biological life developed over time from simple substances, but God did not guide the process; God directly created biological life in its present form at one point in time.

Source: Survey by Virginia Commonwealth University, September 14–17, 2005.



NOTE ON THE PEW STUDY

Just before being asked this sequence of questions about human origins, respondents in the Pew poll were asked to indicate whether or not they believed in God, a universal spirit, or a higher power and, if yes, whether they thought God, the universal spirit, or this higher power was responsible for the creation of life on earth. Of those who believed in God (85%), 92% thought God was responsible for the creation of life on earth; 6% did not believe this; and 2% said "don't know." And of those who did not believe in God, but did believe in a universal spirit or higher power, 45% said this universal spirit or higher power was responsible for the creation of life on earth; 45% did not believe it; and 9% didn't know. So, contextually speaking, respondents were certainly primed to think about the role of a God, a universal spirit, or higher power in answering the subsequent questions about human evolution — a potential bias that cannot be ruled out in the absence of a controlled experiment.

DUNCAN AND GEIST ON POLLS

In "The creationists: How many, who, and where?" (*RNCSE* 2004 Sep/Oct; 24 [5]: 26–33), Otis Dudley Duncan and Claudia Geist studied poll data on public opinion regarding evolution and creationism from the Gallup Poll and the General Social Survey. Among their findings: "women are somewhat more likely to be men to be creationists, the elderly more so than the young, African-Americans more than whites, those who attend religious services more often than those who attend seldom or never, political conservatives more than liberals, and those agreeing with the pro-life position than those classified as pro-choice on abortion." The most startling finding, they wrote, was the relationship between creationism and education: "In the sector defined by firm belief in God in combination with biblical literalism and medium to high frequency of attendence at religious services ... people with more advanced schooling actually are more likely to be creationists than those with lesser amounts of education." "The Bible Belt," they concluded, "is bigger than readers may have thought, not only geographically but also metaphorically."

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In Praise of the Bravery of Biology Teachers

Frans de Waal

[*Asked by* Time *magazine to provide a nomination for the 2007 Person of the Year, Frans de Waal wrote, "I nominate all the brave biology teachers of this nation who teach evolution despite the opposition they encounter. Without evolution, there is no biology; without biology, there is no medicine. It's as simple as that. These teachers arm their pupils with the knowledge they need, putting them on level footing with the rest of the world where evolutionary theory is uncontroversial." His words appeared in the November 26, 2007, issue of* Time. *NCSE asked him to amplify on his nomination, and we are pleased to publish his further comments here.*]

I made this nomination and offered this quote, because I feel it is truly remarkable that so many teachers in this nation have the courage to go against the opinion of parents and sometimes school boards to defend science in the face of what I consider medieval ideas. The idea that the world was created a couple of thousand years ago is not any more believable than the idea that the cosmos revolves around the earth or that the earth is flat. To revamp this line of thinking by calling it "intelligent design" and giving it a scientific flavor doesn't change anything. The fact remains that 99%, or more, of my fellow biologists are convinced that evolution offers the most comprehensive and best theory, and that "intelligent design" is simply untestable, which is the worst thing scientists can say about any idea.

I admire the persistence of teachers to do what is right, to defend the evidence-based approach to the truth that is science, and to risk the wrath of people who believe that "theory" means "we don't know." In science, "theory" simply means that we have a way of finding out, which is far more than can be said of faith.

When I came to this country, one of the things that struck me right away is its irrational approach to biology. Mind you, this was twenty-five years ago, and at the time I just hoped it would blow over. It never did, however, and I have become pretty desperate about it. How come that all modern nations accept evolutionary theory and don't even consider it a point of debate, but not the US? Is it a small minority that thwarts progress, or is there a deep-down resistance? And if so, where does it come from?

One of the issues often brought up is the misunderstanding that if we were to believe that humans descended from "monkeys" and that God was not part of the process, this would imply the absence of a moral compass. Evolution would conflict, in this view, with a society based on values. People sometimes tell me, "to believe in evolution means I could rape my neighbor and it would be fine." I find this a strange idea, and I must say that in fact I don't very much like meeting people who are only stopped from raping their neighbor by their belief in God.

My personal belief is that nature is wonderful. For me, there is nothing negative about being part of nature. Moral rules, insofar as we have and obey them, have a basis in evolved human nature; hence in the animal kingdom as a whole. Nature does not prescribe how we should live, but it has given us the capacity for empathy and sympathy, and has produced cooperative tendencies, all of which we relied upon when we constructed a moral world.

Teachers should be free to communicate all of these exciting ideas about the role of biology and the evolution of the human species. Biology has so much to offer. It is in fact the most exciting discipline of our age, so let the teachers convey this excitement without being hampered by the outdated ideas of previous, uninformed eras.

Frans de Waal is Director of the Living Links Center and the CH Candler Professor of Psychology at Emory University. He is the author of a number of popular books, including Our Inner Ape *(New York: Riverhead, 2005).*

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G R A V I T Y : It's Only a Theory

Ellery Schempp

[*Textbook disclaimers are down, but not out. This satirical look at "only a theory" disclaimers imagines what might happen if advocates applied the same logic to the theory of gravitation that they do to the theory of evolution.*]

All physics textbook should include this warning label:

> This textbook contains material on Gravity. Universal Gravity is a theory, not a fact, regarding the natural law of attraction. This material should be approached with an open mind, studied carefully, and critically considered.

The Universal Theory of Gravity is often taught in schools as a fact, when in fact it is not even a good theory.

First of all, no one has measured gravity for every atom and every star. It is simply a religious belief that it is "universal".

Secondly, school textbooks routinely make false statements. For example, "the moon goes around the earth." If the theory of gravity were true, it would show that the sun's gravitational force on the moon is much stronger than the earth's gravitational force on the moon, so the moon would go around the sun. Anybody can look up at night and see the obvious gaps in gravity theory.

The existence of tides is often taken as a proof of gravity, but this is logically flawed. Because if the moon's "gravity" were responsible for a bulge underneath it, then how can anyone explain a high tide on the opposite side of the earth at the same time? Anyone can observe that there are *two* — not *one* — high tides every day. It is far more likely that tides were given us by an Intelligent Creator long ago and they have been with us ever since. In any case, the fact that there are two high tides falsifies gravity.

There are numerous other flaws. For example, astronomers, who seem to have a fetish for gravity, tell us that the moon rotates on its axis but at the same time it always presents the same face to the earth. This is patently absurd. Moreover, if gravity were working on the early earth, then earth would have been bombarded out of existence by falling asteroids, meteors, comets, and other space junk. Furthermore, gravity theory suggests that the planets have been moving in orderly orbits for millions and millions of years, which wholly contradicts the Second Law of Thermodynamics. Since everything in the Universe tends to disorder according to the Second Law, orderly orbits are impossible. This cannot be resolved by pointing to the huge outpouring of energy from the sun. In fact, it is known that the flux of photons from the sun and the "solar wind" actually tends to push earth away.

There are numerous alternative theories that should be taught on an equal basis. For example, the observed behavior of the earth's revolving around the sun can be perfectly explained if the sun has a net positive charge and the planets have a net negative charge, since opposite charges attract and the force is an inverse-square law, exactly as proposed by the increasingly discredited Theory of Gravity. Physics and chemistry texts emphasize that this is the explanation for electrons going around the nucleus, so if it works for atoms, why not for the solar system? The answer is simple: scientific orthodoxy.

The US Patent Office has never issued a patent for anti-gravity. Why is this? According to natural law and homeopathy, everything exists in opposites: good–evil; grace–sin; positive charges–negative charges; north poles–south poles; good vibes–bad vibes; and so on. We know there are anti-evolutionists, so why not anti-gravitationalists? It is clearly a matter of the scientific establishment elite's protecting their own. Anti-gravity papers are routinely rejected from peer-reviewed journals, and scientists who propose anti-gravity quickly lose their funding. Universal gravity theory is just a way to keep the grant money flowing.

Even Isaac Newton, said to be the discoverer of gravity, knew there were problems with the theory. He claims to have invented the idea early in his life, but he knew that no mathematician of his day would approve his theory, so he invented a whole new branch of mathematics, called fluxions, just to "prove" his theory. This became calculus, a deeply flawed branch having to do with so-called "infinitesimals" which have never been observed. Then when Einstein

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invented a new theory of gravity, he, too, used an obscure bit of mathematics called tensors. It seems that every time there is a theory of gravity, it is mixed up with fringe mathematics. Newton, by the way, was far from a secular scientist, and the bulk of his writings is actually on theology and Christianity. His dabbling in gravity, alchemy, and calculus was a mere sideline, perhaps an aberration best left forgotten in describing his career and faith in a Creator.

To make matters worse, proponents of gravity theory hypothesize about mysterious things called gravitons and gravity waves. These have never been observed, and when some accounts of detecting gravity waves were published, the physicists involved had to quickly retract them. Every account of anti-gravity and gravity waves quickly elicits laughter. This is not a theory suitable for children. And even children can see how ridiculous it is to imagine that people in Australia are upside down with respect to us, as gravity theory would have it. If this is an example of the predictive power of the theory of gravity, we can see that at the core there is no foundation.

Gravity totally fails to explain why Saturn has rings and Jupiter does not. It utterly fails to account for obesity. In fact, what it does "explain" is far outweighed by what it does not explain.

When the planet Pluto was discovered in 1930 by Clyde Tombaugh, he relied on "gravitational calculations". But Tombaugh was a Unitarian, a liberal religious group that supports the Theory of Gravity. The modern-day Unitarian-Universalists continue to rely on liberal notions and dismiss ideas of anti-gravity as heretical. Tombaugh never even attempted to justify his "gravitational calculations" on the basis of Scripture, and he went on to be a founding member of the liberal Unitarian Fellowship of Las Cruces, New Mexico.

The theory of gravity violates common sense in many ways. Adherents have a hard time explaining, for instance, why airplanes do not fall. Since anti-gravity is rejected by the scientific establishment, they resort to lots of hand-waving. The theory, if taken seriously, implies that the default position for all airplanes is on the ground. While this seems true for Northwest Airlines, it appears that JetBlue and Southwest have a superior theory that effectively harnesses forces that overcome so-called gravity.

It is unlikely that the Law of Gravity will be repealed given the present geo-political climate, but there is no need to teach unfounded theories in the public schools. There is, indeed, evidence that the Theory of Gravity is having a grave effect on morality. Activist judges and left-leaning teachers often use the phrase "what goes up must come down" as a way of describing gravity, and relativists have been quick to apply this to moral standards and common decency.

Finally, the mere name, "Universal Theory of Gravity" or "Theory of Universal Gravity" (the secularists like to use confusing language) has a distinctly socialist ring to it. The core idea of "to each according to his weight, from each according to his mass" is communistic. There is no reason that gravity should apply to the just and the unjust equally, and the saved should have relief from such "universalism." If we have Universal Gravity now, then universal health care will be sure to follow. It is this kind of universalism that saps a nation's moral fiber. It is not even clear why we need a theory of gravity: there is not a single mention in the Bible, and the patriotic Founding Fathers never referred to it.

Overall, the Theory of Universal Gravity is just not an attractive theory. It is based on borderline evidence, has many serious gaps in what it claims to explain, is clearly wrong in important respects, and has social and moral deficiencies. If taught in the public schools, by mis-directed "educators", it has to be balanced with alternative, more attractive theories with genuine gravamen and spiritual gravitas.

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UNION OF CONCERNED SCIENTISTS ADDS ITS VOICE FOR EVOLUTION

On September 4, 2007, the Union of Concerned Scientists issued "Science, Evolution, and Intelligent Design," a statement (available on-line at <http://www.ucsusa.org/scientific_integrity/interference/statement-on-id.html>) expressing concern about "current attempts to mandate the teaching of 'intelligent design' and other non-scientific accounts of the origins of species and biological diversity in our nation's science classrooms" and "the misleading interpretations of scientific principles being used to discredit and misrepresent the science of evolution," and calling for "the mobilization of scientists, teachers, policy makers, and concerned citizens to combat efforts to undermine science education and the integrity of science."

Together with the statement, the Union of Concerned Scientists provided a six-section primer (available on-line at <http://www.ucsusa.org/scientific_integrity/interference/intelligent-design.html>) "on the scientific theory, evolution, and intelligent design, along with discussions of why intelligent design is not science, why it should not be part of the science curriculum, and the broader implications anti-evolution efforts can have on society." The Union of Concerned Scientists is an independent, nonprofit alliance of more than 200 000 citizens and scientists, basing its research and outreach on rigorous scientific analysis and the maintenance of scientific integrity in decision making among the public and policy makers.

BookReviews

Our Inner Ape: A Leading Primatologist Explains Why We Are Who We Are

by Frans de Waal
New York: Riverhead Books, 2005.
288 pages

Reviewed by Anne D Holden

There are only a few names within the field of primatology that are recognizable to the general public, and Frans de Waal certainly falls into this category. The noted Emory University primatologist has studied our closest living relatives, chimpanzees and bonobos, for nearly 30 years. He has authored countless scientific articles and texts, as well as several books. While his previous works have focused on such topics as chimpanzee politics and ape social complexity, de Waal's 2005 book looks at similarities between humans and our two closest living ape relatives. Entitled *Our Inner Ape: A Leading Primatologist Explains Why We Are Who We Are*, this book looks at various aspects of what most people believe to be distinctively human characteristics, including love, kindness, and power, explaining them in the context of our evolutionary cousins: chimpanzees and bonobos.

Yet instead of simply describing cultural traits that we may share with chimpanzees or bonobos, de Waal continually poses the question: to which species we are more similar, the often-violent chimpanzee, or the peaceful and overtly sexual bonobo? De Waal attempts to find an answer to this question through the examination of the human characteristics of power, sex, violence, and kindness.

One of the strengths of de Waal's writing is his vast amount of first-hand experience, having worked with chimps and bonobos at facilities both in his native Netherlands and in the US. De Waal uses these experiences to help to explain important similarities between human and chimpanzee/bonobo cultures. In chapters on power, sex, violence, and kindness, he offers powerful examples of how chimpanzees or bonobos exhibit the characteristic in question, often in a very human-like manner. Indeed, it is these examples, peppered throughout each chapter, that allow this book to be enjoyed by a wide audience.

For instance, in the chapter on power, de Waal describes a struggle for male dominance that took place between three chimpanzees in the Arnhem zoo in Amsterdam. In this touching story, de Waal tells how the alpha male, Luit, was attacked by two other chimps, Yeoren and Nikkie, as a response to Luit's fast ascent to power within the group. Yeoren and Nikkie had formed an alliance, whose purpose was to get rid of Luit and then take over control of the group. Unfortunately, Luit did not survive the encounter, and this display of both violence and strategy leads de Waal to remark, "Those two had been plotting against him in order to take back the power they had lost. The shocking way they did so opened my eyes to how deadly seriously chimpanzees take their politics" (p 43). Noting that political murder is also present in our species, de Waal observes that the struggle for power among both chimpanzees and humans illustrates just how closely related to each other we are.

However, though humans' violent nature can be compared accurately to that of chimpanzees, perhaps our sex drive can be compared more accurately to that of bonobos. Bonobos used to be known as "pygmy chimpanzees," but have since been upgraded to their own separate species within the family of great apes. Though they are physically similar to chimpanzees, their social structure and culture is markedly different, especially with regard to sex. De Waal examines human sexuality in the same way he examines human violence: in the context of our ape relatives. Indeed, de Waal begins his discussion on sexuality by asking, "Why are people and bonobos such sexual hedonists? Why are we endowed with sexual appetites beyond those needed to fertilize the occasional egg and beyond the partners who make this possible?" (p 96). De Waal then continues on an exploration of multiple aspects of both human and ape sexuality, covering such topics as homosexuality, child-rearing, and infanticide. He then ends his discussion on how we came to differ from bonobos in our sexuality, pointing to the evolution of the nuclear family as a step towards reduction of overt sexual competition, which in turn increased cooperation among these family units. De Waal finally proposes that our success as a species may have been a result of an abandonment of the "bonobo lifestyle" in favor of a tighter control of our sexual expressions.

De Waal's final chapter takes the characteristics on which he focuses — power, sex, violence, and kindness — and asks which

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species humans are more similar to: chimpanzees or bonobos? However, de Waal argues that attempting to categorize ourselves in this way is fruitless, as we humans are much too bipolar: we cooperate and we compete, we are characterized by hate and by love. Further, de Waal argues that if we are "essentially apes, or at least descended from apes, we are born with a gamut of tendencies from the basest to the noblest. ... our morality is a product of the same selection process that shaped our competitive and aggressive side" (p 237). In other words, when attempting to discover from where our humanity evolved, we must look towards both our closest living relatives: chimpanzees *and* bonobos; and that both these species represent our two "inner apes."

De Waal's exploration of our "inner ape" is largely readable and often engaging, and even a reader with only a general interest in primatology would have no trouble understanding the arguments that de Waal presents. However, advanced primatologists and students might find the subject matter rather basic, as there is not much new research discussed in the book. In addition, the reliance on vivid, often emotional examples may put off some veteran primatologists who would prefer a more straightforward or dry approach. Yet it is clear that de Waal was not trying to create a data-heavy textbook on human and ape cultures. Rather, de Waal's argument that humans exhibit important qualities of both chimpanzees and bonobos is well-developed, organized, and is complemented by excellent examples from his years in close contact with these animals. As a result, the reader is left with a solid understanding of what it means to be human, as well as what it means to be an ape; something that would be appealing to anyone with a general interest in anthropology and psychology.

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Just a Theory: Exploring the Nature of Science

by Moti Ben-Ari
Amherst (NY): Prometheus Books, 2005. 237 pages

Reviewed by
Michael Zimmerman

The most common criticism anyone involved in the evolution/creationism controversy is likely to hear is that evolution is just a theory, and thus there's no reason to privilege it over other ideas. Although Ben-Ari does not focus exclusively on evolution, he does pay it significant attention as he attempts to explain what it means for a scientific idea to rise to the level of theory.

He does a nice job, for example, of comparing the theory of gravity to the theory of evolution, pointing out that while there is no public controversy over the former, a great deal more is actually known about the latter. Sophisticated evolutionary mechanisms abound with a great deal of research being produced each year designed to determine the conditions under which each operates. A mechanism for gravity, on the other hand, is still purely conjectural with no solid evidence that gravitons — gravitational waves, and particles hypothesized to be "analogous to the electromagnetic waves and photons that come from electromagnetic fields" — actually exist. In the light, somewhat humorous style that permeates the book, Ben-Ari concludes, "Currently, the evidence [for gravitons] is controversial, so we must live with the embarrassment of risking our lives on a theory whose mechanism is not fully understood" (p 32).

Ben-Ari makes his comparative point very clear: "the theory of evolution more than fulfills all of the requirements of scientific 'theoryhood,' even more than the theory of gravitation. To brand evolution as 'just a theory' is the finest compliment one can confer on it!" (p 38).

The only reasonable conclusion to be drawn from this discrepancy is that those who attack evolution for being just a theory are clearly not doing so on scientific grounds. If the theory of gravity could be interpreted by some to have political ramifications, it too would be attacked by those who disagreed with those political extensions. What's important to remember, though, is that the misuse of scientific concepts, purposefully or ignorantly, when those concepts are brought into the public arena should have no bearing on their underlying scientific validity. Ben-Ari appropriately explains that science is a discipline that strictly imposes self-limitations. "Few people appreciate that modern science is quite limited in scope and restricts itself to description and explanation of natural phenomena; on purpose, science does not deal with *purpose*" (p x).

Ben-Ari deals with the basics of the epistemology of science, how we know what we know, in a straightforward and readable fashion that is fully accessible to the general reader. He covers the importance of falsification, makes critical distinctions between the technical use of terms and the common use of the same words, provides a cursory overview of the use of statistics in science (focusing mostly on medical examples), and offers abbreviated critiques of the sociology of science and postmodern attacks on science. Taken together, all of this allows Ben-Ari to accomplish his main goal of helping readers "distinguish claims that are provisional and debatable, from claims that are so well established that rejecting them drives one over the border that divides real science from *pseudoscience*, which are activities that illegitimately wrap themselves in the mantle of science" (p ix).

The more sophisticated reader, one who is already fairly well immersed in the evolution/creationism controversy, is not likely to find much new in the book.

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Similarly, this is not the book for those looking for specific refutations of creationist assertions about their "discipline" or for ammunition to rebut creationist attacks on evolution beyond those of the "it's just a theory" genre.

Ben-Ari ends each chapter with a very short vignette of a famous scientist. These interesting but fairly superficial asides are designed to humanize the face of science and to demonstrate that science is always conducted within a cultural and historical context. The twelve people discussed include such notables as Newton, Darwin, Einstein, Pasteur and Pauling, but, unfortunately only one woman, mathematician Emmy Noether, is included.

By covering topics as varied as the nature of reductionism, geology, and the future of science, in addition to the epistemological approaches mentioned above, in such a short book it is not surprising that Ben-Ari is barely able to scratch the surface of any one of them. He has provided the equivalent of a tasty appetizer, one that might be the precursor to an elegant meal. Many readers will likely finish the book ready for the next, more substantial, course — and that's not a bad thing!

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Intelligent Design and Fundamentalist Opposition to Evolution

by Angus M Gunn
Jefferson (NC): McFarland and Company, 2006. 215 pages

Reviewed by Charles A Israel

Other than the tantalizing clue of a dedication "To my fellow evangelicals," Angus Gunn offers little sense of the purpose or intended audience for this short, polemical work. Whether these referenced evangelists are spreading the good news of the Christian gospels or the modern evolutionary synthesis is not clear, though his book seems to lament the drift of ever more American Christians into anti-evolutionist camps. Evangelical Christian fundamentalists and non-fundamentalists might agree on very little, he asserts, but they "find common ground in their opposition to the theory of evolution" (p 53). How they came to this state, and why that poses a problem for modern America, is the focus of the book.

The major theme of Gunn's work is "the importance of modern science and the tragedy of fundamentalist rejection of it for such a long time" (p 2). Gunn attacks one side of this problem in the final chapter, offering a few case studies of how biological research has been important in improving "human welfare". Concentrating on recent advances in genetics and their positive impact on medicine, Gunn also appends a listing of "medical breakthroughs over 100 years" at the end of his book (p 189–90). The role of biological research in these advances is not entirely clear, and it seems that Gunn could have strengthened his case for the plausibility of evolution by examining how human pathogens actually evolve and not just stating that science is finding ways to combat disease.

Perhaps too easily blurring distinctions among "creationists, … proponents of intelligent design, [and] fundamentalists" (p 3), Gunn nonetheless offers some helpful insights into what unites anti-evolutionists. In less temperate moments he damns them all as "just defending the past" (p 1), but at his best Gunn demonstrates the binding thread of a "common sense" approach to science, theology, and even political philosophy that lies at the heart of an evangelical rejection of evolutionary biology. The problem with such a belief, he notes incisively, is that these claims to inductive study of science or scripture mask the reality that the reader or Baconian scientist are still engaged in a process of interpretation. Theological fundamentalists seek to privilege their readings as the most authentic, but their conclusions are no less bound up with their own times and concerns than are those of theological modernists or evolutionary biologists. Gunn seems unwilling to pursue these insights about interpretation into science, boldly claiming, "science is and always has been free from issues of ethics and morality" (p 4), despite the growing literature in the social history of science since Thomas Kuhn's path-breaking *The Structure of Scientific Revolutions* (1970).

Too often Gunn falls into an approach he criticizes when used by anti-evolutionists; like several chapters in *The Fundamentals*, the early-twentieth-century handbook of theologically conservative Christian thought, Gunn's book frequently proves more "vitriolic rather than critical" (p 93). He describes evolutionary opponents as practitioners of a "mindless fundamentalism" (p 22) who refuse "to deal rationally" (p 39) with modern science. He even turns on its head the oft-used anti-evolutionist attack linking belief in evolution with the Prussian militarism of World War I or the Nazi atrocities of World War II. Gunn explains the success of George McCready Price's flood geology with an explicit connection to Adolf Hitler, suggesting that both perpetrated "a big lie" (p 160) with disastrous consequences. I am not suggesting a purity of motive for anti-evolutionists — among other sources, evidence from the 2005 Dover trial demonstrated a clear pattern of deception on the part of several proponents of "intelligent design" — but to equate opponents of naturalistic evolution with a mass murderer of historic proportions is sure to produce more heat than light.

Beyond the excess of vitriol, Gunn's volume suffers from insufficient background in the admittedly voluminous secondary literature. He asserts that Dayton, site of the 1925 Scopes trial, "was as fundamentalist as any place in America" (p 106), although as Edward Larson has demonstrated, the town was mostly Methodist and had a higher percentage of

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non-church members than many surrounding towns (Larson 1997: 92–3). Careless editing leads Gunn to several confusing passages: he covers the same topics in multiple places, at times repeating multiple sentences verbatim (for example on p 120 and 161, on Henry Morris); he seems to regard Stephen Jay Gould as a contemporary of Karl Marx and a precursor to the Russian Revolution (p 103); and he suggests that modern scientists no longer regard "naturalism … as very important" (p 129).

US President Warren G Harding (1921–23) reportedly remarked "I have no trouble with my enemies, but my damn friends … they're the ones that keep me walking the floor nights!" The President was reacting to accusations lodged against several members of his short-lived administration; Harding complained that allegations of wrongdoing by others prevented him from pursuing his agenda. While there is no hint of corruption, malfeasance, or malicious intent in the volume under review, Angus Gunn's combative approach and inattentive editing might leave defenders of the teaching of evolution in public schools wandering the hallways after dark. In short, it is neither a very effective tool for explaining to evolutionists why fundamentalist Christians cannot accept the central arguments of modern biology nor for converting anti-evolutionists to an understanding of the importance of modern science.

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Evolution versus Intelligent Design: Why All the Fuss? The Arguments for Both Sides

by Peter Cook
Sydney (Australia): New Holland Publishers, 2006. 128 pages

Reviewed by Matt Young

Peter Cook, a philosopher with a degree from the University of Sydney, suffers from terminal objectivity — the idea that you have to give equal consideration to both sides of any controversy, whether or not both sides have equal merit. Why all the fuss indeed! There is a fuss because a tiny handful of well-funded activists, few of them scientists, have set themselves up to undermine the theory of evolution and thereby all of science, because evolution does not fit well with their preconceived religious notions. You would not know that from reading this book. Indeed, on page 45, Cook swallows, hook, line, and sinker, the contention that "intelligent design" creationism is not religious in origin because it does not "rule out the possibility that the intelligent designer may in fact be a hyper-intelligent race of aliens from another galaxy!"

Cook's approach is to present competing factoids so that, as the back cover of the book advises, "You, the reader, can make up your own mind." No one, layperson or not, can make an informed decision about a highly technical subject like evolution on the basis of a sequence of 100-word factoids.

It does not help that Cook conflates "intelligent design" creationism with creationism in general, as when he notes, incorrectly, that "intelligent design" creationism uses the supposed absence of transitional fossils as evidence against speciation or macroevolution. It also does not help that the book is badly proofread and contains a number of annoying factual errors. For example, contrary to Cook, Darwin was unaware of genetic variation and genetic drift. Galileo did not devise the heliocentric theory in 1616 (nor at any other time). Darwin did not publish the *Origin of Species* in 1859 when he "got wind of a similar theory being proposed by fellow naturalist Alfred Wallace"; Darwin and Wallace published jointly in 1858, the year before the *Origin* was published. Design does not necessarily imply purpose. Energy is not exerted; entropy is not lost energy or "spent energy that loses its direction." The No Free Lunch theorems are not physics. Genesis and the fossil record do not agree. And so on.

Cook writes, "Evolution is a theory in the sense that it is a story about how all past and present life on our planet came to be as it was, and as it now is." If he thinks that a scientific theory is just a story, then it is no wonder that he cannot choose between evolution and creationism. Cook goes on to say that "scientists are more likely to simply assume the idea of evolution from the outset ..." as if that assumption were an arbitrary choice based on faith. Scientists, he says, could in principle "find data which simply cannot be made to fit with the theory of evolution. This [finding] would imply that the theory of evolution is wrong." He then argues, correctly but inconsistently, that scientists "constantly" find things they cannot explain but, rather than doubt the theory of evolution, try to explain any apparently anomalous results within the context of the theory. "So," asks Cook, "is it possible to challenge the validity of the theory of evolution?" The short answer is no, probably not. The theory of evolution is far too well established to be challenged, for example, by a handful of anomalous data or carping criticisms based on tenuous concepts like specified complexity or irreducible complexity.

The structure of the book is like a he said–she said story: "intelligent design" creationism says this; evolution says that. Or sometimes evolution says this; creationism says that. Almost no argument runs longer than one page, and they are mighty small pages at 5 x 7 inches.

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Arguments on both sides are presented without comment; readers are left to decide which arguments they prefer, but they are given no guidance whatsoever. For example, Cook repeats uncritically William Dembski's spurious claim that the No Free Lunch (NFL) theorems prove that no search algorithm performs better than a blind search. On the facing page, he notes that evolution has no target and that the NFL theorems do not apply to co-evolution. But he leaves out the crucial fact that Dembski is prevaricating: the NFL theorems do not apply to a single search algorithm in a single environment (that is, a single fitness function) but to the average over all fitness functions. In other words, the NFL theorems are irrelevant to evolution under any conditions, and discussion of a target or coevolution is beside the point.

As a specialist in optics, I was particularly amused by Cook's uncritical repetition of the creationist claim that the parts of the eye are arranged precisely as a human engineer would have arranged them. I do not know about Cook's eye, but mine would be a lot better if the nerves were not on top of the retina. As it is, the nerves have to pass through a hole in the retina, and we can get glaucoma if the tensile force on the nerves gets too great. In addition, if I were designing an eye, I would have made the retina lie on a plane, I would not have designed such a small area of high resolution, and I would have made a lens that did not get stiff and opaque with age. I suppose an automatic exposure control would have been a bit too much to ask for, but at a minimum I would have made the nerves that attach to the rods and cones go to different parts of the brain so that the user could switch rapidly between rods and cones and not have to wait minutes or longer to accommodate to darkness. Nature did what it could with the materials at hand, but, frankly, if I had been around at the appropriate time, I might have made some good suggestions. Cook observes that biochemists sometimes reverse-engineer a system and says they find "design decisions" built into those systems; he uses the possibility of reverse-engineering as evidence that biochemical systems may have been designed. I certainly hope they are better designed than my eye, but I doubt it. Indeed, I would argue that the existence of demonstrably suboptimal systems militates against a design argument.

Not everything in this little book is bad. But, apart from the errors, Cook's dogged refusal to take a stand is vexing, if not downright irresponsible. Not every question has two sides, and some truth claims are better supported than others. "intelligent design" creationism is bunk and should be treated as such.

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Mammals Who Morph: The Universe Tells Our Evolution Story, Book Three

by Jennifer Morgan
Nevada City (CA): Dawn Publications, 2006. 48 pages

Reviewed by Lisa M Blank

"Long ago, humans intuited that the Universe had a beginning, and told creation stories the world over. Science now confirms that ancient tradition."

— Jennifer Morgan

Mammals Who Morph is the third and final book in Jennifer Morgan's trilogy for children on the earth's history, preceded by *Born with a Bang* and *From Lava to Life*. As in her previous two accounts, Morgan's chronicle opens with a "Letter from the Universe" in which the reader is invited to follow the universe's life story, as told in first-person by the universe.

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As readers, our time travels begin with "mousy mini-mammals" who "ruled the nights" in a world of giant dinosaurs "who ruled the days"; that is until the great meteor struck the earth 65 million years ago. The mini-mammals then disperse across the land, sea, and air, with some mammals returning to an "easier life" in the seas.

Along the way, Morgan effectively demonstrates the powerful force of co-evolution using an example of the bargain struck between horses and grasses. "Unlike other plants, grass grew from the bottom so it didn't get damaged when the top was eaten ... over time the horses ... had just the right teeth for grinding grass." Hominins enter the story wielding a variety of tools and strategies for survival, capturing the power of fire and sun, and close the story by confronting the current environmental crisis with the "creative powers of the universe that reside within each of us: imagination, love, and decision making."

Throughout the storyline, the universe moves from "crisis to crisis". In each episodic occurrence, Morgan characterizes the crisis as an opportunity for inventiveness and emphasizes how the interconnectedness of all life forms is very much in evidence today. For example, a lightning storm brings fire to the humans; a human's backbone was "fashioned by fish"; the deepest part of the brain was "built by reptiles"; the cells "are directly descended from ancient single cell organisms"; the rotating shoulder was "developed by primates in trees".

Morgan's tale is vividly told and thoughtfully supportive of teachers or parents who plan to use this narrative with their children. Each page contains a timeline of events and in the footer Morgan succinctly captures the science concept or concepts being developed. For example, when she relates how the "morphing of the earth" resulted in the creation of wide-open plains, the science concepts are listed as "Earth cools down and new partnerships form" and a page number links the reader to a more complete scientific explanation of the event. Morgan also provides the reader with a comprehensive list of books, videos, and websites

to use in extending the scientific concepts introduced.

While Morgan's combination of storytelling and science is a compelling format for young readers, it may also prove provocative for some. First Nations readers will likely be troubled by the reference to the peopling of North America via the Bering Strait; their creation narratives do not recognize migration from Asia. Is this a case where Morgan's personification of the universe undermines her effort to advance the reader's scientific way of knowing the world? Will the reader infer then that the theory of evolution is just another story?

As I pondered these questions and how Morgan might respond, I read Morgan's farewell to the reader. Here she explains that "God is purposefully not in the story so that it can be embraced by people of all religious traditions, or of none at all ... people usually refer to "God" as a transcendent, supernatural creator who exists outside the physical world ... today we're rediscovering a sense of divine creativity, not simply in the transcendent mode, but also as immanent, as present in the Universe itself."

While this adieu did not provide an answer to any of my questions, I do know this. In these pages Morgan elegantly captures the richness and wonder of an interdependent and ever changing world where who we are cannot be separated from where we are.

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A Jealous God: Science's Crusade Against Religion

by Pamela R Winnick
Nashville (TN): Thomas Nelson, 2005. 368 pages

Reviewed by Jeffrey Shallit

Pamela Winnick is an attorney and former reporter for the *Pittsburgh Post-Gazette* who has written several articles that lean against evolution and in favor of "intelligent design". I recently forced myself to read her 2005 book, *A Jealous God: Science's Crusade Against Religion*. It was not a pleasant experience.

Winnick's book covers a variety of topics: abortion, population control, eugenics, medical experimentation, the Scopes trial, the theory of evolution, "intelligent design", and fetal tissue research. Her thesis — if this rambling, disjointed book can be said to have one — is contained in the book's final paragraph: "The Galileo prototype of the scientist martyred by religion is now purely a myth. Science long ago won its war against religion, not just traditional religion, but any faith in a power outside the human mind. Now it wants more" (p 298).

Throughout the book, scientists are depicted as crazed, power-hungry, and immoral. Only religion, Winnick implies, can rein in these dangerous nuts who threaten society.

Winnick's claim that "science long ago won its war against religion" is far too glib. Ironically, 2005 also saw the publication of Chris Mooney's *The Republican War on Science* (New York: Basic Books, 2005; reviewed in *RNCSE* 2005 May–Aug; 25 [3–4]: 45–6), a far better documented book that shows in depressing detail how American science has been subjugated to the political and especially religious goals of the Christian right.

Winnick's reporting is often sloppy. Incidents are slanted to support her thesis, names are misspelled (Stanislaw Ulam's last name is comically morphed into "Ulsam"; Richard Lewontin's middle initial is given incorrectly), quotes are mined (sometimes incorrectly), and some "facts" are just plain made up (see below).

Here is an example of a mined quote. Winnick claims, "In a 1997 piece in the *New York Times*, Dawkins famously remarked that anyone who does not believe in evolution is 'stupid, and ignorant and ... *wicked*' (emphasis added)" (p 161). However, Dawkins's actual remark was "It is absolutely safe to say that if you meet somebody who claims not to believe in evolution, that person is ignorant, stupid or insane (or wicked, but I'd rather not consider that)." Winnick entirely changed the meaning of the quote by replacing Dawkins's "or"s with "and"s. Further, Dawkins's remark did not appear in 1997; it appeared in an April 9, 1989, book review.

As might be expected of someone with no scientific training, Winnick displays multiple misunderstandings of science. In this, she joins several other lawyers who have criticized evolution, such as Phillip Johnson (*Darwin on Trial*), Norman Macbeth (*Darwin Retried*), and Dean Overman (*A Case Against Accident and Self-Organization*). (Oddly enough, the reverse case — evolutionary biologists writing books about law — does not seem to occur.) And despite the fact that Winnick claims to be a "practicing Jew and liberal Democrat", her book uses the same nasty and dishonest rhetorical tricks that are the staple of far-right Christian creationists.

First, let us look at some of Winnick's misunderstandings.

On page 110, Winnick claims that, although evolution cannot be observed, "evolution could be inferred from the rapid variations that occur *within* a given species. During his famed five-year voyage aboard the HMS Beagle, Darwin observed these variations first hand. On a stop in the Galápagos Islands, he noticed the different beak sizes and shapes among the finches that had flown in from the mainland, each settling on a different island" (emphasis in original). Winnick fails to understand that the Galápagos finches are *not* merely variations "within" a species (here she merely echoes a typical creationist objection to evolution), but different species — in fact, thirteen different species in the Galápagos. And of course, evolution *can* be observed, as speciation has been observed in both the laboratory and the wild. How many times can these creationist falsehoods be repeated? Why does Winnick not subject these false claims to some critical scrutiny?

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Later on the same page, Winnick writes (in a footnote), "The word 'theory' when used in science is different from its ordinary use. A scientific theory is considered virtually the same as fact." While the first sentence is correct, one can only stare open-mouthed at the ignorance of the second. A theory is *not* the same as a fact; otherwise how could one speak of competing scientific theories? Rather, a theory in the scientific sense is a coherent system of explanation for natural phenomena, testable by experiments, that makes predictions and explains observations. Some theories are better supported than others; only the really well-supported theories, such as gravity and evolution, can be considered as similar to facts, keeping in mind that in science *every* explanation is provisional.

Winnick also claims that "Darwin's theory was inspired not by science, but by the politics of his time" (p 111). Although it is true that Darwin hit on natural selection by an analogy with Malthus, it is misrepresentation to suggest that his theory was inspired by politics alone. Has Winnick never read the *Origin of Species*? If so, she would have known that Darwin patiently built his scientific case for evolution on a host of supporting facts, not politics. And her history is wrong, too, since Darwin began his transmutation notebook (the "B" notebook) in 1837, but did not make the connection with Malthus's essay until 1838.

But then, Winnick is no stranger to misrepresentations. In 2001, she claimed, "I am, however, writing a book about the subject showing how the media and scientific elite has stifled meaningful debate on the subject. In doing so, I am indeed supported ($25 000) by the Phillips Foundation, an organization which takes absolutely no position on the subject of evolution, but which seeks to promote fair and balanced reporting in all subject areas." However, Wesley Elsberry took a look at the Phillips Foundation web page and found that Winnick's fellowship was then described as follows: "Project: 'Examination of How Media and Established Scientists Treat the Subject of Evolution,' analyzing why there seems to be little tolerance for teaching creationism in America." (See <http://www.anti-evolution.org/events/pbsevo/wre_prw_20011129.html> for details.) Since then, the Phillips Foundation has altered its web page and the description of Winnick's project.

Another creationist trick that Winnick uses is credential inflation. Phillip Johnson, a law professor with no biological training, is described as "brilliant". Ironically, on page 195, Winnick asks, "how likely was it that Alec Baldwin or Kim Basinger or any of the many other glitzy Hollywood stars had ever seriously studied biology or understood Darwin's theory of evolution by natural selection or ever read anything on the subject other than PFAW press releases?" Offhand, I'd say it is about the same likelihood that Phillip Johnson or William Dembski or David Berlinski has seriously studied biology, but Winnick does not hesitate to tout *them* as experts.

No creationist saw is too unreliable for Winnick to repeat. Here are a few examples:

A nameless Chinese paleontologist is quoted on page 198 as saying, "In China we can criticize Darwin, but not the government; in America, you can criticize the government, but not Darwin." Neither Winnick nor others who have used the quote, including Phillip Johnson and Jonathan Wells, have ever identified the paleontologist or provided any corroboration for the anecdote.

On page 122, two brief quotes from mathematicians expressing skepticism about the mathematical feasibility of neo-Darwinism are presented as representing the consensus of the 1966 Wistar Institute Symposium. Winnick says that their dissent was ignored and their objections "faded into oblivion" because of ideological resistance, not considering the possibility that they were mistaken.

Fred Hoyle's "tornado in a junkyard" objection to current theories of abiogenesis is mentioned on page 172 as if it represented a scientific result rather than his own expression of incredulity and as if no progress had occurred in origins-of-life research in the 25 years between Hoyle's comment (in his 1983 book *The Intelligent Universe*) and Winnick's book.

Liberal Democrat or not, this book cements Pamela Winnick's reputation as a flack for the Christian right. It is not a fair, reliable, or objective look at the battles between science and religion. It appears to me that Winnick has a bad case of science envy.

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Dinosaurs: The Most Complete, Up-to-Date Encyclopedia for Dinosaur Lovers of All Ages

by Thomas R Holtz Jr,
illustrated by Luis V Rey
New York: Random House,
2007. 428 pages

Reviewed by Randall B Irmis

There is no shortage of dinosaur books for children, and this is reflected by Tom Holtz's admonition on the inside flap that "the world doesn't need another A-to-Z list of dinosaurs." Typically, dinosaur books are organized by name, vague groupings of creatures, or by time period, rather than any evolutionary or biological theme. Many of these volumes have passable to excellent art, but are light on scientific content, and more informative books are generally inappropriate for children. What, then, does this new book offer over other popular dinosaur books?

The major strength of *Dinosaurs* is that Holtz has done an excellent job explaining dinosaur science as a process; that is, how paleontologists understand the biology of dinosaurs through inferences from the fossil record.

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There are four basic sections of the book: basic principles of dinosaur science; the relationships and major groups of dinosaurs; the evolution of Mesozoic faunas through time; and dinosaur paleobiology; and each is infused with explanations of how science is done. Complex topics are clearly explained in a way that both children and adults will understand. Particularly impressive is that Holtz spends an entire chapter explaining the principles of cladistics, the method by which scientists reconstruct the evolutionary relationships of organisms. Although cladistics is fundamental to modern organismal biology, few popular books (and perhaps no children's books) tackle the subject in any detail, and Holtz should be applauded for taking the plunge. This explanation is also practical for the reader, because Holtz often refers to cladistics in other sections of the book when explaining the relationships of dinosaurs and how scientists make conclusions about dinosaur paleobiology.

Another advantage of this book over others is the inclusion of sidebars written by a variety of dinosaur experts. These short articles cover topics that are not directly discussed in the main text, including dinosaur growth, diseases, and feeding. Not only do these sidebars broaden the topics discussed in the book, but also they introduce a diversity of opinions and information that wouldn't be possible with a single author. The quality of these contributions varies (some are more informative than others), but they are superb overall and put the book on a level above most other children's dinosaur books.

Dinosaurs may not be the first book that I'd reach for to teach children about evolution, but it does an excellent job integrating the principles of evolution and natural selection into the discussion of dinosaur topics. Evolution is used to explain how we know the relationships of dinosaurs, provide hypotheses about dinosaur behavior, and explain why different growth strategies might be beneficial. Holtz's introductory chapter on evolution is short, but it effectively communicates the basic principles of natural selection and concepts like the evolutionary tree of life.

This is one of the best popular dinosaur books I've read. Although focused for children, it will also be informative for students and adults. The book is packed with up-to-date and clearly explained information, and the author maintains a website for future updates (<http://www.geol.umd.edu/~tholtz/dinoappendix/>). Given the information content, clear explanations, full-color semi-glossy printing, and hardback binding, this book is an excellent value at the list price of $34.99.

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The Voyage of the Beetle: A Journey Around the World with Charles Darwin and the Search for the Solution to the Mystery of Mysteries, as Narrated by Rosie, an Articulate Beetle

by Anne H Weaver
illustrated by George Lawrence
Albuquerque (NM): University of New Mexico Press, 2007. 80 pages

Reviewed by Jason R Wiles

Its title easily recognizable as a play on that of Darwin's own volume, Anne Weaver's *The Voyage of the Beetle* is a fanciful account of the historic circumnavigation from the perspective of Rosie, another passenger on the *Beagle* who happens to be a rose chafer beetle (*Cetonia aurata*).

Those acquainted with books on evolution for young readers will probably, and fondly, recall *The Sandwalk Adventures* (2003), Jay Hosler's delightful graphic novel in which Darwin is similarly associated with a storytelling arthropod. And while the subject matter and the intended age level may overlap, there are marked differences between these two works. For example, in *Sandwalk*, Mara, a young follicle mite and resident of Darwin's left eyebrow, is unfailingly respectful to Darwin, calling him "sir" while she wrestles with his insistence that he is not, as she has always believed, an all-powerful god called "Flycatcher", an allusion to his moniker among the *Beagle*'s crew. Mara listens raptly as Darwin explains his theory of natural selection and debunks misconceptions about evolution such as, for example, that individuals (rather than populations) evolve — a misconception retained in Weaver's definition of adaptation in *Beetle*'s glossary, which suggests, erroneously, that adaptation in animals is achieved "by learning".

Rosie contrasts starkly with Hosler's reverent Mara. She has been a constant, though independent, companion of Darwin since the young naturalist discovered her under a rock, and she rather familiarly calls him Charles — which she prefers over his "silly nickname of Gas." Fortunately, Rosie followed a most unbeetlelike whim in her decision to forsake a comfortable life among England's rosebuds to join Darwin in his travels. Otherwise he might never have discovered his solution — descent with modification via natural selection — to "the mystery of mysteries", the origin of new species.

Darwin is already pondering questions about the diversity of life as the story begins, sometime before the *Beagle*'s embarkation. Even at this point, Rosie hints that she was aware of the workings of evolution, since "beetles have been around for more than 200 million years" and thus "have an ancient and unique vantage point when it comes to the mysteries of nature."

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However, describing Charles as resistant to suggestions or advice, Rosie decides to guide him toward a solution, challenging the reader to figure it out before Darwin.

Recounting the five-year voyage, Rosie colorfully describes several members of the ship's crew and a few particulars of life at sea, which, to say the least, was uncomfortable for Darwin. Although she portrays him as "a restless and irritable cabin mate," Rosie sympathizes with Darwin over the cramped conditions and his seasickness. She also commends him for faithfully recording and sketching countless and amazing species of microscopic creatures collected via plankton nets, and admires his enthusiasm for such discoveries. At this point, however, our coleopteran narrator turns to well-intended subterfuge, covertly scribbling clues into Darwin's notebook in hopes that she can lead him toward the answer to "the mystery of mysteries".

Rosie's clues are drawn from their encounters with the organisms and environments of South America, the Galápagos, and a few stops in the southern Pacific. They essentially comprise the basic tenets of Darwin's theory (variation exists among individuals of a species; some individuals have traits which give them advantages in the struggle for life; those that survive pass on their traits to offspring) as well as observations about geologic change, comparisons between extinct and extant organisms, and the inference that the diversity of living things has changed over time.

After their return to England, Rosie explains, she "continued to accompany Charles on long walks" where she listened and waited for him to figure out what all the clues meant, and she lists them again for the reader to ponder. A solution is offered in the final chapter which condenses Darwin's theory and a few supporting concepts in a scant three pages.

Although Darwin is often portrayed in *Beetle* as fussy, clumsy, and at times obstinate, he is more often described as insatiably curious, brilliant, and congenial. In the afterword, Weaver explains, "the comical incidents included in this book were chosen to show that Darwin was open to new experiences and able to laugh at himself." Indeed, the book does paint Darwin as likeable, as do the wonderful illustrations by George Lawrence, which refreshingly portray a youthful and spry Darwin with locks of "fly-away red hair" rather than the wizened old sage of Down.

Sundry references to Darwin's training in theology (curiously defined in the glossary as being specific to Christianity) and associations with missionaries on his travels are no doubt intended, and may well help, to make him and the book more palatable to potentially wary Christians. Rosie describes Darwin as a loving husband and father as well as having a deep and caring respect for others. Noting his vehement opposition to slavery, she explains that he had been "much grieved by the misery" of the slaves and that such cruelty was "a mystery that even Charles could not fathom."

Such efforts to depict Darwin as the genius and grand human figure that he was, and such efforts to acquaint young readers with evolution and natural selection, will always get my nod of approval, even if a number of errors detracted from my enjoyment. (For example, spiders are included among Rosie's "insect companions"; a tsunami is called a "tidal wave"; Darwin is described as the *Beagle*'s naturalist — a legend that Stephen Jay Gould [1977] was fond of dispelling.) And *Beetle* is such an attractive book that it is sure to catch the attention of youngsters. I'd like to see *Beetle* in the hands of children of the appropriate age, especially if they have knowledgeable parents and teachers nearby to shore up the details, catch misconceptions, and answer the questions that are sure to arise. As Weaver aptly states, "one mystery leads to another."

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God and Evolution: A Reader

edited by Mary Kathleen Cunningham
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385 pages

Reviewed by James F McGrath

Mary Kathleen Cunningham's reader *God and Evolution* provides an up-to-date collection of key excerpts from the most important representatives of various positions and viewpoints on this subject. Each section begins with an introduction that helps guide the reader to important similarities and differences between the selections, filling in useful background knowledge that makes the readings themselves more accessible.

The first part, on methodology, is focused primarily on method in theology, with a consideration of how language and method in theology relate to language and method in science. This section would have benefited from the inclusion of a discussion of what science is, and how it works, written by a philosopher of science or a biologist who was not specifically concerned to make a comparison with religion. Nevertheless, what is included is extremely helpful. The excerpt from the nineteenth-century Protestant theologian Charles Hodge illustrates that, when Christian fundamentalism first developed, it did not regard a young earth as one of the fundamentals that gave the movement its name. The other excerpts in this section are by Sallie McFague, Mary Midgley, and Ian Barbour, and reflect a more mainstream approach to religious language and theology.

Part two presents evolutionary

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theory, with excerpts from Darwin's *Origin of Species* as well as works by Francisco Ayala and Michael Ruse. The latter are appropriate choices, since these individuals illustrate that a Christian can be a prominent evolutionary biologist, and that an atheist philosopher of science can see no inherent incompatibility of evolution and Christianity. Both Ayala and Ruse distinguish between the fact of evolution, the path of evolutionary development down the ages, and the mechanisms that drive evolution. The distinctions are important ones that are often overlooked when people discuss evolution in theological contexts.

The third part, entitled simply "Creationism", is rather more problematic. It consists of only two readings. The first is simply the first two chapters of Genesis. It was a good choice to use the New Revised Standard Version translation, which neither presupposes that the creation described was a creation out of nothing (the Hebrew in Genesis 1:1 is ambiguous on this point), nor tries to cover up elements of a pre-scientific worldview such as the dome of the sky. Yet it would have been appropriate to provide an example of scholarly treatment of these chapters, showing that the order of the days has more to do with parallelism than chronology, that there in fact seem to be two creation stories in these chapters, and so on. Without such analysis of the Bible itself, it is that much harder to get young-earth creationists over the hurdles that keep them from accepting evolution. It might also have been useful to include here something written by a young-earth creationist author. Nothing is more effective in persuading students of the bankruptcy of the young-earth creationist approach than allowing them to read what they themselves have to say, coupled with insightful scientific and theological analysis of their arguments by people like Kenneth R Miller. Nevertheless, the second reading in this section, a historical overview of young-earth creationism by Ronald Numbers, is very helpful.

Part four deals with "intelligent design", beginning with William Paley's famous argument. The chapter by Michael Behe makes the case for "intelligent design" as well as it possibly can be made, with the result that Miller's response in the chapter that follows becomes all the more effective, showing how much of the evidence Behe says would disprove his claims actually exists.

Part five presents proponents and critics of forms of metaphysical naturalism based on evolution. The excerpts from Richard Dawkins and Daniel C Dennett are excellent examples of their views and of their delightful writing style. Mary Midgley's short piece points out that Darwin himself denied that natural selection is an all-encompassing explanation in biological change over time, much less in economics and other areas. Another (very short) excerpt from Ruse rounds off this section.

Part six is entitled "Evolutionary Theism" and presents a diverse group of theologians united in their acceptance of evolution and their openness to incorporating the relevant scientific data into their theological reflections. Howard Van Till points out a number of ironies that typify both extremes in many discussions of this subject. Arthur Peacocke's piece nicely complicates the oversimplified view that many have of the relationship between Darwin's theory and faith, pointing out that initially there were many in the religious community who embraced evolution, just as many in the scientific community were exceedingly skeptical. Jürgen Moltmann's contribution is an example of the wonderfully creative and exciting theological thinking that he has offered on the subject of creation. The section's final piece by Elizabeth Johnson complements the others, discussing concepts such as that of the soul and incorporating a number of important quotations by a variety of theologians and scientists.

I am puzzled by the editor's decision to place an excerpt by John Haught in the seventh part, "Reformulations of Tradition". Haught represents a Roman Catholic theological outlook very much in line with those offered in part six — indeed, Haught draws heavily on Moltmann's ideas in places, and is, like Peacocke, a panentheist. The other pieces in this section — by Sallie McFague, Ruth Page, and Gordon Kaufman — sit more comfortably under the rubric of "revisionists". McFague explores the idea of the universe as God's body, combining a number of already-existing models in innovative and creative ways. Page suggests that it is more appropriate to speak of God being with everything than in everything in what may perhaps be the least helpful excerpt in the collection, since Page seems to conflate the idea of everything existing in God (panentheism) with the idea that God is in everything. Finally, Kaufman suggests that it is more appropriate to think of God as creativity rather than creator in the context of our current state of scientific knowledge.

On the whole, *God and Evolution* is a useful reader, although some examples of non-Western perspectives might have made the diversity of the book richer still. Quibbles about what was and was not included aside, for most American readers with some background in or contact with conservative Christianity of an anti-evolutionary sort, this book will provide helpful information that will enable readers to understand what is at stake and navigate the current debates over God and evolution in a more well-informed manner.

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[*For a longer version of this review, visit <http://exploringourmatrix.blogspot.com/2007/11/review-of-god-and-evolution.html>.*]

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